Liber Amicorum

H. JAAP VAN DEN HERIK

THE TILBURG YEARS

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Preface

Those who have the privilege to know him personally all agree on one thing: there is never a dull moment when Jaap is around. With boundless energy, a drive for perfection, infectious humour, and a sharp mind, Jaap shapes and influences the people around him. Much of what he does is the result of two of his characteristics: his compassion for others and his devotion to teaching young academics. This volume, written by his former Ph.D.-students, bears witness to Jaap's character.

Jaap van den Herik started his academic career by studying Mathematics. His wide interests allowed him to move on to Computer Science, and subsequently to Law. In 1987 he was appointed as Professor of Computer Science in Maastricht, a position that he combined with a Professorship of Law and Computer Science in Leiden a year later. In 2008, Jaap moved to Tilburg where he became Professor of Computer Science; there, he was the driving force behind the newly established Tilburg center for Creative Computing (TiCC), of which he served as the first director. During his Tilburg years (from September 2008 up to January 2016), Jaap's inexhaustible energy and contagious enthusiasm led to a large number of inspiring scientific projects and a steady outflow of Ph.D. theses on a wide variety of topics. The authors of these theses, the so-called Tilburg promoti, have in many ways been affected by the unique and stimulating supervision of Jaap.

About a year ago, we invited each of them to honour in writing Jaap's contribution to science and to their career. The results of their submissions are collected in this Liber

Amicorum. The topics, content, language, length and style of the submitted texts are as rich and inspiring as Jaap's academic life in Tilburg has been. They range from a two-page note, to a full scientific article, to a comic strip. Still, there is a common denominator that underlies all contributions: the respectful recognition of Jaap's commitment to science and his personal commitment to his students.

On the final pages of this Liber Amicorum, we have included a list of all Tilburg Ph.D. students supervised by Jaap to date. It is an impressive list, which is still to grow in the years to come. We can think of no more fitting way to pay tribute to Jaap's Tilburg years than with a collection of spirited contributions written by his Tilburg promoti, to whom he devoted so much of his time and energy. We are proud to honour our friend and colleague with this Liber.

Tilburg and Leiden,
January 2016

Joke Hellemons
Corien Prins
Aske Plaat
Eric Postma

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The lovely and hard working Jaap

Agus Gunawan

Abstract

All change begins with a first step. For instance, my decision to pursue my Ph.D. research at Tilburg University changed my life profoundly. During my research under the supervision of professor van den Herik, I learned many things, which made the period an invaluable and particularly interesting experience. For sure, without Jaap my Ph.D. thesis would not have been completed. His valuable ideas, recommendations, constructive comments, and supportive opinions guided me in achieving my big ambition. His precision in reviewing my drafts and supervising my Ph.D. research inspired me to become a good academic staff member at my own university. This contribution explains how professor van den Herik has become my academic role model.

1.1 Introduction

The primary objective of writing a Ph.D. thesis arose from the observation that it was difficult to have reliable access to information on Small and Medium Enterprises (SMEs) in Indonesia, especially on Indonesian SME Garment Manufactur-

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ers (ISGMs). The more I worked with ISGMs, the more I understood the variety of challenges they faced in the globalised world. I realised that I faced a considerable challenge.

A globalised world may have both positive and negative impact on ISGMs. In the recent past dealing with globalisation turned out to be very hard for ISGMs. Should they produce and sell their products to domestic markets, to foreign markets, or to both? ISGM managers have to make qualified decisions even when under time pressure. As a consequence, they have an urgent need for direct access to reliable information that can support their decisions. My goal was to help the managers by enabling them to understand their business performance. My solution was to develop a Knowledge-intensive System that had adequate knowledge and was able to support the managers.

Once I was convinced of the idea, I received further encouragement from my family, colleagues, and friends to pursue a Ph.D. program. The Japan Indonesia Presidential Scholarship Program, managed by the World Bank, provided me with a scholarship that enabled me to realise my ambition. So, on one day, my host university, Parahyangan Catholic University (UNPAR), received the message that I was accepted as a Ph.D. student at the Maastricht School of Management (MSM). A year after I joined MSM, I discussed my research idea with professor van den Herik and became involved in the MSM-Tilburg University partnership. I learned many things from professor van den Herik, my supervisor, and my two co-supervisors, Dr. Wahdan and Dr. Van de Walle.

I owe a great deal of appreciation to professor van den Herik who has provided me with professional guidance throughout my Ph.D. research. I am still amazed by his willingness to spend such an abundance of his time to check and to revise my work. In particular I am happy to have frequently visited him at home (once in the vacation period and several times on Saturdays) to discuss my work. Professor van den Herik even took my chapters with him during his holidays. I believe that there is no unproductive time for him. Jaap is really a hard worker. Let me tell you the story about professor van den Herik that explains why he became my role model. I will use some of his utterances as section headers followed by a brief story that explains the meaning of the utterances.

1.2 Work hard - it pays off in the end

> "A dream doesnt become reality through magic; it takes sweat, determination and hard work."
> — Colin Powell

The above inspirational quote by Colin Powell is a synthesis of the advice given by professor van den Herik when I met him for the first time in his office at Tilburg University. I was introduced to him by Dr. Mohamed A Wahdan. Professor van den Herik welcomed us warmly. We had a good discussion and I got the message: to be able to obtain my Ph.D. title, I should work hard. He showed me a collection of 53 Ph.D. theses that were supervised by him. He remembered the contents of each thesis and suggested me to read some of them that were related to my research topic. Apart from being a supervisor of Ph.D. students, I knew that professor van den Herik is also active in various organizations and journals. From these facts, I drew the following conclusion: Jaap is really a hard worker. A long road with lots of struggle and hard work were ahead of me. But, it was comforting to be supervised by an excellent supervisor who always guides me to reach the faraway destination. He provides a real example of what working hard means. The challenging question is whether I can follow him in his footsteps, with his diligence and speed?

1.3 Mastering your concepts - use everyday examples

> "I once had a professor who could condense an entire lecture into a can of frozen orange juice. Talk about hard to concentrate." — Jarod Kintz

Professor van den Herik always challenged me to "master my concepts." The best way to do that is to explain the concepts in terms of everyday examples. His examples are easy to remember. Below is an illustration of such an example.

> Now we need to emphasise the transition from data via information to knowledge. We take an example by van den Herik [1]. Assume that the following data have been registered into a database system in a Dutch organisation: 471008192 jaapherik@hotmail.com +31134663569 DZGL17. There are 48 characters in the data. We are interested in their meaning. It is not the intention to solve puzzles, but to give some insight into the difference between data, information, and knowledge.
>
> Based on a general understanding, we observe that there is information about an e-mail address in the data. We may conclude that, because there is the character @, which commonly refers to an e-mail address. Here: jaapherik@hotmail.com. The character +31 refers to a phone code (internationally recognised) for the Netherlands. Here: +31134663569 is a

Fig. 1.1 Professor Jaap van den Herik with Dr. Mohamed Wahdan.

phone number in Tilburg. The initial figures (471008192) may indicate a Burgerservicenummer (residence code in the Netherlands), a bank number, or other identification numbers. With prior knowledge on any code system in the Netherlands, the first six characters of the information may indicate a birthday; and with prior knowledge on the military code system, 192 means that the child was the 192nd child (or boy) born on that day. The last six characters of the data series (DZGL17) refer to the license plate of a car. So, we have 48 characters (data) into four types of information. When we have the information interpreted, we have a sense of the information on military registration, an e-mail address, a telephone number, and a car license plate.

At this point, we have given a meaning to the full series of data. This implies that the data is now transformed into information. Adding the assumption that all information is related to Jaap van den Herik, we are on our way to transform the information on van den Herik into knowledge on van den Herik. For instance, with prior knowledge, the combination of the car license plate tells us that the car is an old edition. So we may state that van den Herik drives an old car. In summary, knowledge is information within a context.

1.4 *Fantastic!* - a compliment and a very effective encouragement

> "It's not how we make mistakes, but how we correct them that define us" — Rachel Wolchin

Even for a scientific paper, a lot of revisions are required before a reasonable final version is obtained. Each revision leads to a stronger understanding of my research topic. Professor van den Herik always explained the reasons behind the revisions. Not only that, he also checked and made corrections to every single word in the paper. When I came back from Tilburg to Maastricht with a huge number of revisions, some of my friends laughed and pitied me. I replied that the huge number of comments showed that professor van den Herik really read my work and that it motivated me to improve my work. I told them that the huge amounts of work and tiredness disappear every time professor van den Herik welcomed me in his office with the word *Fantastic*, which means that it is good work - at least for that stage. I am not as brilliant as professor van den Herik but for sure I will try my best to work very very hard while expecting and hoping him to say the magic word: *Fantastic*.

1.5 Holidays = more work days - an amazing fact about Jaap

> "Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do." — Steve Jobs

The most amazing fact about professor van den Herik is his productivity and his love for his job. Every time he has vacation, he will bring along the drafts of his students for revision. He reads and makes comments during his vacation. So, holidays is mainly an extension of his working hours during which he becomes even more productive. Personally, I was also invited to his house on Saturdays or during short holidays for the discussion of my drafts. I really appreciate his willingness to share his private time with us, his Ph.D. students. His wife and his daughters also receive me warmly. On one side, I felt unconformable as I realize that his vacation may be ruined by me. But on the other side, I felt really happy because after having visited his house I made huge improvements on my work. I never seen such a kind of professor in Indonesia. He is inspiring others through his actions. That is why I admire him so much.

Fig. 1.2 Prof. Jaap van den Herik with Prof. Dragan Nikolik and Dr. Mohamed Wahdan during my M.Phil. Defense.

1.6 A rich source of inspiration

"A professor is someone who talks in someone else's sleep." — W. H. Auden

His actions inspire many people. Professor van den Herik also inspired me by the way in which he supported his daughter, Larissa van den Herik, for obtaining her professorship. On 29 June 2012, I had the privilege of attending her inaugural address in the field of Public International Law at Leiden University. She obtained her professorship at a young age. This made me and some colleagues from Parahyangan Catholic University aware of the need to improve ourselves though qualified publications. Since that time, we collaborated intensively on many papers.

Fig. 1.3 Professor Jaap van den Herik during the Ph.D. defense of Najja Terry Kakeeto-Aelen

1.7 Take care of your student - a caring personality

"The greatest treasure in the world is the presence of family and buddies." — Agus Gunawan

Besides his academic competencies and diligence, professor van den Herik also has a very lovely personality. He cares for his students. The following example provides evidence of that. When I had to return to Indonesia because my father was hospitalized in intensive care, Professor van den Herik took care of my obligations for the preparation of my Ph.D. defense. Together with Mrs. Joke Hellemons, he took care of the distribution and practicalities of my thesis. I really appreciate his lovely personality and that of Mrs. Hellemons. They became part of my family in the Netherlands.

Fig. 1.4 Powerpoint slide showing the contributors to my Ph.D. thesis

1.8 The lovely & hard working Jaap

"I am what I am today because of the choices I made yesterday." — Stephen Covey

My stories above explain why I called professor van den Herik a lovely and hard working person. "Lovely" and "hard working" are the two concepts that cross my mind whenever I think about him. A very humble person but also a very competent professor who cares for his students. A person who loves his job and welcomes his student to his house (a not ordinary Dutch person, at least from my point of view). An inspiring professor who is accepted internationally. Although he is retired from Tilburg University, he made an enormous positive impact to the Tilburg community, in particular to his Ph.D. students. His style become an ideal role model for me. I believe that my personality and behavior changed after being supervised by him for four years and nineteen days at Tilburg University. The changes led to good positions

and success for me. My success today is because I made a right choice to study under professor van den Herik's supervision. Thank you professor Jaap van den Herik!

Fig. 1.5 Professor Jaap van den Herik at the end of my Ph.D. defense.

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Chapter 2

Jaap

Ben Torben-Nielsen

Jaap was one of my teachers. Not only as a PhD supervisor, but also while I was a student of Knowledge Engineering at Maastricht. The first time I really got to know Jaap was during one of the coffee breaks when I was sitting for a quick coffee in the pub directly opposite our faculty building, *Café Tribunal*. It was Jaap's birthday and he offered a fellow student and myself a coffee. I was greatly and positively surprised. As a Belgian I (thought I) knew that professors don't intermingle with students. Jaap was one of the first open-minded, Dutch professors I met. Moreover, Jaap enjoyed our company and we had a nice discussion about one of the many provocative statements during his lecture ("Computers can be better at religion than humans by 2060"). A little while later I had my first academic job in the computer science departments at the University of Maastricht headed by Jaap at that time. Fast-forward another four years and Jaap became my promotor when I did my PhD; another four years later I was Jaap's first student to graduate from the Tilburg Institute of Creative Computing (TiCC #2). As such, I can say Jaap and I have quite a history!

So far, during my own academic career, I have seen science changing a lot. Not to mention the bureaucratic overhead and the introduction of industrial management styles, but even a change purely in scientific content. During my PhD, I wrote a tool to perform evolutionary optimization on a given parameter set. Moreover, one of my papers (as a single author - in my youthful naïveté and enthusiasm I wanted to show

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to be able to successfully write a paper without supervision) is about evolutionary optimization. Nowadays, there is little active research in which evolutionary algorithms is the goal itself. Evolutionary algorithms have become standard optimization techniques and are the means to reach some scientific goals, not the ends by themselves. This fact can be illustrated by an online search of a few minutes: many open-source evolutionary optimization libraries can be found in any conceivable programming language. Neuronal networks had a similar fate as they are not developed anymore in computer science but nowadays belong to the realm of a new field of scientific inquiry - computational neuroscience. New "artificial neural network" are now less and less inspired by the brain but rather have become applied statistics (i.e., "deep learning"). So within my own field of expertise, computational neuroscience, I have seen a profound change in scientific content over the last decade. Jaap obtained his PhD in 1983, one year after I was born. In 1983, there was no internet yet and artificial intelligence was still in its cradle (at least, so it seems to me). Today, we have self-driving cars and roughly every piece of consumer electronics contains more "artificial intelligence" than existed some decades ago. The internet is the carrier for an internet-of-things; intelligent things, that is. In Jaap's field, he witnessed the triumph of *Deep Blue* over the human world champion in chess. Jaap has seen and actively participated in all these developments. As a teacher he guided many students through their undergraduate and graduate studies. A challenging task given the exceptional volatility of the subject! Artificial Intelligence has become a household term and people read about the "singularity" on a regular basis in popular press. Without a shadow of doubt, Jaap managed to stay up to date in this ever changing and rapidly expanding field.

Chapter 3

The believer and the non-believer

Hans Stol

Abstract

Jaap van den Herik is a remarkable person. He is straightforward and obsessed by the capabilities of the computer. Jaap played an important role in artificial intelligence, and was one of the driving forces behind computer chess. I look back on my contacts with Jaap in two different ways: as a friend for having the same background and common memories and as a competitor due to our different beliefs in the capabilities of computers. The title of my contribution is taken from a statement by Jaap in one of the meeting with his Ph.D.s. He called me the "non-believer", meaning a non-believer in the capabilities of the computer to take over human activities. After all I think I am "a non-believer reassessed," because I think eventually Jaap is right. In my conclusion I show why I still have my fears of computers thinking like human beings, because - as a consequence - human beings are losing their own capabilities and freedom to act.

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3.1 Introduction

In 1975, I met Jaap van den Herik for the first time. I was student at the Delft University and Jaap entered that year the University, assisting Prof. van der Poel. In 1976 we were shorty colleagues, as I was assistant to Prof. Brussaard (applied informatics) and we worked in the same corridor on the third floor at the Julianalaan 124, where the Faculty of Mathematics was located. Informatics was those days a part of the the Faculty of Mathematics! I still think that this was not a wrong place, as analytical thinking is the basis for applying computers in real world problems. I will come back to that later.

From April 2004 until February 2006 Jaap was my promotor. He supervised me in writing my dissertation, that was based on my experiences with the use of (computerised) information systems in the public and private sector. Hereafter I gave some lectures in Jaap's Knowledge Management course at Tilburg University.

The emphasis in this contribution is on the close connection between the believer (Jaap) and the non-believer (myself). So, I will give a short overview of the similarities and differences in our views and standpoints, the very close cooperation during the writing of my dissertation and some thoughts on how the computer has influenced our way of thinking, and on how the world has been changed by the computer.

3.2 Similarities and differences

Jaap was born in 1947, on the 8th of October. I was born one day later. Although not many (scientific and rational) people believe in horoscopes, sometimes we had remarkable common experiences. The similarities did not only appear in our (very early) interest in chess, mathematics and computers, but also in some aspects of our private lives.

During the past forty years Jaap and I met each other from time to time and in different circumstances. As I wrote in the introduction of my Ph.D. thesis, one of the occasions was on the 50th anniversary of Christiaan Huygens in April 2007: the start of the process that eventually led to my doctors title in February 2009.

Another meeting with Jaap was also a very special one. In October 1984 I organised an event on the occasion of the opening of the office at the Kalfjeslaan in Delft, of Orga-Info Nederland, a professional organisation in the field of organisation and information systems. I was director of that company. I knew of course the interest and knowledge of Jaap in chess computing. Jaap had many contacts in that field, amongst others with the programmers of Nuchess, those day one of the best chess programs in the world (see [1]). We can nowadays hardly imagine that to run this chess program a Cray 1 mainframe computer was needed (price about 1 M guilders).

I asked Jaap to assist us in organising an event in with chess and chess computing played a central role. The idea was the following. Korchnoi, one of the best players in the world those days, should play a game against Nuchess. After leaving the opening book of Nuchess the position of Korchnoi against Nuchess was taken by Bill Lombardy against Jan Timman. Those days Jan Timman was in the best of his carrier and Bill Lombardy was not playing very much, so that expectation was that the game between Jan Timman and Bill Lombardy could be very exiting. Unfortunately things went another way.

The start was already a bit unusual. I asked the Dutch Parliament Speaker, Dick Dolman, to put the first move on behalf of Victor Korchnoi. Of course I had to ask Victor for permission in doing so. I was surprised that he insisted in his own first move. The fact that Dick actually did the opening move (on the photo: Dolman, Stol, Korchnoi) was not a problem. Apparently Korchnoi was afraid and wanted to open with a unusual move: Pf3!

Fig. 3.1 Dolman, Stol, Korchnoi

In the meantime Jaap made contact (by phone) with the Nuchess team in the USA. Jaap commented on the game (see also his article in ICCA Journal [3]) and had to recall the second move of Korchnoi: c4. After this move of Korchnoi the Nuchess team announced that Nuchess was out of book . We decided to start the game between Timman (taking the position of Korchnoi) and Lombardy (taking the position of Nuchess) after the tenth move of Nuchess. The result was a disappointment for the believers in computer chess. Lombardy won quite easily (after 47 moves) as Korchnoi did (after 40 moves). However, one of the conclusions was that even a grandmaster was afraid of the power of the computer. Korchnoi did not trust a, freely chosen, opening move from Dolman (a very experienced chess player), obvious because he was not sure about the game with a normal opening! Nowadays, 30 years later, computers are serious competitors of grandmasters. It was not going as fast as Jaap expected but eventually it came true.

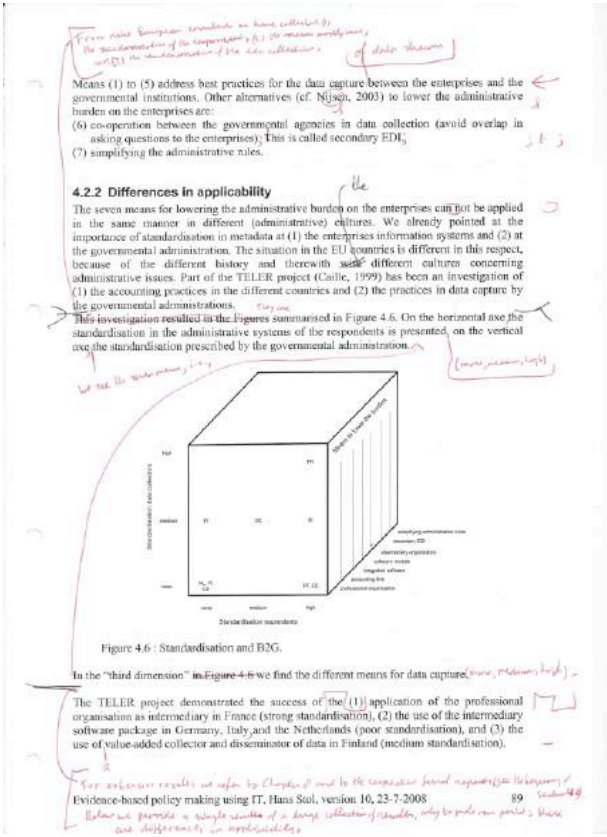
3.3 The process

In September 2007 I gave Jaap a very detailed outline of my thesis on which we agreed, as well as on the title: A Framework form Evidence policymaking [1]. The following year I wrote the paragraphs and sections according the schedule with regular feedback from Jaap. Every time I finished a part we made an appointment, sometimes in the University, in Jaaps home or in a restaurant.

The comments of Jaap were amazing: very detailed, with all kind of suggestions. His comments were also very precise, as shown in one of the pages of the draft of my thesis. Later I understood that giving these detailed comments (in red) was a characteristic for Jaap's supervision of his Ph.D.s. Jaap's suggestions intended, besides pointing at inconsistencies and implicit statements, to trigger the Ph.D. thinking about what he or she wrote.

I remember that there were only a few disputes on the content of Jaap's suggestions on the text. In those cases I wanted to introduce new issues, on which I knew I should come back later in much more detail. By the questions and remarks of Jaap, the readability of my thesis improved eventually as well as its quality.

I must not forget in this section to mention Jaap's intervention during the process of reviewing the thesis by the commission, eventually leading to a different title of the



Means (1) to (5) address best practices for the data capture between the enterprises and the governmental institutions. Other alternatives (cf. Nijsen, 2003) to lower the administrative burden on the enterprises are:

(6) co-operation between the governmental agencies in data collection (avoid overlap in asking questions to the enterprises); This is called secondary EDI;

(7) simplifying the administrative rules.

4.2.2 Differences in applicability

The seven means for lowering the administrative burden on the enterprises can not be applied in the same manner in different (administrative) cultures. We already pointed at the importance of standardisation in metadata at (1) the enterprises information systems and (2) at the governmental administration. The situation in the EU countries is different in this respect, because of the different history and therewith ~~with~~ different cultures concerning administrative issues. Part of the TELER project (Caille, 1999) has been an investigation of (1) the accounting practices in the different countries and (2) the practices in data capture by the governmental administrations.

~~This investigation resulted in the Figures~~ summarised in Figure 4.6. On the horizontal axe the standardisation in the administrative systems of the respondents is presented, on the vertical axe the standardisation prescribed by the governmental administration.

Figure 4.6 : Standardisation and B2G.

In the "third dimension" ~~in Figure 4.6~~ we find the different means for data capture.

The TELER project demonstrated the success of the (1) application of the professional organisation as intermediary in France (strong standardisation), (2) the use of the intermediary software package in Germany, Italy and the Netherlands (poor standardisation), and (3) the use of value-added collector and disseminator of data in Finland (medium standardisation).

Evidence-based policy making using IT, Hans Stol, version 10, 23-7-2008 89

Fig. 3.2 Jaap's Comments

thesis. One of the members of the commission made some comments on the scope of the thesis, he missed some aspects of the policy science theory. So, after a short discussion the problem was solved by adding some notes and by changing the title of the dissertation in "A Framework for Evidence-based Policy Making, using IT" with the under title a systems approach. A very practical solution!

3.4 Thinking like a computer

In 1985 I was interviewed by a journalist of Datex Holding, on the occasion of the opening of the office of Orga Info in Delft. Because of the central discussion during the opening event about the strength of the computer in chess, the interview was partly on this subject. One of the questions was what my opinion was on the future capabilities of the computer, related to human thinking. My answer was: the issue is not if and when the computer can think like human beings, but how we can avoid that human beings are thinking like computers. My fear became true. People tend to adapt their lives to the computer and thus their way of thinking. Examples are the use of computers in daily life, but also the tendency of structuring processes so that they can be computerized. A good example is the definition of patients in a hospital: they are considered as products.

I had many discussions with Jaap on the capabilities of computers versus the human capabilities, especially in decision processes. I was reluctant to leave to many decisions to the computer because: (1) decisions in computers are programmed by human beings (initially) and are by definition based on subjective orientations, (2) once decisions are programmed in computer systems, they are seldomly changed, although the reality may be changed, and (3) people forget why certain decisions are included in the computerized system and what they really mean. People tend to react on the computer instead of thinking autonomously, about the issue at hand [3].

3.5 The non-believer reassessed

During the writing of this contribution I asked myself: what is my belief now in the capacities of the computer compared to human beings? The answer is that I am more and more convinced that Jaap is right. The computers are better in most of the decision processes than human beings. But I was also right: the reason that the computers are competitive with human beings is that human beings, after all, are more and more thinking like computers. It is evident that computers in those cases are much better than human beings: faster, more memory, more consistency, etc.

If the developments in applying IT will continue like they did the past 30 years, human beings will increasingly depend on computers. Some of the consequences we

face daily: less continuity in providing electricity, more problems in railway traffic, uncontrollable financial systems but also: incredible advances in discovering the space, medical care and the automotive industry.

3.6 Conclusions

After all these years, I agree more or less with Jaap that the computer has a tremendous power and, more than that, is able to perform many tasks much better than human beings. I keep emphasising that it is dangerous to leave so many decisions to the computer, especially if the complexity is high because the decisions depend on many, often not formalisable, variables. The brilliant programmers of complex systems are eventually the only people understanding why the computer systems are working as they do, and for what purposes they are designed. Who understands the financial flows that are going around between the financial systems in the world? The consequence is that nobody dares to interfere in these systems, with some well known results during the finical crises we had and we still have.

I conclude my contribution by a statement: "By adding knowledge to systems the knowledge in the minds of human beings disappears."

This might be a very bold and dangerous statement, though it is based on our experience. We have seen many examples: the financial crises, the lack of knowledge in many service centers (tax services, automobile services, financial services, etc.), the focus on standardisation in education, the standardisation in the administration of the medical system resulting in a tremendous administrative burden for the people in the field, etc.. The last two examples of standardisation did not add any quality to the education, nor to the medical system.

The ultimate challenge is how to use the computer without the negative side effects as I have mentioned above? In general, how do we prevent to become a slave of the computer? This is a social and organisational challenge, that is much bigger than the challenge to add knowledge to the computer. This last challenge has been fulfilled by Jaap in the first place. He has shown that the computer can perform tasks that nobody predicted tens of years ago. His contribution is recognised and I congratulate him with the results, especially also taking into account all the Ph.D. students that he supervised. Most of the non-believers became believers after all.

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Chapter 4

Jaap's Tilburg years

Herman Stehouwer

I met Jaap for the first time when he moved to Tilburg to start the Tilburg center for Creative Computing (now Cognition and Communication), TiCC. It became clear quite rapidly that Jaap had an active presence.

I got to know Jaap somewhat better when he came in as a second promotor towards the end of my thesis. Jaap likes to work on different fields and it became clear very rapidly that he has managed to generalise his skill set, especially in terms of writing.

Jaap managed to teach me some writing skills, even though I was nowhere near a good academic writer. He is exigent of any written material, resulting in clearer and more concise texts. But mostly Jaap showed what it is to work well, something he demands from those he works with as well.

So thank you Jaap for your wisdom and hard work. I would not have made it here without your guidance.

Herman

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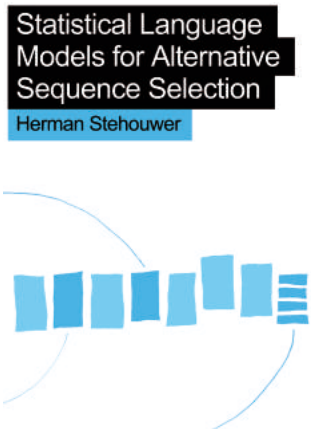
Statistical Language
Models for Alternative
Sequence Selection
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Chapter 5

A first four hours

Jasmina Marić

You never know when you are going to wake up on a memorable day. This feature of life is simultaneously exciting and disturbing. The morning of 28 June 2011 did not seem to be different from any other morning. Except that I woke up in Paris and that I was surrounded by enormous wallpaper roses of the Hotel *du Danube*, the rest looked quite like my ordinary day. I gazed over the rooftops of 6th arrondissement and listened to the sounds of Paris in the early morning.

It was time to go. I checked once more that I have not forgotten something, took my suitcase and I went out. I remember the feeling of that morning quite well. I was satisfied. One conference was behind me, and one beautiful breakfast was in front me. In a small, secluded garden, on a tastefully arranged table, the breakfast was waiting.

I went to the rue De'l Universite, turned right to the rue Bonaparte, and left to Sain-Germain-De-Pres. Train 4 to Paris Nord. My next stop was Tilburg. At 6 pm, I was about to meet Professor Jaap van den Herik.

It was hot. You could feel the heat on your face. The air stood still. I embarked on the airconditioned train to Brussels with relief. After only 30 minutes the train stopped for the first time. Without receiving any announcement, we kept sitting, stuck in the train, sweating profusely. It seemed like nothing was happening: no electricity, no air-conditioning, no information. The passengers looked at each other in despair. All of a sudden, the train started speeding up, the electricity was on again. And so was

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the information flow. France, Belgium and the Netherlands were hit by the strong heat wave that apparently affected the transportation. All trains were delayed; no one knew when one will reach our ones destination. We have travelled for some time and then stopped again. This is how I spent the next 8 hours. So, instead of arriving in 3 hours and having 5 hours to check into the hotel, have lunch and make it to the meeting on time, I arrived to Tilburg University Campus nervous, hungry and soaked in sweat.

As I was practically running to the meeting room in order to be on time, I nervously thought to myself that I have to change somewhere, do something about my appearance. I simply cannot arrive to the meeting looking the way I looked - over stressed, very tired, and looking really bad. Running like that through the building, I almost crashed into the tall man in a snow-white shirt.

– Good afternoon, he smiled at me as he opened the glass door in the corridor, you must be Jasmina?

– Yes, that's me. — I tried to smile — I am Jasmina Marić, nice to meet you.

– Please, follow me. We are in this room — he pointed to the left, and escorted me to the room. Let me introduce you to Dr Rein, my right hand in this matter. Rein, this is Jasmina Marić.

"Oh, what an elegant, well mannered, and tall gentlemen", I thought. I remember my first impression clearly. Professor Jaap's elegance and manners made me feel even worse. "Look at me", I had to do something to bring myself to a more presentable state.

– Please excuse me, can you give me another 10 minutes before we start? I have travelled for 8 hours, I need to freshen-up.

– But of course — said professor Jaap. He discretely showed me the way, and left me alone right at the point when I needed it so.

I was so grateful for these 10 minutes. After nearly having a shower, I changed my clothes and I looked at myself in the mirror. The person opposite me looked really exhausted, almost drained. I thought I was going to faint. I was certain that the meeting was ruined.

I came back to the meeting room and I sat in front of Professor Jaap. On the table, between us, there was a pile of approximately three hundred pages of something, that, at that time I used to call "my finished PhD thesis". He started to ask questions, while

I did my best to give careful answers. He talked without either rush or stress and was quite direct and meticulous.

Miraculously, only ten, fifteen minutes of our conversation was enough to recover my energy. Being exposed to the amazing logic of Professor Jaap's mind, direct questions, clear arguments, vast knowledge and experience, my brain recuperated. I soaked up every single word he said. He would randomly pick a page and start reading:

– What do we have here? What kind of Introduction is this? Is this some kind of a story-telling? This should be a scientific text.

– Well—I felt so bad about it—my ex-supervisor thought it would be nice if I keep that informal language to tell the interesting story.

– That is absolutely inappropriate. Doctoral thesis requires concise, scientific vocabulary. There cannot be one word out of that frame of thinking.

Then he would turn several pages.

– What do you write here: There are several questions.. What does this mean? How many questions, 3, 5, 8? — he looked at me. I just stared at him. I did not know the answer. Really, how many are there?

– A Doctoral thesis should contain precise and accurate text. One cannot write like this. If there are 3 questions, they have to be listed, and carefully introduced. You should change the title of the book. You need a good title. Not too long, not too short. The best would be to express the idea, the topic of the interest in three to four words, three concepts.

He stood up and took few books from the shelf.

– These are very good examples. Take them, read them. Look at the number of the pages. How many pages your book has?

– 324, I think.

– 324!!! That is too many pages. If you cannot express your idea in a concise way that only means that you are not sure what you want to say.

He went on and on through my book, picking examples, explaining the problems and introducing possible solutions. We stayed in that office for four hours. I never felt for a minute that he was getting tired. Me neither. He taught me more in these four hours then I had learned in the three years of my research before I met him. We finished our

first meeting, agreeing that we will work together on a new version of my doctoral thesis.

He voiced concern about my transportation back to Brussels and Paris and offered me a ride to Roosendaal. I sincerely thought that would be too much to ask, but he insisted. Having in mind my misfortunate arrival and the fact that that he is apparently a very persistent man, I accepted the offer. On our arrival to Roosendaal he offered to escort me to the station. It was quite late, and I told him thank you but no thank you, I can manage. After all, I was at the train station. How complicated could it be? Still, he insisted again, and came with me to the ticket machine. To my great surprise, the ticket machine only accepted coins! No cards, no banknotes, but coins! Who has so many coins in his pocket, I wondered? It is late, there is no one at the station, what do I do now? And there he was, flawless Professor Jaap, standing by the ticket machine, filling it with coins. Kindly, he gave me the ticket and wished a happy journey. I stood alone at the Roosendaal's train station, grateful for holding a ticket in my hand. He went back to his car, smiled and waved to me again, and I knew it was going to be quite hard to forget the day when I met Professor Jaap.

Over the next three years I was receiving pages that looked like the one in Figure 5.1.

Every single word, every single comma, everything was a matter of a careful analysis. For months I received a feedback puzzles, no results (Figures 5.2, and 5.3).

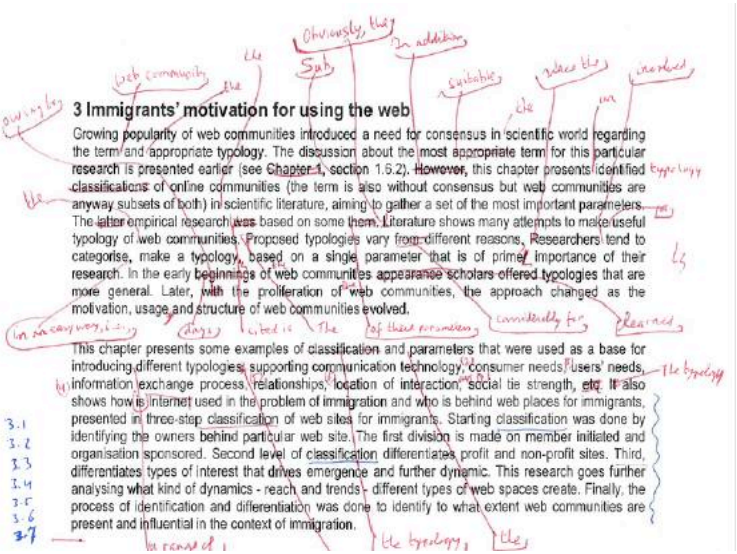
I thought I will never be able to satisfy his criteria. What was he after? It took me several months to arrive to that conclusion.

Finally, after I do not know how many iterations, I have managed to arrive to a satisfactory solution. The amount of red comments decreased. Puzzles were gone, but, there was always another little thing around the corner.

Today, this famous puzzle table looks like the one in Figure 5.6. Nice, neat, clear, easy to read and understand, exactly as it should be (Figure 5.6).

I have learned so much just to arrive to one small table, the famous Table 3.10. (Figure 5.6). Today, when my doctoral thesis is 219 pages long, and the title comprises three concepts, I must admit that finishing the doctoral thesis supervised by Professor Jaap required a lot of hard work. Many times during the process of writing and re-writing it, I dreamt of the day when it will be all finished.

Now that it is, and my mailbox is not receiving Professor Jaap's mails with the same frequency, I feel somehow as if lacking something. I realised that I miss the time of being exposed to his elegant thinking, bold ideas, I miss our creative correspondence.

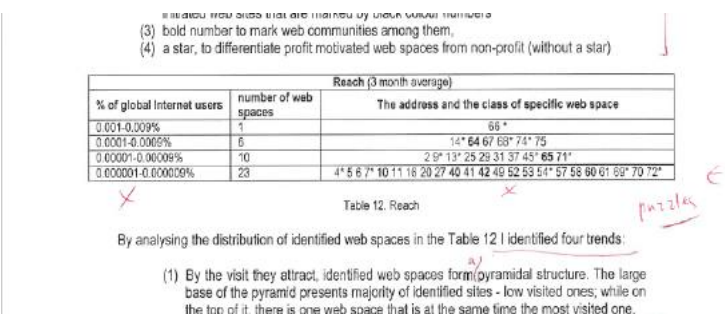


3 Immigrants' motivation for using the web

Growing popularity of web communities introduced a need for consensus in scientific world regarding the term and appropriate typology. The discussion about the most appropriate term for this particular research is presented earlier (see Chapter 1, section 1.6.2). However, this chapter presents identified classifications of online communities (the term is also without consensus but web communities are anyway subsets of both) in scientific literature, aiming to gather a set of the most important parameters. The latter empirical research was based on some them. Literature shows many attempts to make useful typology of web communities. Proposed typologies vary from different reasons. Researchers tend to categorise, make a typology, based on a single parameter that is of primer importance of their research. In the early beginnings of web communities appearance scholars offered typologies that are more general. Later, with the proliferation of web communities, the approach changed as the motivation, usage and structure of web communities evolved.

This chapter presents some examples of classification and parameters that were used as a base for introducing different typologies, supporting communication technology, consumer needs, users' needs, information exchange process, relationships, location of interaction, social tie strength, etc. It also shows how is Internet used in the problem of immigration and who is behind web places for immigrants, presented in three-step classification of web sites for immigrants. Starting classification was done by identifying the owners behind particular web site. The first division is made on member initiated and organisation sponsored. Second level of classification differentiates profit and non-profit sites. Third, differentiates types of interest that drives emergence and further dynamic. This research goes further analysing what kind of dynamics - reach and trends - different types of web spaces create. Finally, the process of identification and differentiation was done to identify to what extent web communities are present and influential in the context of immigration.

Fig. 5.1



(3) bold number to mark web communities among them,
(4) a star, to differentiate profit motivated web spaces from non-profit (without a star)

Reach (3 month average)		
% of global Internet users	number of web spaces	The address and the class of specific web space
0.001-0.009%	1	66 *
0.0001-0.0009%	6	14* **64** 67 68* 74* 75
0.00001-0.00009%	10	2 9* 13* 25 29 31 37 45* **65** 71*
0.000001-0.000009%	23	4* 5 6 7* **10** 11 18 20 27 40 41 **42** 49 52 53 54* 57 58 60 61 69* 70 72*

Table 12. Reach

By analysing the distribution of identified web spaces in the Table 12 I identified four trends:

(1) By the visit they attract, identified web spaces form pyramidal structure. The large base of the pyramid presents majority of identified sites - low visited ones; while on the top of it, there is one web space that is at the same time the most visited one.

Fig. 5.2

Working with Jaap was inspiring and learning was noble. I am privileged for the opportunity to work with such great and knowledgeable gentleman, Professor Jaap van den Herik. His presence in my life made me feel special, and in turn, making my life special, too.

(4) The top of the pyramid belongs again to organization sponsored, profit orientated web community (bold red numbers with a star)

Reach -% of global Internet users and absolute numbers*		
3 month average	daily average (approx.)	
16 588 – 150 198 (0.001-0.009%)	184.42- 1668.86	66 *
1 668 – 15 019 (0.0001-0.0009%)	18.53 – 166.77	14* **64** 67 68* 74* 75
166,89 – 1501,98 (0.00001-0.00009%)	1.84 – 16.67	2 9* 13* 25 29 31 37 45* **65** 71*
16,69 – 150,2 (0.000001-0.000009%)	0.18 – 1.66	4* 5 6 7* **10** 11 16 20 27 **40** 41 **42** 49 52 53 54* 57 58 60 61 69* 70 72*

Table 12. Reach*
(Numbers in this table on the left side, correspond with the names of the links in the Appendix I list)

The trend of visit of observed web sites is for the most of them (60,5%) rising.

Three month change of number of visits – trend*		
Rise	↑	2 5 7* 13* 14* 18 28 31 37 41 45* 49 52 **57** 58 61 67 68* 69* **70** 71* 74* 75*
Fall	↓	4* 6 9* 23 25 27 **40** 53 54* 55 **64** **65** 66* 72*

puzzles

Table 13. The Trend – three month change*
(Numbers in this table correspond with the names of the links in the Appendix I list)

Tables 12 and 13 are presenting results for those web sites that the Alexa tool was able to provide. Some of them were without particular data and because of that they are not in these tables.

no result

Fig. 5.3

Reach - (3 month average)		
% of global Internet users	number of web spaces	The address and the class of specific web space
0.01-0.09%	1	35*
0.001-0.009%	1	38
0.0001-0.0009%	0	
0.00001-0.00009%	7	6 11 14 21 33 34 36*
0.000001-0.000009%	7	12 13 19 23 25 26 30

Table 3.12 Classification of Swedish Immigration

I identified that results of reach create pyramidal structure where (1) the top of the pyramid belongs again to organization-sponsored, profit-orientated web community (bold red numbers with a star), and (2) the trend of change of traffic is for the most of them 12 of 17 (70.59%) rising (see Table 3.13)

Three month change of traffic – Traffic trend		
Rise	↑	6 11 12 13 14 19 21 27 35* 36 37 40
Fall	↓	26 32 34 33 38

Table 3.13 Classification of Swedish Immigration

Fig. 5.4

tool. Analogously to section 3.4 some of the web spaces are without reach and without traffic change data. ~~Therefore, the~~ Table 3.10 represents the results for 16 web spaces.

Analogously to Table 3.8

M% of global Internet users	number of web spaces
10000 – 90000	1
1000-9000	1
100-900	0
10-90	7
1-9	7

Table 3.10 Daily reach of web spaces of Swedish Immigration

TOTAL 16

The analysis of the traffic trend says that there are 12 web spaces having a rising trend, and 5 a falling trend.

12 + 5 = 17 ≠ 16

By analysing the results we identified the following:

Fig. 5.5

reach and without traffic change data. Analogous to Table 3.8, the results for 16 web spaces are presented in Table 3.10.

Table 3.10 Daily reach of web spaces of Swedish Immigration

M% of global Internet users	number of web spaces
10000 – 90000	1
1000-9000	1
100-900	0
10-90	7
1-9	7
Total	**16**

Our analysis of the traffic trend gives the following result: there are 12 web spaces having a rising trend, and 4 that have a falling trend.

Fig. 5.6

Chapter 6

A page a day keeps the promotor away

Jeroen H.M. Janssens

Abstract

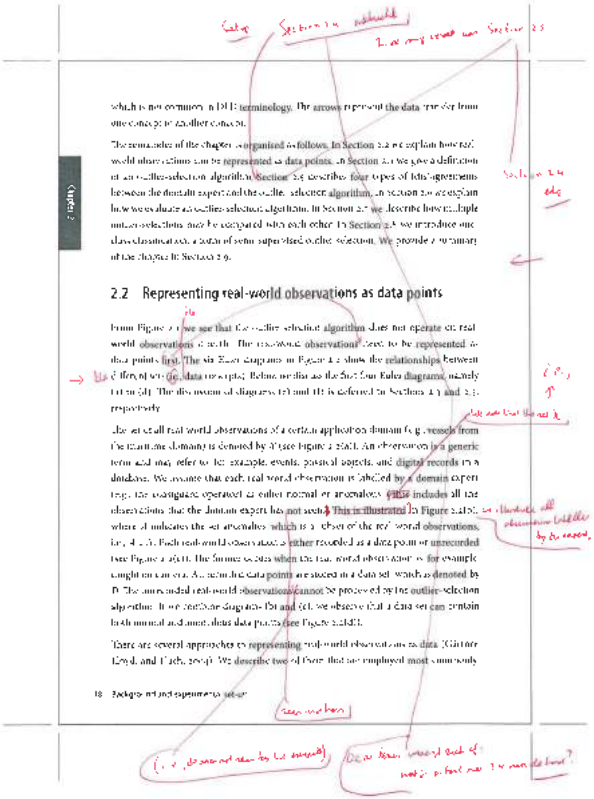
For Jaap's Liber Amicorum I recall an important period of my Ph.D., namely our remote, fruitful collaboration while I was in New York City.

6.1 Introduction

For my Ph.D., I was fortunate to have two promotores: prof.dr. Eric Postma and prof.dr. Jaap van den Herik. It has been said many times before, but their qualities are truly complementary to each other. In a nutshell, Eric's guidance and creativity have helped me to define the area of my research, while Jaap's discipline and drive have helped me to write it all down. For Jaap's Liber Amicorum—Eric's will not be due for another thirty years—I would like to recall an important period of my Ph.D., namely our remote collaboration towards the end of it.

Jeroen Janssens, Independent Data Science Consultant and Trainer e-mail: jeroen@janssens.com

Fig. 6.1 A sample page from my Ph.D. thesis with Jaap's comments.



6.2 Four more years?

After four years of researching one-class classifiers and outlier-selection algorithms, first at Maastricht University and later at Tilburg University, funding stopped (I wasn't elected for four more years), and it was high time to find another source of income. I was given the opportunity to work as a data scientist at a startup in New York City. There was just one little problem: I still needed to write most of the thesis.

6.3 Writer's block in NYC

In June 2012, I moved to the Big Apple. With my fiancee back in the Netherlands—she would join me after our wedding in September—I was looking forward to ten weeks of writing. I would only be interrupted by a day job and the city's craziness. Can you guess the amount of writing I got done during that time? Exactly, "zip," as they say in the States.

Needless to say, Jaap was not quite pleased with this situation. Luckily, one of Jaap's many qualities is to find a solution for each Ph.D. student that works, ensuring that they submit their thesis.

6.4 Smooth operation

Jaap also had a solution in mind for my situation. I was to hand in two pages per day. That is, every single day, including Saturdays and Sundays, I would write two pages of text, no matter how rough or silly it was. (The idea is that it's easier to work with existing text than to start from scratch.) One iteration (i.e., day) consisted of the following eight steps:

1. Jeroen writes text in LaTeX until it compiles to a PDF of two A5 pages;
2. Jeroen emails Joke Hellemons and Eva Verschoor the PDF;
3. Joke or Eva prints the PDF and hands the two pages to Jaap;
4. Jaap reads the text and marks any syntactical, grammatical, semantic or structural bug with red pen;
5. Jaap gives the marked pages back to Joke or Eva;
6. Joke or Eva scans the marked pages as PDF and emails it to Jeroen;
7. Jeroen interprets Jaap's comments (sometimes with Joke's help) and fixes the text;
8. Repeat until submitted to Ph.D. committee.

After a couple of iterations we had a smooth operation going. As made clear by the above-mentioned steps, Joke's and Eva's help has been crucial in making this operations possible. I would like to take this opportunity to thank them wholeheartedly.

Unlike the title of this contribution suggests, Jaap, or his comments to be precise, actually kept coming back on a regular basis, no matter how many pages I sent. We all know how busy Jaap's schedule is, so I'm grateful for his discipline. (If I only had a fraction of it, this operation wouldn't have been necessary.)

Such a short feedback loop was extremely motivating for me (unfortunately it's also quite uncommon in academia). Over a period of three months, hundreds of pages were written, compiled, emailed, printed, commented, and scanned. Figures 6.1 and 6.2 show two of those pages, illustrating Jaap's distinctive style of commenting.

Such an operation is hard at first, but after a while, you get into a daily rhythm. It can be compared to going to the gym, only here you're flexing your brain and writing muscles. (And to take this analogy a bit further, I'm now reminded by the fact that it's important to keep exercising.) Before you know it, you complete a paragraph, a section, a chapter, and eventually, as in my case, a Ph.D. thesis [1].

6.5 Thank you

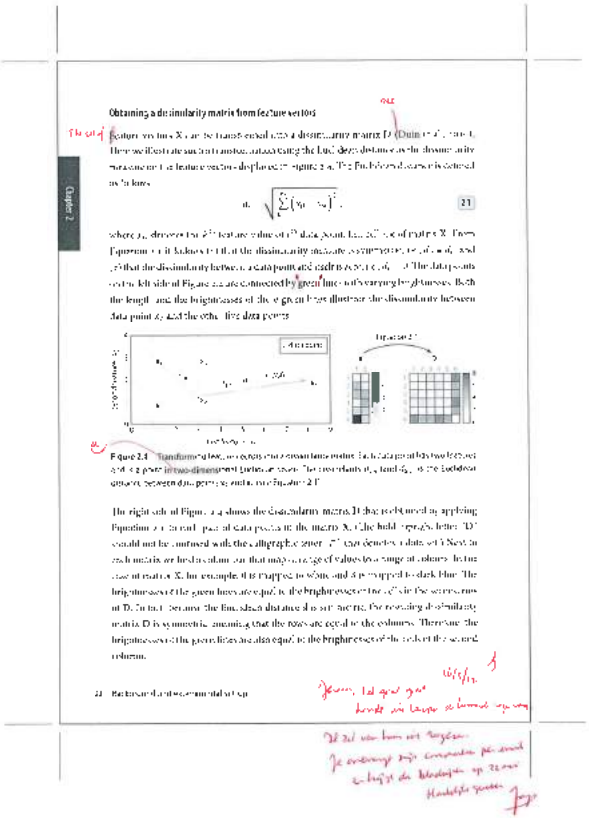
As I mentioned earlier, Jaap has many qualities. With this contribution I hope I have illustrated three of those, namely his (1) problem solving, (2) writing, and (3) motivational skills. Without him, I would have never finished my Ph.D. thesis. I'm sure many other of his former Ph.D. students can relate to this.

Jaap, I'm extremely thankful for your help. Not only for your help during this remote, fruitful collaboration, but also before and after. You have accomplished a great many things, and I wish you all the best with the things to come in the remainder of your impressive career.

Best wishes,

Jeroen

Fig. 6.2 After a few iterations, a page will contain fewer bugs.



Obtaining a dissimilarity matrix from feature vectors

Figure 2.4 Transforming feature vectors into a dissimilarity matrix

Chapter 2

References

1. J.H.M. Janssens, *Outlier Selection and One-Class Classification*, Ph.D. Thesis (TiCC 27), Tilburg University, 2013.

Chapter 7

One email gone wrong!

Nancy Pascall

As everyone who has ever worked towards writing a Ph.D. thesis knows, researching the subject is only a very small part of the work to be done in order to finally get the prestigious title and this little ”Dr” in front of your name. No-one but no-one thought telling you about the tediousness and frustration of writing the same thing again and again and again until you feel you are going to scream.

Having passed a big chunk of my working life in an organisation where writing documents is an art in itself, and having managed to have my written work published or performed, writing the thesis seemed such an easy thing. You research, you think about your data, put it on paper or better on screen and there you are! All that of course, without putting Jaap and his perfectionism into the equation!

I have spent the first six to seven months of the year, correcting chapter 1 i.e. the introduction. I do not appear to get anything right the names should be referred with first name first or with secondary name first, there should be semi column instead of a full stop, and so on and so forth. All things of extreme importance I suppose but of extreme irrelevance for me. I thought that I was telling my story well, Jaap did not agree! It was now more than a year that I had submitted the last chapter and had completed the work and I was still here writing, correcting, re-writing and re-correcting. In my mind I should have defended my thesis at least three times during this period and I was still in chapter 1.

Nancy Pascall
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I should mention here, that this continuous correcting created a love-hate relationship between me and my postman. I have never met the man, in fact I found out that she was a woman, but every time I was getting an A4 white envelope in my letter-box with the University of Tilburg insignia, I started swearing at the poor postwoman. Thank God it was in the evening when she was happily going about her own business. At the same time though, I was very annoyed when I did not get the A4 white envelope. In fact, I was right miserable either way.

You might not know that my thesis was about women and technology, but here is the paradox: I was sending electronically my chapter (me, a mere woman) and got back a paper version with comments on the text plus a typed version with numbers from Jaap (a man, working with technology). In addition, it looked like Jaap profession in a previous life was a ”medical doctor”. Only this could explain his handwriting!

This was going on as I said before for about six months, when one morning, leaving for work I saw the A4 white envelope. I was so excited. I must admit that somewhere inside me I believed that there would be a ”this is fine” comment without any corrections. One may dream, may not one? I got to the office, got me a cup of coffee and sat down. I do not even remember what Jaap was asking for but, straight away, I sent him an email trying to understand his request. I forgot about it until I got an email where he clarified what he wanted. And then it happened!!!

I forwarded the email to a friend with the comment: ”he finally lost it!” and something else, I do not even remember what it was now, but it was equally ”delicate and fluttering” Wrote my message, pressed the ”send button” and there it went. I had unloaded my frustration and reasonably forgot all about it until, a few days later, I get an email from, guess who? Yes, right, Jaap replying to this mail. Oh, the wonderful world of technology and the haste of modern life: instead of ”forward” I pressed ”reply”. Lots of egg on my face, great embarrassment to say the least. How do you save it? But Jaap showed that he was above mere mundane things like anger. He was magnanimous, forgiving and one has to admit, showed a great a sense of humour. I don’t quite remember what he said, and cannot find the mail, but he just made some comments about the text correction requirements and just made a little barbed remark about my unfortunate mail which was really funny and aimed to diffuse tension. I might have suffered during the ”learn to write a PhD thesis” process but I achieved by goal. You do not know the worse though. Many times during my work I have to edit documents and I catch myself highlighting (I am more connected) and making comments which are so similar to Jaap’s. Oh dear! Is it a good or a bad thing?

Well, whilst the jury is still out on this last point, I would like to wish Jaap a good and fruitful retirement. He deserves a good rest but I am not sure he is got to get it—so many grand children!

Good luck Jaap and enjoy!

Chapter 8

A personal letter to Jaap

Peter A. de Kock

Dear Jaap,

First of all let me say that I am very happy to be able to contribute to this Liber Amicorum that commemorates the many years you have devoted to Tilburg University. Secondly, it gives me great pleasure to have been able to challenge the first 'scientific rule' you taught me in the first sentence of my letter. "Never use 'very,' never use 'many'!"

After careful consideration, I have decided to shape my contribution to this book into a personal letter to you. There are a few things left unsaid and they are more easily addressed in writing that in spoken words. So please allow me to spend a little ink on the profound impact you have made on my professional career. Now, people may think a Liber Amicorum is the perfect place to use the rhetorical technique of exaggeration, but I assure you, it is not my intention to speak hyperbolically.

In the four years that we have collaborated on my Ph.D. thesis, I have come to know you as a warm and generous person who undeniably emits a great sense of fun in what he does. You have an insatiable interest in both (big) data management and social innovation, and your knowledge of literature in this field is unsurpassed. However, you do not limit yourself to these domains and have a liberal open-mindedness to new and interdisciplinary approaches. Your unbiased view on science and society has always been appealing to me and I have never felt disappointed when I consulted you

on a topic that did not seem to relate directly to your expertise. You would always find time to consider new ideas even if they were (or turned out to be) too far-off.

But most important of all, you guided me through a transdisciplinary research in which we combined art and science. In discovering the common ground between these disciplines, neither of us had previous experience and we both where venturing somewhat out of our comfort zone. To me, finding my way in this territory was related to a certain apprehension and waves of doubt. Already, I had experienced that doubt can be a great breeding ground for art, but I did not feel sure it would be as good an incubator for science. As my promotor you provided scientific confidence in our endeavour from the day we started and that proved to be essential in the development of my research.

To be able to illustrate the impact of your confidence, I would like to provide three personal experiences that are related to uncertainty or doubt. For the value of confidence may be best explained by the value of doubt.

In the school system that I was brought up in, good reproduction generated good grades. I distinctly remember the moment that I discovered that imitating my teacher was an efficient way to earn good grades. (In fact, the best results were generated by reproducing the teacher is such a way that he did not recognise being reproduced.) Whenever I tried to capture the essence of an assignment and approached it in my own way, my grades did not nearly seem to reflect my effort. Once, I found a note attached to my paper that stated: Don't experiment, don't doubt! Stick to what is taught in class.

At the film academy I met a professor whose views on doubt were starkly different. He encouraged students to endeavour beyond "charted territory." His favourite phrase was "Forget what you are taught; for you have been taught by obedient authorities!" He claimed that authorities such as parents, teachers, policemen, judges and even scientists primarily teach us what they have been taught themselves. He challenged us to dust off the knowledge of our peers, to eliminate the subjective elements that were introduced, and to experience life in a fresh and nave way in order to obtain an objective picture of reality. "Dare to doubt," he was known to declare "for your only obligation to art is to touch people."

At the police academy I was trained in how to neutralise people that are armed with a weapon. An important part in this Active Shooter Training[1] is to learn to make decisions in a split second. When you are "clearing" a room, you may encounter a

[1] In Dutch Active Shooter Training is referred to as AMOK training.

criminal pointing a firearm at you, or a civilian in distress pointing out a direction to you. In aggravating situations like this every judgement is made within a framework of fear, for an erroneous decision will open a door to tragedy. Take too long to decide, and that door will open itself to you. Doubt, in a situation like this, is a virtue one can do without.

To me these examples illustrate three different dimensions of uncertainty. Doubt related to ignorance, doubt related to the struggle against authority (or the discovery of freedom), and doubt related to responsibility or to vested authority.

In What do you care what other people think? Nobel Prize winning physicist Richard Feynman elaborates on the role of doubt in science: "When a scientist doesn't know the answer to a problem, he is ignorant. When he has a hunch as to what the result is, he is uncertain. And when he is pretty darned sure of what the result is going to be, he is in some doubt. We have found it of paramount importance that in order to progress we must recognize the ignorance and leave room for doubt. Scientific knowledge is a body of statements of varying degrees of certainty – some most unsure, some nearly sure, none absolutely certain () Our freedom to doubt was born of a struggle against authority in the early days of science. It was a very deep and strong struggle. Permit us to question – to doubt, that's all – and not to be sure." (Feynman, 1988).

It is often said that art and science meet in wonder. This aphorism seems to value the strange and wonderful merge of emotions and knowledge. The American astronomer Maria Mitchell (who herself ventured on the verge of art and science) described this phenomenon: "We especially need imagination in science. It is not all mathematics nor all logic, but is somewhat beauty and poetry" (Mitchell, 1896). Another example of a person who operated on the common ground between these disciplines is Jacob Bronowski, a great scientist as well as a strong chess player. Inter alia he was a mathematician, biologist, historian, scenario writer, poet, and television presenter. When I was in film school, we were shown the closing scene of an episode of the BBC series The Ascent of man hosted by Bronowski, that profoundly touched me. While washing his hands in a pond that contained the remains of people who fell victim to the holocaust in concentration camp Auschwitz, Bronowski insisted that mankind should dare to doubt. At least he did so, to the best of my knowledge.

For the purpose of this letter I tried to find the specific episode of the series *The Ascent of man* and to my joy, I found it online.[2] However, to my confusion – and as to prove that knowledge is not absolute — I discovered that my memory had tragically

[2] https://www.youtube.com/watch? v=BCfJstzPyZQ

failed me. Bronowski did not wash his hand in the pond in Auschwitz. He only dipped one hand into it. Moreover, his closing statement is not as much about doubt, as it is about the dangers of absolute knowledge. “Every judgement in science stands on the edge of error and is personal. (...) We have to cure ourselves from the itch of absolute knowledge and power. We have to close the distance between the push-button order, and the human act. We have to touch people” (Durlacher, 2010).[3]

For Bronowski, absolute knowledge was not to be found in science. He insisted that while knowledge is precise, that precision is confined within a certain toleration of uncertainty, or doubt. To understand the virtue of doubt he often referred to art. For Bronowski science was always linked to art. He regarded both disciplines as two neighbouring rivers that flowed from a common source: the human imagination (Chritchley, 2014).

When you and I first met, you offered me a thrilling proposition. To discover a subject situated at the exotic terrain that lies between art and science, and to chronicle our explorations in a Ph.D. research. You offered to help me navigate these grounds by offering your expertise in science, and relied on my expertise in art, to negotiate what we apprehensively called “uncharted territory.”

Some people might object to combining art and science. For while artists are primarily concerned with the subjective realm of emotions, scientists are concerned with the body of knowledge that can be rationally explained and reliably applied. However, in my experience all too often the ’common source’ is forgotten. The most prevailing educational system in our country facilitates an efficient segregation of children at a relatively young age, labelling them as ’Alpha’s’ or ’Beta’s.’ This separation is based on dogmatic stereotypes: Science is absolute / science is for nerds, art is subjective / art is for dreamers. More importantly, an approach like this discourages a natural fusion between science and art.

Our exploration of the common ground between art and science has enhanced my appreciation for the wonders of art, and deepened my recognition for the wisdom of modern science. Art and science are best to be seen as two complementary perspectives on the world. As two different ways of dealing with doubt or that which is not known (yet). Both artist and scientists operate at the verge of what is known—and by their curious nature aspire to understand the unknown. Integrating art and science can

[3] Notably, the remark Dare to doubt, your only obligation to art is to touch people that was made by my professor at film school (the same professor that showed the BBC film clip), may have been -partly- misattributed.

provide a deeper understanding of the world, beginning in wonder and ending with wisdom.

Over the course of the four years my research lasted, I have learned that there are quite a few elements that are shared between artists and scientists. A natural curiosity, a drive for experimentation, an ability to doubt, a fearlessness to make mistakes -and to learn from failure- are amongst them. These are elements that are crucial for a successful scientist as well as for a competent artist. However, while the similarities may be obvious, the two disciplines rarely integrate, and that is unfortunate. For where two rivers meet, the strongest current occurs.

Now, months after our endeavour has ended, I feel comfortable enough to admit that when we first discussed the option to collaborate together in a Ph.D. research, I was quite intimidated by your scientific weight. If I were to build on the metaphor of two rivers, I would say that, while I regarded myself as a rather fast running stream, you were a mighty and impressive running river to me. The fact that I was able to experience some of the force of nature that is released when art and science connect, is entirely thanks to you.

Therefore, I would like to finish my letter by expressing my personal gratefulness and deep respect to you. You have been willing to step out of your comfort zone and embark on this journey together with me, regardless of the fact that I commenced from quite an unusual background. You have been prudent enough not to engulf my modest stream of ideas, nor to change its course dramatically. Instead you generously assisted me in finding my own way, and helped me to stay afloat. For all this I want to express my deepest gratitude and sincere appreciation. Thank you so much.

Peter de Kock

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Chapter 9

Prof. Jaap - My unforgettable role model and mentor

Terry Najja Kakeeto-Aelen

If there is one person who left a remarkable impact on both my academic and personal life, it is Prof. Jaap. I know that when he reads this, he will ask himself why! I will explain why this is so from the fourth paragraph onwards. But first ... an introduction.

Prof. Jaap was appointed to be my second promotor (supervisor) at a very critical phase in my Ph.D. trajectory. It was in the spring of 2011. At that point in time, I had finished the data collection exercise and the data analysis phase under the guidance of my first promotor, Prof. Jan van Dalen, and had begun with the writing phase. Though I had collected a great deal of data and had also derived some interesting findings from the study, I felt very inadequate about the way I was presenting the results and my writing style. Hence, Prof. Jaap's appointment was very timely and a blessing from above. After his appointment, I thought that it should take me just a few months to come up with the final thesis since I had already begun with the writing phase. But the actual reality was yet to unfold. Unknown to me at the time was the amount of work that I still had to do to come up with a so-called final version of the thesis. It became clear, for instance, that my thesis lacked a clear structure among other things. From the moment that Prof. Jaap was appointed, my thesis took a new shape. I began to see positive transformation on a regular basis. He, together with Dr. Bartel, my co-promotor, gave my thesis the much needed structure and scientific argumentation. Without their professional support and advice, my thesis would never

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have appeared in its current form. As a result, I was able to have a successful defense in Tilburg University on 1st February 2012.

There are many reasons why I consider Prof. Jaap to be my role model and mentor and why I feel that he left a remarkable impact on both my academic and personal life. However, I will explain only the five main reasons below. These reasons give rise to the five main lessons that I picked up from him along the course of supervision.

First, Prof. Jaap has a high passion for hard work and expects the same high standards from his students. To illustrate his passion for hard work, I will talk about his holidays which he often took in France. Whenever Prof. Jaap went on holiday, he always carried along several theses for his students to read and comment on while on holiday. There are also several times when he told me that he would read the revised versions of my thesis during his holiday and give me the comments after he was back from holiday. This never ceased to amaze me. I always used to wonder how he was able to balance relaxation with hard work sitting by the poolside (or on the beach) with a pile of theses but at the same time relaxing!!! This is the first lesson he taught me ... to be diligent at work no matter the circumstances. Today, I preach the same lesson to my Master students. Prof. Jaap, thank you for teaching me this invaluable lesson - being diligent.

Second, Prof. Jaap is very knowledgeable and versatile, not only in his field but also in other fields that may seem quite distant from his specialized field. His special interest is in the field of mathematics and computer science. However, my thesis was in the field of relationship marketing, a field that would seem quite distant from his own at first glance. But the expertise and ease with which he talked about relationship marketing and the rich discussions and inputs he always generated about the topic always left me admiring him. As a result, I learnt from him my second lesson ... to "hunger" for more knowledge, to read more widely and to also read materials that may seem unrelated to my field of interest but which are interesting ... never know when you might need to tap into this knowledge. The knowledge gained in this way can be priceless.

Third, Prof. Jaap is very meticulous and critical in his work. Never before have I met someone so critical and precise! In a revised thesis draft, he would quickly notice a missing comma, a missing word or a wrong sentence construction. And not only would he note what is missing, but he would also add his detailed comments and suggestions for easy follow up on what he meant. Hence it was always easy to understand his comments. Though he was very critical, he did not hesitate to give compliments (which he always expressed as "!!") whenever he was happy with a revised draft,

phrase, etc. I referred to his compliments as thesis energizers (by the way he does not know this) as they kept me strong especially when the going seemed tough. Because of Prof. Jaap's meticulous, critical and precise nature, I picked up lesson three ... to be meticulous, critical and precise in whatever I do. In fact, every time I have to supervise students for their Masters thesis, I keep emphasizing to them words/phrases like "structure" , "being precise" and "being critical" ... all of which were a part of Prof. Jaap's supervision vocabulary.

Fourth, Prof. Jaap exhibits very high levels of commitment to supervision. He loved what he did and it showed in the enthusiasm he always displayed during our supervision sessions. During the period he was supervising me, he was always available whenever I needed his help. Despite his busy schedule, he was always quick to respond to my emails. I cannot recall a single moment when he did not get back to me when I communicated to him. Related to this, he was also very committed to following up on the tasks we had agreed upon in our previous meetings. I always used to wonder how he would juggle his commitment to supervision with his tight agenda. Because of Prof. Jaap's high levels of commitment, I learnt lesson four ... to show high levels of commitment and dedication in whatever task I am entrusted with.

Fifth, Prof. Jaap has a big heart. Many times during our supervision meetings, he brought for me a cup of tea from the vending machine even when I insisted that I could have picked it up myself. I found this act so humbling. There are also a few times when he invited me for lunch in the Tilburg university cafeteria. These were simple gestures that showed his caring and generous nature. Furthermore, there were also times when he shared with me interesting aspects concerning his private life, e.g., how he and his wife often went on vacation with their grandchildren every year and how his daughter became a Professor of Law in Leiden University at such a young age. I could see his caring and kind-hearted nature all the way. In his laudacio speech after my thesis defense, I was deeply moved by the personal manner in which he welcomed my parents - "Mr. and Mrs. Kakeeto, Tilburg university congratulates you with the success of your daughter. What a pleasure to have you here". Also when I gave birth to our son, Victor in the Autumn of 2012, Prof. Jaap and his wife sent us a beautiful present by post. My husband and I were deeply touched by their caring nature and thoughtfulness. This leads me to the fifth lesson which I learnt from Prof. Jaap ... to always be kind to the people around me and to spend more special moments with my family and close friends. They are priceless treasures that can never be replaced.

Prof. Jaap has served to his fullest and has brought a permanent smile to many people's faces, especially his promovendi. He is now ready for his well-deserved retirement.

"Prof. Jaap, I will always remain indebted to you. I wish you lots of happiness and wonderful reflections in your retirement and I hope that you will continue to have many special moments with your family and friends."

Terry Najja Kakeeto-Aelen

Chapter 10
Een schop onder mijn kont

Thijs Vis

Toen ik in juni 2012 promoveerde, sloot ik het geheel volgens de traditie af met een diner. Vanzelfsprekend waren mijn promotoren ook uitgenodigd. Jaap was natuurlijk een van hen. En volgens goed gebruik sprak ook Jaap de jonge doctor toe. Ik kan zijn toespraak niet woordelijk herhalen, onder meer omdat het een half uur duurde en ik al lang beneveld was door de wijn en door de nieuw verworven doctorstitel. Eén element staat echter in mijn geheugen gegrift. Het betrof een omissie mijnerzijds, en zoals vaker in het promotietraject was het Jaap die het fijntjes opmerkte.

Een paar maanden eerder worstelde ik namelijk met het schrijven van een voorwoord. Als je er net vierhonderd pagina's tekst uit hebt geperst lijkt het schrijven van een voorwoord een bijna onmogelijke opgave. Want wat zet je er in? En belangrijker nog: wat niet? Schrijf je een wat formelere tekst, of heb je de vrijheid iets informeler te doen? Zoals ik die jaren vaker had gedaan, ging ik bij Jaap te rade. Jaap's advies: lees eens wat voorwoorden in andere proefschriften en kijk wat je daarvan kunt lenen. Zo gezegd zo gedaan. Ik pakte twee proefschriften waarbij Jaap ook promotor was geweest en waande me inderdaad enorm geholpen. Ik had de juiste toon gevonden, alsmede de volgorde van het bedanken. En ik waande me behoed voor een fout. In de eerste versie van mijn voorwoord bedankte ik namelijk de promotoren. Ere wie ere toekomt. Maar in de voorbeeld-proefschriften werd met geen woord gerept over de promotor. Enigszins verbaasd schrapte ik mijn promotoren Theo de Roos en Jaap uit het dankwoord. Kennelijk waren de mores van de academische wereld dat promotoren niet werden bedankt in proefschriften. Gelukkig was ik daar op tijd achter

gekomen. Het zou toch vervelend zijn als ik de enige was die niet op de hoogte van dit gebruik leek te zijn...

Toen ik op 12 juni 2012, ten overstaande van mijn familie en vrienden, op mijn donder kreeg van Jaap, was ik volkomen verrast. Jaap vertelde (all in good fun natuurlijk, laat daar geen misverstand over bestaan) dat hij door collega's in Tilburg was aangesproken. Ze verbaasde zich erover dat Jaap en Theo niet in mijn voorwoord werden bedankt! De samenwerking was toch wel goed geweest met 'die Vis'? In eerste instantie was ik met name verbaasd dat er mensen waren die daadwerkelijk het proefschrift hadden opengeslagen (om het voorwoord te lezen). Maar schaamte voerde toch echt de boventoon. Wat doe je dan? Als je geschoren wordt, moet je stil blijven zitten. Dus ik heb netjes met iedereen meegelachen. Maar ik nam mij op dat moment voor ooit deze fout recht te gaan zetten. Want als ik iemand dank verschuldigd ben, dan is het wel Jaap. Toen ik de mail kreeg met het verzoek of ik een bijdrage aan Jaap's Liber Amicorum wilde leveren, wist ik direct: dit is mijn kans. Mijn bijdrage is dan ook een korte uiteenzetting van waarom ik Jaap dankbaar ben. Zonder Jaap was er namelijk nooit een proefschrift geweest. Nu zal dit voor velen gelden: Jaap heeft immers een indrukwekkende/bizarre/uitzonderlijke/zorgwekkende/imposante lijst van succesvolle promotietrajecten op zijn naam staan. Maar voor mij geldt dit dubbel en dwars. Het begon in 2009.

Iedere promovendus kent het moment. Je staart naar het scherm. Honderd pagina's tekst. Het eerste resultaat van jarenlang eenzaam onderzoek doen. En toegegeven, honderd pagina's is veel. Je hebt je data geanalyseerd, weet wat je wilt gaan zeggen en hebt de eerste hoofdstukken op papier. Maar je weet ook dat je nog niet eens op de helft bent. Dat er nog zoveel meer gezegd moet worden, zoveel meer uren in gestoken moeten worden voordat je iets hebt dat op een manuscript lijkt. En dan zakt de moed je in de schoenen. Vragen die al die jaren ergens op de achtergrond een marginale rol hebben gehad, grijpen nu hun kans en nemen een hoofdrol in. Waarom doe ik dit eigenlijk? En voor wie? En voor diegenen die geen academische carriere ambiren: wat heb ik in godsnaam aan die doctorstitel? Honderd pagina's is veel, maar nog niet te veel om niet de handdoek in de ring te gooien. Bij mij kwam dat moment in 2009, een dag voordat ik voor het eerst naar mij promotor Jaap zou gaan.

Ik kende Jaap wel, had hem een paar keer gesproken. Met name bij voortgangsgesprekken. Maar Jaap was niet de promotor die bij mijn onderzoek the lead had. Het zat namelijk zo: het onderzoek kende twee delen, te weten (1) een empirisch juridisch-criminologisch deel en (2) een natuurwetenschappelijk deel. Ik nam het eerste deel voor mijn rekening en had een geweldige hoogleraar strafrecht als promotor en eerste

aanspreekpunt. Het tweede deel kwam voor rekening van een andere promovendus (Stijn Vanderlooy) en hij had Jaap als promotor en eerste aanspreekpunt. Maar na een aantal jaren was Stijn al gepromoveerd en zat 'die Vis' nog steeds in het veld data te verzamelen. Van iets dat op een proefschrift leek, was toen nog geen sprake. Maar, zoals reeds gezegd: er lagen wel honderd pagina's ruw materiaal, dat dan weer wel. Kennelijk ging het Jaap toch niet snel genoeg, en hij had aangeboden eens samen te gaan kijken naar wat er lag en wat er nog moest gebeuren. Dat zou op een zaterdagochtend bij hem thuis zijn. En de dag daarvoor had ik dus mijn breakdown. Hiermee is niets teveel gezegd. Het was echt een bona fide breakdown. Ik zat die avond met tranen in mijn ogen te klagen bij mijn vriendin. Ik zag het niet meer zitten. Wat had ik nou aan die titel? Waarom deed ik dit, en voor wie? Ze hoorde me aan en gaf me het beste advies wat ik nooit heb opgevolgd: als het zoveel energie kost en je voelt er niks voor, stop er dan in godsnaam mee. Wellicht ingegeven door de angst voor nog twee jaar een emotioneel labiele promovendus. Het voelde als een bevrijding. De volgende dag zou ik naar Jaap gaan en hem vertellen dat ik zou stoppen. Dat Jaap mijn welverdiende zaterdagochtend had gekaapt, maakte de beslissing alleen maar makkelijker.

De volgende ochtend stapte ik vol goede moed in de trein. Eindelijk zou ik dan toch gaan stoppen. Aan de lijdensweg die promotie-onderzoek heette zou die dag nog een einde komen. Om dit te vieren, had ik die avond afgesproken met een paar vrienden om weereens ouderwets te gaan stappen. Vol goede moed stapte ik de trein uit. En ik voelde me goed, beter dan ik in jaren had gevoeld. In mijn hoofd nam ik een aantal keren door wat ik Jaap zou gaan zeggen. Ik kwam bij de voordeur, haalde diep adem en belde aan. Een jongetje van ik denk een jaar of tien deed open. Zijn moeder kwam achter hem aan. Oh, jij komt voor Jaap? Leuk je te ontmoeten. En interessant onderzoek doe je. Ik gaf haar een hand, me stiekem verkneukelend om het feit dat ik er die dag nog een eind aan zou maken (aan dat interessante onderzoek natuurlijk: zo erg is promotieonderzoek doen nou ook weer niet). Ik volgde haar naar binnen en daar ontmoette ik Letty, Jaap's vrouw. Ook zij ontving me hartelijk, en daarna kwam Jaap. Ik werd voorzien van een kop koffie, en Jaap en ik wisselde wat beleefdheden uit. Allemaal de eerste schermutselingen voor de daadwerkelijke slag. Nou, laten we maar beginnen. Het is immers zaterdag en ik heb nog veel werk te doen. Ik knikte en dacht bij mezelf stakker. Wie werkt er nou op zaterdag? Jaap ging mij voor naar de woonkamer. En daar, in de woonkamer van Jaap, sneuvelde mijn voornemens om te stoppen. Voor mij op de grond lagen stapeltjes papier. Honderd pagina's welteverstaan, per hoofdstuk en thema gerangschikt. En werkelijk iedere

pagina stond vol strepen en opmerkingen in de kantlijn. Iedere pagina! Ik stond met mijn mond vol tanden.

Ja, niet schrikken hoor Thijs, maar zo werk ik graag. Ik breng graag wat structuur aan en dacht dat het voor jou ook wel goed was om jouw eigen werk in een bepaalde structuur te zien. Ik knikte en nam een grote slok koffie. Hoe kon ik in hemelsnaam nog zeggen dat ik zou gaan stoppen als die man er zoveel tijd en moeite in had gestoken? Dit is uitstel, geen afstel. Ik wacht gewoon tot de volgende keer en dan stop ik ermee. Die ochtend liepen Jaap en ik alle hoofdstukken door en kreeg ik een aantal tips mee over hoe te schrijven en, belangrijker nog, hoe nu verder te gaan.

Die middag ging ik naar huis met in mijn tas de honderd pagina's nagekeken tekst. Mijn goede voornemen was teniet gedaan, maar er was iets voor in de plaats gekomen wat ik tot die tijd niet had gehad: het idee dat er zowaar een basis voor een proefschrift lag. En dat ik het kon schrijven. Toen ik thuiskwam, zat mijn vriendin op de bank en keek mij vragend aan. Hoe dat gesprek precies is gelopen kan ik me niet meer herinneren, maar wat ik nog wel weet is dat ik de volgende dag met een stevige kater mij computer opstartte en gewoon ben begonnen met schrijven. Wat anderen jarenlang niet was gelukt, was Jaap in n ochtend wel gelukt: ik kreeg zowaar plezier in het schrijven. Waar zat hem dat precies in? Aan de ene kant denk ik dat ik gewoon een flinke schop onder mijn kont nodig had. Ik was niet gemotiveerd, en had iemand nodig die me over een dood punt heen hielp. Aan de andere kant was die schop niet voldoende geweest. Een paar weken eerder had de voorzitter van de vakgroep strafrecht en criminologie hetzelfde geprobeerd. Zijn benadering was een beetje die van de Amerikaanse drill sergeant: mij toeblaffen dat ik had gefaald, dat ik heb zitten lanterfanten en dat ik het doorzettingsvermogen miste om het daadwerkelijk af te maken. In zijn woorden: aan de kleine hersentjes zal het niet liggen. Het is een motivatieprobleem. En die man had deels gelijk. Er zat echter een essentieel verschil tussen hem aan Jaap: Jaap gaf mij perspectief en, minstens zo belangrijk, het gevoel dat ik er niet alleen voor stond. Hij deed aan leading by example. En vanaf dat moment is alles in een stroomversnelling gekomen. In anderhalf jaar tijd heb ik het proefschrift afgeschreven. Samen met Jaap.[1] Best een prestatie, gezien het feit dat ik inmiddels een fulltime baan had en het schrijven in de avonduren en in het weekend moest doen. Ik kreeg de schop onder mijn kont die ik verdiende en die mij in de juiste richting stuurde. Daarnaast kreeg ik ook het compas en de middelen om die lijn vol te houden.

[1] Ook mijn andere promotor Theo de Roos verdient in dit opzicht alle lof.

De begeleiding is op geen enkel moment minder geworden. Tot de laatste letter bleef Jaap in de weer met een rode pen. Ik merkte wel dat de pagina's steeds minder rood kleurde. Kennelijk zat er ook progressie in mijn schrijven. Nooit zal ik een lezer meer opzadelen met 'cognitieve puzzels'. En ik zal altijd 'blijven tellen' bij opsommingen. Onder Jaap's (bege)leiding lag er in 2012 een proefschrift. Voor 'die Vis' van twee jaar eerder ondenkbaar. En het bijzondere van alles is dat het echt *mijn* verhaal is. Nergens is Jaap aan het woord, nergens is er ook maar enige concessie gedaan aan mijn verhaal. Jaap heeft mij naar de eindstreep begeleid, maar uiteindelijk heb ik het zelf moeten doen. En dat is in mijn optiek de beste eigenschap van een promotor: betrokken distantie, een perfecte balans tussen begeleiden en loslaten. Oftewel: een beetje goed mikken, een ferme trap onder de kont en onderweg een beetje bijsturen zodat het projectiel fatsoenlijk landt.

Op één punt heb ik wel een concessie gedaan: het gebruik van de wij-vorm (pluralis modestiae, oftewel bescheidenheidsmeervoud). Jaap suggereerde dat dit de door mij gehanteerde ik-vorm zou kunnen vervangen, iets waar ik minder voor voelde. Binnen de sociale wetenschappen is bescheidenheidsmeervoud namelijk vrij ongebruikelijk. Velen kennen het berhaupt niet en verwarren het met pluralis majestatis of denken aan een ghost-writer. Ik wilde het risico niet lopen binnen de sociale wetenschappen verkeerd begrepen te worden. Maar toch heb ik op een gegeven moment gekozen voor pluralis modestiae. Naast dat dit bescheidener is dan de ik-vorm, en dus beter past in een wetenschappelijke publicatie, verwijst het naar alle betrokkenen die het proefschrift mogelijk maken: promovendus, promotoren, co-promotoren etc. Dit gold zeker voor mijn proefschrift, dat er zonder de begeleiding en bemoeienis van Jaap nooit zou zijn geweest.

Dus Jaap, dit brengt mij tot de ontbrekende zin van ons voorwoord:

"En tot slot ben ik (zijn wij...) bijzonder veel dank verschuldigd aan mijn promotor Jaap van den Herik voor die eerste schop onder de kont die mij richting de eindstreep heeft gelanceerd. Jaap, zonder jouw hulp, begeleiding en steun zou dit boek er nooit zijn gekomen. Bedankt!"

Chapter 11

TiCC 16, the result of our special cooperation

Xiaoyu Mao

Abstract

This contribution presents a unique experience of the author as being an external Ph.D. student of Professor Jaap van den Herik from Tilburg University. The journey of working on Ph.D. under the supervision of Jaap for almost 6 years has left many good memories to the author. The contribution highlights a few moments of those as the author's special thanks to Jaap for his trust, guidance and continuous support throughout the journey.

11.1 Introduction

The Netherlands is one of the few countries in the world where one can perform a Ph.D. research in a company instead of in a university. I happened to be one of the odds. Being an external Ph.D. student of Jaap, I have had the honor to work with him for almost 6 years. The cooperation was a unique experience, just like how Jaap opened his speech at on my Ph.D. promotion ceremony: "*Our cooperation is and has been very special.*".

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The journey started in one university and ended in another. Nevertheless, it has successfully concluded at the Auditorium of Tilburg University with a book referred to as *TiCC 16*, which means that it is the 16th dissertation of Tilburg Center for Cognition and Communication, a young but already successful institute initiated by Jaap and his colleague — also my copromotor — professor Eric Postma. The 6-year Ph.D. journey was not only about working together on a research subject, but also, and more importantly, about a valuable learning experience.

11.2 The second poster

The first time I entered Jaap's office in Tilburg University, my attention was quickly drawn to a poster hanging on the wall. It was a collection of 25 book covers, all of which were Ph.D. dissertations written by Ph.D. students whom Jaap had promoted in his earlier years of professorship.

"Yours will be on the second one!", said Jaap when he noticed me staring at the poster. Although it took yet another two years before my thesis got finally published, it was at that very moment I started to see the light towards the end of the tunnel.

Doing a Ph.D. is a long journey and a lonely job. It felt like a never ending project where you are the only one working on it. It was the trust and encouragement that Jaap gave me kept me researching, writing, and eventually finishing it. Today, I don't know whether the second poster was ever made or printed. But I am very certain that Jaap has already promoted more than 50 Ph.D. students, and I am proudly to say that I am one of them.

11.3 *La Mamma*, Pijnacker

Working in a research company and living in the city of Rotterdam, I had to travel frequently to visit Jaap at Tilburg to discuss the research. Seeing the long-distance traveling I had to do for our weekly progress meeting, Jaap was very considerate and offered to meet at Pijnacker, his home place that is 15 minutes away from Rotterdam. *La Mamma*, a small Italian bistro, became our meeting location for the last two years

of my Ph.D life. I tell my friend that J. K. Rowling wrote her Harry Potter in a coffee shop of Edinburgh, and I wrote my Ph.D. thesis at *La Mamma* in Pijnacker.

Every time we met at *La Mamma*, Jaap was well prepared. Right after a simple dinner, he took out from his suitcase a deck of printed thesis draft. Almost on every page there are texts highlighted by red lines and comments. Just like that, weeks after weeks, months after months, the deck was getting thicker and thicker, and comments get fewer and fewer. The book is getting its shape.

11.4 Quiz about robot soccer

Jaap is never conservative in communicating his vision and ambitions of AI. Together with his colleagues and students, he has always been the front runners of AI research. In a closing speech at a research conference, he asked a question to the audience: "In how many years do you think that robots can win a soccer game against the best human players?" The audiences shouted "100", "80", and a few said "50". Disappointed by the answers given by the audience, Jaap has given his prediction of 30 years' time and explained how much we have advanced in technology in the past 30 years. All of the sudden, making it happen in 30 years didn't feel like something impossible. This is how Jaap encourages young researchers to aim big, and think about impossibles.

End note

It's been a privilege to work under Jaap's supervision. I owe many thanks to Jaap for his great enthusiasm and support for my research, especially for teaching me how to write scientific topics in understandable and interesting texts.

Part II

Jaap's influence on scientific contributions

Chapter 12

On artificial intelligence and art analysis

Laurens van der Maaten

Abstract

Jaap's life work has centered on artificial intelligence research, which has been extremely successful in the last two decades or so. In this contribution, I argue that the name artificial intelligence may be somewhat unfortunately chosen, and that it should probably neither have the word artificial nor the word intelligence in it. Subsequently, I will give an example of the influence Jaap on one of my recent studies in the field of artificial intelligence: a study in which we applied techniques from artificial intelligence to art analysis. Tautologically, concluding remarks conclude this contribution.

12.1 Introduction

The goal of artificial intelligence (AI) research is to develop algorithms that solve problems that are considered to require some form of intelligence. Unfortunately, the term "intelligence" is somewhat vacuous in this case, which poses difficulties to those performing artificial intelligence research: when researchers successfully solve an AI problem by developing and deploying an advanced algorithm, many are very quick to

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point out that the problem actually did not require real intelligence. They argue that if there exists some formal procedure to solve the problem (the new algorithm), it is clearly possible to solve the problem without (human) intelligence. As a result, doing artificial intelligence research appears to be like shooting at a moving target.

One of the areas in something like this happened is in Jaap's very own computer chess. Deep Blue defeating Kasparov was clearly one of the earliest and biggest successes of artificial intelligence research, but this success also marked a decline in the (public) interest in computer-chess research and perhaps even computer-game research in general. The hallmark of defeating the chess world champion was achieved, it was not entirely clear how further improvements would impact other real-world problems, and as a result many researchers (but not Jaap!) stopped doing computer-chess research and started working on different topics. Only recently, because of the persistence of scholars such as Jaap, computer-game research has been making a rapid comeback: the Monte Carlo tree search methods that were pioneered in computer Go research turn out to have applications in a range of fields [3], and the defeat of Jeopardy champion Ken Jennings by IBM's Watson has once again captured the publics imagination. As soon as the computer Go and question answering problems are solved beyond human capabilities, however, it may well be that many will once again argue that these problems apparently did not require intelligence, but merely a bunch of smart computer programmers churning out the right algorithm[1]. As long as there is no generally agreed upon definition of which problems require (human) intelligence and which ones do not, I expect this trend to continue, which is harmful because it may slow down the progress of our field.

The recent trend where the likes of Elon Musk and Stephen Hawking predict artificial intelligence to be the most dangerous thing since nuclear weapons (fueled by movies such as Ex Machina) are also largely based on the lack of consensus on what (human) intelligence exactly entails. This new trend is potentially even more harmful, in particular, because it obfuscates the discussion that modern societies actually should be having on the progress of AI: viz., a discussion about how society should be organized when increasingly many low-education, low-income jobs disappear due to the automation of these jobs that AI research fuels.

The problems outlined in the above largely stem from the use of the word intelligence in the term artificial intelligence, and of societys (mis)understanding of this

[1] Ironically, when our field is unsuccessful in solving these problems anytime soon, society will react disappointed because artificial intelligence did not deliver on its promise. In the past, similar disappointment has led to several AI winters

term. Therefore, I argue that it may be good to remove the word intelligence from artificial intelligence altogether. Removing this word may make it easier for everyone involved to focus on what is truly important: how to make computers solve increasingly complex problems and how to use this ability to make the world a better place. By the way: echoing Zoubin Ghahramani, I also argue for removing the word artificial from artificial intelligence. The argument for that removal is, however, much simpler: we also dont say that an airplane is artificially flying, so why would we say that our models are artificially intelligent? I do not have a concrete proposal for a new name for the field (yet), but since Jaap will have some time on his hands soon, I very much look forward to his proposals.

12.2 Jaap's influence on my work

Whilst Jaap has generally been more on the symbolic side of artificial intelligence, my research focuses on the sub-symbolic side. For now, this appears to have been a good choice: in recent years, deep learning has been tremendously successful in solving perceptual tasks such as object recognition and speech recognition. More recently, some initial successes are being achieved in combining deep learning with sub-symbolic techniques such as search and reasoning [1]. The fact that our research interests are quite different does, however, not imply that Jaap has had less of an influence on my work. Much of my applied work has focused on applications of machine learning in the cultural heritage, an area that was greatly stimulated by Jaap in The Netherlands (for instance, by his chairmanship of the CATCH program that financed my Ph.D. position).

In fact, my last paper, which appeared last month, was the result of an initiative of Jaap: he introduced me to Rob Erdmann and he arranged for me to work with Rob at the NIAS in Wassenaar for several months. The result of that collaboration was the first published algorithm that can trace individual threads in the canvases of paintings, based on radiographs of these paintings. Canvas analysis is important in art-historical studies of paintings because it provides information as to whether two paintings were made on canvas originating from the same bolt. This in turn, can give clues about the history of these paintings: if the paintings were made on canvas originating from the same bolt, this provides evidence that the artists who made them had access to the same bolt of canvas, for instance, because they were working in the same studio, or

because they were actually the same person. The fingerprint extracted from canvas radiographs by canvas analysis algorithms is formed by (ir)regularities in the spacings between the canvas threads, which are (nearly) constant across the entire bolt of canvas. Until Jaap initiated my collaboration with Rob, canvas algorithms algorithms where extracting a spacing signal via Fourier (or related) analyses, averaging the signal over a number of threads to reduce noise. This lead to information loss in the final measurements, making them less reliable and thus less valuable. By contrast, Rob and I developed a sub-symbolic AI approach (based on machine learning) that learned to discern the visual appearance of canvas threads from the visual appearance of other structures in the canvas. This allowed us to trace individual threads in the canvas, which in turn led to much more precise and reliable thread-spacing measurements. A detailed description of the algorithm falls out of the scope of this paper, but is presented in [4].

The performance of our thread-level canvas analysis algorithm is illustrated in Figure 12.1, which presents: (a) a piece of a canvas radiograph, (b-c) the result of the thread-crossing detection algorithm we apply on the canvas, and (d) the final detections of thread crossings (red crosses) and the detections of the actual threads (blue lines).

As argued in the paper, our results pose questions with respect to the art-historical description of an alleged late copy of a Nicholas Poussin painting entitled Triumph of Silenus. These questions are rooted in the discovery of a very strong canvas match of that painting with two other Nicholas Poussin paintings that are widely considered to be by Poussin himself; see Figure 12.2. In the figure, different colors correspond to different spacings between threads in the canvas. It can be clearly seen from the figure that all three paintings analyzed have the same thread spacing profile, which strongly suggests that all three paintings were made on canvas originating from the same bolt. This strongly contradicts the current art-historical account on Triumph of Silenus, which states that the current painting is a copy that was made 30 year later in a different location (Poussin was working in Rome, whereas the alleged copyist worked in France).

Next to an exciting result, this work provides a nice illustration of the kinds of questions that Jaap has spent much time thinking about throughout his career: Can a computer recognize art? Can a computer practice law? Etcetera. Jaaps answer to all these questions is a very convincing yes. By nature, I tend to be a bit more careful and formulate my answer as: over time, the computer will probably be better in these things than art experts and judges.

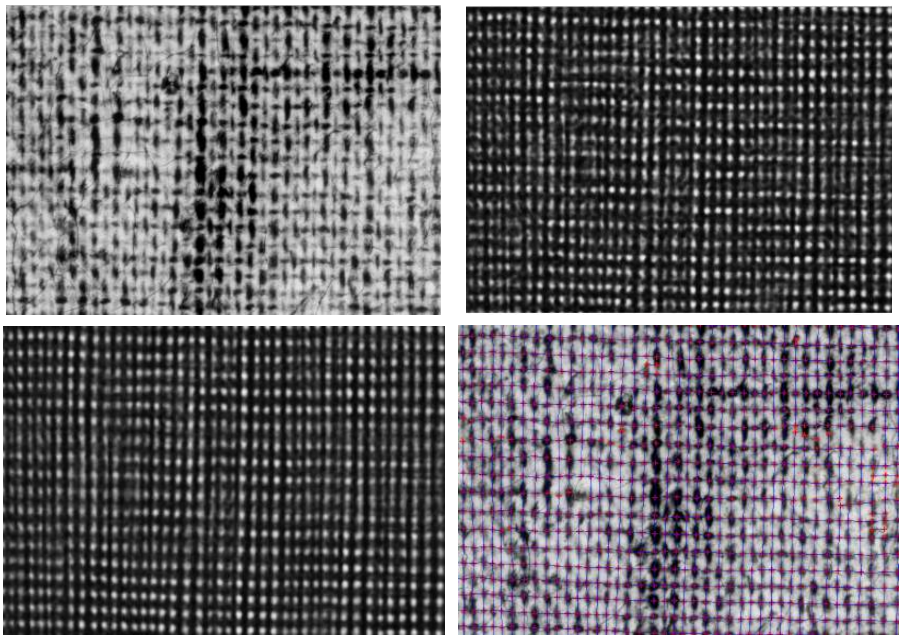

Fig. 12.1 Illustration of our canvas analysis algorithm: (top left) a small patch of canvas taken from Poussins Triumph of Bacchus; (top right) the response of our thread crossing classifier on the patch of canvas; (bottom left) the response of our model after incorporating the pictorial-structures model that exploit canvas regularity; and (bottom right) the final thread-crossing detections and the identified neighbor relations between these detections. In the response images, a brighter color corresponds to a higher likelihood of a thread crossing being present in the canvas (according to our model). In the bottom-right figure, detected thread crossings are indicated by red crossings. The blue lines indicate the detected neighbor relations: to construct distance maps, distances that were measured between all neighboring thread crossings (i.e., over all blue lines). At locations where blue lines are absent, the distances are interpolated from neighboring thread crossings. Figure and caption adopted from [4].

12.3 Concluding remarks

In the previous section, I gave a single example of Jaap's influence on my work. This single example is by no means a comprehensive account of how Jaap contributed to my work. For instance, Eric Postma, him, and I have written a very impactful

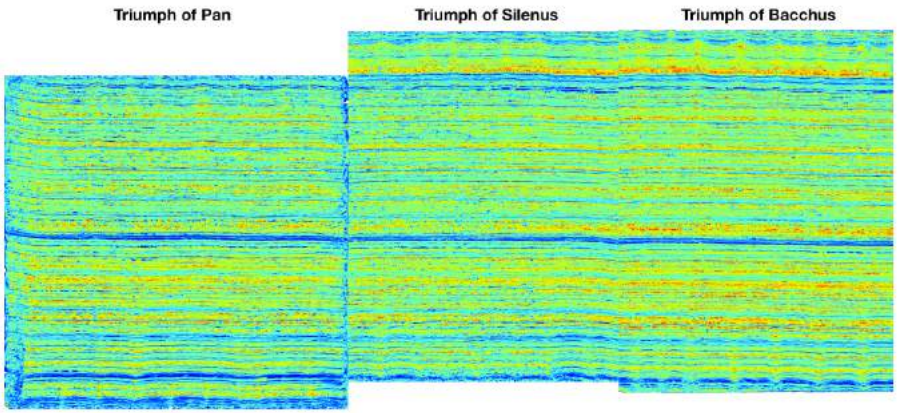

Fig. 12.2 Results of thread-level canvas analysis of the three Triumph paintings (two by Nicholas Poussin and one alleged later copy). Different colors indicate the distance between (detected) neighboring thread crossings. Figure adopted from [4].

overview paper on dimensionality reduction [2]: whilst we never managed to get that paper published, it has still had a lot of impact and, indeed, it is Jaap's most-cited paper to date according to Google Scholar.

Jaap's influence is also present in many discussions that I am having with others about our field. For instance, a common debate in the deep-learning community is whether it is essential to develop algorithms that are biologically inspired. I believe the answer is no and when expressing this opinion, I often find myself using an example that I learned from Jaap about his beloved computer chess: Playing chess well requires intuition. Intuition cannot be programmed. Hence, a computer program cannot be good at chess. History has proven the argument to be incorrect: the incorrectness stems from the fact that the argument ignores the fact that there may exist fundamentally different solutions to the same problem (as is evidently the case for chess). In my opinion, the same applies to deep learning: to reproduce a system that can solve problems the brain can solve, I am not convinced that you actually have to reproduce a brain. The biggest influence of Jaap on my work has probably been that he taught me how think and write in a structured way. The profound influence that my meetings with Jaap on

early drafts of my first papers have had became clear to me much later, when I started having students. When reading my students first drafts, I often heard Jaap talking in my head; and I tried to teach them the same lessons. After reading this contribution, I expect Jaap to maybe even take out his red pen and scribble some illegible notes in the margin. His notes would say that the paper: (1) does not have a single, clear message; (2) lacks clearly structured argumentation; and (3) is inconsistent in its use of terminology. I am hoping to get away with that just this one time in this "liber" amicorum!

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Chapter 13

Sociale innovatie, Intelligent Blauw en de (re)organisatie Nationale Politie

Paulien Meesters

13.1 Inleiding

Het was een zaterdag in oktober 2014. De laatste bijeenkomst bij Jaap thuis. Kopje koffie met een stroopwafel en mijn manuscript Intelligent Blauw ligt op tafel. We zitten nog wat te praten over het laatste hoofdstuk. “Het is toch een mooi begrip dat sociale innovatie”, zegt Jaap. Ik had de term sociale innovatie gebruikt in de laatste hoofdstukken. “Eigenlijk had je het hele proefschrift vanuit dit begrip moeten schrijven. Dat was nog beter geweest”. U kunt het al raden, dat was niet het geval. Dus Jaap, voor jou in dit liber amicorum aandacht voor sociale innovatie. Voor ons is dit begrip voor altijd verbonden aan jouw Tilburgse periode.

Na een introductie over Intelligent Blauw bespreken we de hefbomen van sociale innovatie. Vervolgens gaan we in op de relatie tussen Intelligent Blauw en sociale innovatie. We geven hier ook (beetje) aandacht aan technologische innovaties. Voor ons nog een thema dat onlosmakelijk aan jou is verbonden. Daarna maken we de overstap naar het nu: de (re)organisatie van de Nationale politie. En dit alles, in ongeveer zes pagina’s. Dit gezegd hebbend, weet ik tegelijkertijd dat als jouw rode pen er doorheen gaat het korter kan.

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13.2 Intelligent Blauw

Intelligent Blauw gaat over mensen. Mensen, die werken in de blauwe politieteams en districten. Zij verrichten allerlei activiteiten, die we politiezorg noemen. Hun doel: onze veiligheid. Zij doen dat niet alleen. Politiezorg maken onderdeel uit van een groter systeem; de maatschappelijke veiligheidszorg. Met het concept Intelligent Blauw hebben we een toekomstperspectief willen bieden voor primair de geüniformeerde politieteams en ruimer de gehele politieorganisatie. In Intelligent Blauw gaat het om het (verder) ontwikkelen van drie vermogens. Het zijn van Alert, adaptief en responsief. Deze vermogens dienen ontwikkeld te worden door de politieorganisatie om in te kunnen spelen op veiligheidsvraagstukken in de samenleving met behulp van politiezorg en ruimer maatschappelijke veiligheidszorg.

> **Intelligent Blauw**: een gebiedsgebonden politie-eenheid die voortdurend in contact staat met en onderdeel is van de samenleving, zodat zij tijdig op veranderingen in de samenleving in relatie tot maatschappelijke veiligheid kan inspelen. Dit betekent dat zij (1) alert is op signalen uit de samenleving, de partners binnen de maatschappelijke veiligheidszorg en de eigen organisatie, (2) adaptief is in de wijze waarop zij haar taak uitvoert (zowel de actiekeuze als de uitvoering ervan) en (3) responsief is aan de voorwaarden die onze samenleving stelt.

Het achterliggende idee van Intelligent Blauw is dat politiemensen geleid dienen te worden vanuit het concept intelligence. De term intelligence hanteren we op twee wijzen. Allereerst intelligence als intelligentie. Voor de uitleg van intelligentie hebben we gebruik gemaakt van de bekende twee hiërarchieën van Jaap (Van den Herik, 2007).[1] Intelligentie als het vermogen om de werkelijkheid om ons heen te kunnen begrijpen, te waarderen, en een respons te formuleren. Ten tweede, intelligence als intelligence-product. Een analyse van één of meerdere veiligheidsvraagstukken. We merkten hierbij op dat dit product actiegericht dient te zijn. De inhoud van het product is op een zodanige wijze geformuleerd dat de intelligentie (in het product) kan worden aangeroepen.

Een opstapje voor Intelligent Blauw was naar ons idee het concept intelligence-gestuurde politiezorg (IGP). In het begin van deze eeuw is IGP gentroduceerd in de Nederlandse politie (Abrio, 2001). De centrale gedachte van IGP is “het verkrijgen van een adequaat beeld van de veiligheidsproblematiek in de samenleving, de oorzaken, de mogelijke daders en de interventiemogelijkheden” (Straver, Meesters, & Van Duijneveldt, 2011, p. 61). Dit dient te gebeuren door op een professionele manier

[1] De eerste hiërarchie omvat ruwe data, data, gegevens, informatie, kennis en intelligence. De tweede hirarchie bestaat uit kennis, intutie, normen, waarden en intelligentie (zie Van den Herik, 2007).

data te verzamelen en te analyseren. Op basis van deze analyse moet de capaciteit die beschikbaar is voor politiezorg gericht worden ingevuld. Uitgangspunten van IGP zijn probleemgericht werken en integraal werken (samenwerken in de maatschappelijke veiligheidszorg).

Het concept IGP is te typeren als een samenhangend stelsel van stuurprocessen (het begrijpen, waarderen van veiligheidvraagstukken en het formuleren van respons) en intelligence-processen (het produceren van intelligence-producten). Wij hebben dit stelsel beschouwd als een werkwijze. Het is een werkwijze die Blauw toepast tussen twee kaders; een richtinggevend kader "Politiezorg voor Blauw" en een operationeel kader "Politiezorg door Blauw". We hebben voor de toepassing van de IGP-werkwijze door Blauw mogen concluderen dat er drie knelpunten zijn: (1) een zwakke kwaliteit van de besluitvorming in het stuurproces, (2) een zwak begrip van de twee genoemde kaders voor politiezorg en de IGP-werkwijze waarin intelligence als leidraad dient en (3) een zwakke koppeling van het stuurproces naar de uitvoeringproces van het politiewerk.

Politiezorg voor Blauw is het richtinggevend kader voor de wijze waarop gebiedsgebonden eenheden invulling geven aan politiezorg in relatie tot maatschappelijke veiligheid.

Politiezorg door Blauw is het operationele kader voor de wijze waarop gebiedsgebonden eenheden beschikbare mogelijkheden hebben om de politie-zorg binnen maatschappelijke veiligheid vorm te geven.

Intelligent Blauw en IGP hebben grote inhoudelijke en theoretische overeenkomsten. De door ons gegeven uitwerking van de IGP-werkwijze omvat een groot deel van de uitwerking van de gedefinieerde vermogens alert, adaptief en responsief van Intelligent Blauw. Er bestaan daarentegen ook verschillen. Intelligent Blauw gaat uit van *leren, verder leren en reflecteren*. Het antwoord op de door ons geformuleerde probleemstelling (PS) "In hoeverre kan de gebiedsgebonden politie door het intelligent toepassen van de IGP-werkwijze in Blauw komen tot Intelligent Blauw?" is door te stellen dat een intelligente toepassing van IGP een begin is om te komen tot Intelligent Blauw. Door de drie geconstateerde knelpunten positief te formuleren in sleutels, is het mogelijk gebleken om het slot op een intelligente toepassing van de IGP-werkwijze te openen. Bovendien hebben we mogen concluderen dat er een ontwikkelpad naar Intelligent Blauw ontstaat. De sleutels gaan op elkaar inwerken en versterken elkaar.[2] Wel dient zich al snel een vierde sleutel aan. Het beschikbaar hebben van hoogwaardige intelligence-producten. Een belangrijk aandachtspunt en

[2] Het ontwikkelpad bestond uit (1) verbeteren van de besluitvorming in de stuurprocessen, (2) versterken van een intelligente toepassing van de IGP-werkwijze in het bredere perspectief van de maatschappelijke veiligheidszorg en het koppelen van stuurprocessen aan operationele processen en

wellicht beter nog een voorwaarde voor het ontwikkelpad naar Intelligent Blauw was, het "organiseren van intelligence" als organisatieontwikkeling. Het "organiseren van intelligence" raakt namelijk de cultuur van de politieorganisatie. In ons onderzoek hebben we mogen constateren dat deze cultuur soms taai is (Meesters, 2014, p. 233; zie verder Cockcroft, 2013). Sociale innovatie in de politieorganisatie kan ons inziens behulpzaam zijn om de taaiheid naar lenigheid om te buigen. De opstelling van politiemanagers is daarbij cruciaal. Naar ons idee zijn cultuur en leiderschap de dragers voor een verdere ontwikkeling naar Intelligent Blauw (Meesters, 2014, p. 287).

13.3 Sociale Innovatie

Sociale innovatie staat voor een vernieuwing van de wijze waarop het werk in en tussen organisaties is georganiseerd op een zodanige wijze dat zowel arbeidsproductiviteit als kwaliteit van de arbeid daarmee gebaat zijn. Het gaat om het slimmer samenwerken en om het identificeren van mogelijkheden om problemen op te lossen.[3] In het concept sociale innovatie staat de mens centraal om te komen tot verandering en vernieuwing in de organisatie. Het investeren in mensen en de manier waarop zij samenwerken creëert voorwaarden waarin vernieuwingen, veranderingen en prestatieverbeteringen sneller tot stand kunnen komen, zo is de gedachte. Vernieuwen en veranderen door te leren, te herleren en te reflecteren. Voor ons staat sociale innovatie vooral voor hoe er naar organisatiedoelen toegewerkt kan worden. Het zegt niets over de organisatiedoelen zelf (het wat) en geeft als concept zelf in feite geen aandacht aan het *waarom* van een organisatie (zie Sinek, 2009, 2014).

De literatuur geeft aan dat de drie belangrijkste hefbomen van sociale innovatie zijn (1) slimmer werken, (2) dynamisch managen en (3) flexibel organiseren (Volberda, Jansen, Tempelaars & Heij, 2011, p. 85). Hoewel deze drie hefbomen afzonderlijk

(3) ontwikkelen van een intelligence-discipline en versterking van diagnostisch vermogen (Meesters, 2014, p. 257).

[3] Volberda is één van trekkers van het concept sociale innovatie. Samen met Jansen, Tempelaars en Heij omschrijft hij sociale innovatie als "het ontwikkelen van nieuwe management vaardigheden (dynamisch managen), het hanteren van flexibele organisatieprincipes (flexibel organiseren) en het realiseren van hoogwaardige arbeidsvormen (slimmer werken) om het concurrentievermogen en de productiviteit te verhogen. Met sociale innovatie kunnen organisaties hun technologische kennisbasis beter benutten en prestaties verbeteren" (Volberda, Jansen, Tempelaars en Heij, 2011, p. 85).

benoemd kunnen worden, beïnvloeden zij elkaar en zijn ze afhankelijk van elkaar. Daarnaast is (4) co-creatie door externe samenwerking benoemd als een belangrijke hefboom. We bespreken onderstaand deze vier hefbomen kort. Hierbij leunen we met name op het werk van Volberda et al. (2011).

13.3.1 Slimmer werken

Slimmer werken houdt in essentie in dat mensen in een organisatie beschouwd worden als "kenniswerkers". Ons inziens een meer holistische denkwijze over medewerkers. Mensen niet reduceren tot het laten uitvoeren van productietaken. Zij hebben evaring en vaardigheden. Kortom, kennis van zaken (vakmanschap). Juist vanuit deze kennis kunnen ze meedenken over vernieuwingen en veranderingen, die nodig zijn om de gewenste prestaties op een goede manier te bereiken. Slimmer werken is daarmee eigenlijk een oproep om mensen hun talenten (lees ook vermogens) te gebruiken. De relaties in het werk dienen daarop gericht te zijn. Volberda et al. geven aan dat de aanwezigheid van vertrouwen in een organisatie(onderdeel) het sleutelwoord is (zie Peeman, 2009). Vertrouwen stimuleert "de betrokkenheid van en kennisdeling tussen medewerkers en om met hulp van elkaar tot goede oplossingen te komen" (Volberda et al., 2011, p. 94). Vertrouwen is nodig om elkaars problemen en zienswijzen te begrijpen (zie ook Peeman, 2009; Reina & Reina, 1999).[4] Hiervoor is een goede communicatie een voorwaarde (zie noot 5). Voor slimmer werken is verder kennisbewustzijn van belang; bij wie kan snel een bepaalde expertise gevonden worden voor een bepaald vraagstuk (zie noot 5). Impliciete kennis kan op die manier expliciet worden en verspreid. Bovendien stimuleert kennisbewustzijn zelforganisatie op de werkvloer.

[4] Reina & Reina (1999, p. 23) geven in hun werk aan dat vertrouwen bestaat uit vier componenten: "(1) vermogen tot vertrouwen; onze bereidheid om te vertrouwen, (2) contractueel vertrouwen; vertrouwen op karakter, (3) communicatief vertrouwen; vertrouwen in goede communicatie en (4) competentievertrouwen; vertrouwen in capaciteiten".

13.3.2 Dynamisch managen

Dynamisch managen gaat om "het stimuleren van creatieve oplossingen binnen organisaties" (Volberda et al., 2011, p. 96). Managers moeten het vermogen hebben om mensen mee te nemen in nieuwe ideeën en mogelijkheden door zich als een actieve leider op te stellen. Voorts dienen zij deze ideeën en mogelijkheden tot ontwikkeling te brengen. Managers of managementteams nemen derhalve in sociale innovatie belangrijke plaats in. Het stimuleren en motiveren van medewerkers ten behoeve van de organisatiedoelen (transformationeel leiderschap). Ons inziens gaat het vooral ook om het ontwikkelen van de eigen talenten en zelfvertrouwen van de medewerkers. Het woord attitude komt daarbij in gedachten. De hefbomen "slimmer werken" en "dynamisch managen" vormen samen de formule van Weggeman (1997, pp. 33-34); kennis is informatie * ervaring, vaardigheid en attitude (I*EVA). We merken overigens op dat het in dynamisch managen niet alleen gaat om het beïnvloeden van de attitude van medewerkers. Aandacht dient eveneens uit gaan naar de wijze waarop werkprocessen georganiseerd zijn (zie ook flexibel organiseren). Het "in controle" willen zijn van organisaties heeft ertoe geleid dat veel zaken vastgelegd zijn in allerlei procedures en instructies. Medewerkers (soms ook de organisatie zelf) lijken daarin geregeld verstrikt te zijn. Vandaar dat dynamisch managen alleen mogelijk is als er ruimte is om de eigen verantwoordelijkheid te nemen.

13.3.3 Flexibel organiseren

Flexibel organiseren houdt in " ... het slim en logisch samenvoegen, organiseren en combineren van bestaande middelen of juist het afleren van gedrag en het ontmantelen van starre structuren zodat de reactiesnelheid van de organisatie toeneemt" (Van Beek 2006, p. 120). Het aanpassingsvermogen van een organisatie voor een groot deel afhangt van hoe goed zij informatie (lees ook kennis) kan verwerken (Haeckel, 1999). Het vermogen om zich aan te passen aan veranderingen in de omgeving staat of valt ook hier bij het beschikbaar hebben van de informatie en kennis.[5]

[5] Volberda et al. (2011, p. 98) geven aan dat het hierbij wel van belang is om innovatieactiviteiten te scheiden van bestaande activiteiten.

13.3.4 Co-creatie door samenwerking met andere organisaties en kennisinstellingen

Co-creatie houdt in samenwerken met anderen aan vraagstukken vanuit een dialoog. Het idee van sociale innovatie is dat de "go-alone strategie" niet meer werkt in deze maatschappij (Volberda et al., 2011, p. 100). Samenwerken met andere organisaties en kennisinstituten is noodzakelijk om de gewenste prestaties te halen.

13.4 Sociale innovatie en Intelligent Blauw

Theoretisch gezien zijn drie van de vier hefbomen te vinden in Intelligent Blauw.[6] We beginnen met de vierde hefboom, co-creatie. Co-creatie is te herkennen in het alert - en het adaptief - vermogen. Hoewel het in het alert-vermogen nog niet om feitelijke samenwerking gaat, is er aandacht voor het identificeren van partners. Het oog van de politiezorg in de maatschappelijke veiligheidszorg wordt daar wel gericht. Verder wordt co-creatie zichtbaar in het besluitvormingsproces in het adaptief-vermogen en wel in het nemen van de besluiten. Is er sprake van een politile oplossing voor problemen of integraal en dus met anderen. Tot slot, is co-creatie te vinden in het ontwikkelpad van Intelligent Blauw. Wil er gekomen worden tot een intelligence-discipline, is het samenwerken met andere organisatie en kennisinstituten een voorwaarde (Meesters, 2014, p. 273). Flexibel organiseren hebben wij concreet als één van de indicatoren van het adaptief-vermogen benoemd en is dus conceptueel te herleiden. Het dynamisch managen is eveneens zichtbaar in Intelligent Blauw. Wij hebben hiervoor het begrip organisational intelligence gehanteerd. Organisational Intelligence heeft betrekking op de mensen binnen een organisatie. Het begrip houdt in dat medewerkers het vermogen en de bereidheid hebben (1) anders en effectiever te werken, (2) zich kritisch op willen stellen naar ingesleten patronen en (3) bereid zijn deze patronen aan te passen als deze niet effectief blijken te zijn. Het slimmer samenwerken komt niet direct in beeld in Intelligent Blauw. Daarentegen mag gesteld worden dat het "slimmer werken" is gehanteerd in de aanpak van het onderzoek Intel-

[6] Slimmer werken is niet als indicator terug te vinden in ons concept Intelligent Blauw. Daarentegen is zij wel terug te vinden in de aanpak van het onderzoek, met name in het gedeelte van het actieonderzoek (zie Meesters, 2014, hoofdstuk 5).

ligent Blauw. het betrof actieonderzoek, waarbij het doel was steeds op zoek te gaan naar nieuwe handelingspatronen.

In ons werk hebben we een vergelijkende analyse verricht tussen de concepten Intelligent Blauw en (de intelligente toepassing) van IGP. Als we de hefbomen van sociale innovatie in deze vergelijking betrekken, dan mogen we nu concluderen dat in het alert - en adaptief - vermogen de drie hefbomen van sociale innovatie marginaal aanwezig (co-creatie) zijn dan wel ontbreken (dynamisch managen en flexibel organiseren). In ons werk hebben we vooral gewezen op dat er aandacht moet komen voor organisational intelligence. Wij hebben gesteld dat politiemanagers hiertoe de motor zijn. Het raakt, zoals gezegd, de cultuur en leiderschap van de politieorganisatie. Voorts hebben we gesteld dat organisational intelligence - het dynamisch managen - nodig is om het responsief-vermogen van Intelligent Blauw inhoud te geven. “Het waarlijk organiseren van intelligence vindt hier naar ons idee zijn ankerpunt” (Meesters, 2014, p. 289). Hier moeten we even terug naar het begrip intelligence (intelligentie) en de tweede hiërarchie van Jaap; kennis, intuïtie, normen en waarden. Intelligentie is naar ons idee nodig om de waarden te bepalen, want waarden kunnen veranderen. Naar ons idee zorgt het responsief-vermogen voor het morele kompas van Blauw. Dit morele kompas geeft Blauw richting. De hefbomen van sociale innovatie kunnen bijdragen in hoe responsiviteit te vergroten. Slimmer werken komt hier dan ook nadrukkelijk om de hoek kijken. Tot slot kan door toepassing van de hefbomen van sociale innovatie ook de inhoud van politiezorg (het wat en ook deels het waarom) gevonden worden. Maar het gaat veel verder, de hefbomen van sociale innovatie zijn nodig om intelligentie in de besluitvorming in Blauw (zowel op langere termijn en in het operationele werk) tot stand te brengen. Bezien vanuit de politieorganisatie is dit nodig, omdat een groot deel van Blauw beschouw frontlijnwerkers zijn. Het werk in de frontlijn is sterk normatief geladen, en hier zijn waardenconflicten te vinden. Bezien vanuit maatschappelijke veiligheidszorg is het eveneens opportuun. Daar zijn andere frontlijnwerkers werkzaam, die met identieke uitdagingen in het werk te maken hebben. Bovendien staan de vraagstukken waaraan zij werken vaak direct, indirect of op langere termijn met elkaar in verbinding. Vandaar dat co-creatie in de ruime zin aan de orde zal komen, op strategisch, tactisch en operationeel niveau in de organisaties (zie onze suggestie van smart areas in Meesters, 2014, p. 293).

We hebben bovenstaand in de alinea’s over dynamisch managen aangegeven dat de formule van Weggeman “I*EVA” deels gevuld wordt door de hefbomen. Gemist wordt de aandacht voor de I. De I van informatie (lees intelligence-product). In Intelligent Blauw is het beschikbaar hebben van intelligence-product een belangrijke dimensie. Het gaat om het alert-vermogen van de organisatie. Weten wat er speelt,

zoeken naar mogelijkheden om data te verzamelen et cetera. We pleiten daarom voor het versterken van diagnostisch vermogen binnen Blauw, de politieorganisatie en de maatschappelijke veiligheidszorg. Ook hier gaat het om slimmer werken (ervaring en vaardigheden) en het zijn van kenniswerkers. We hebben ook mogen vaststellen dat het nemen van besluiten op basis van intelligence-producten niet eenvoudig is. Een vaardigheid in het adaptief-vermogen, die politiemanagers (in eerste) instantie moeten ontwikkelen. Immers, er is op het vlak van intelligence-productie een enorme ontwikkeling gaande is: Big Data. Daarnaast zijn er diverse andere innovatieve intelligente tools ontwikkeld, die tegemoet komen aan high quality intelligence-producten. Nodig is, dat Blauw de inhoud dan wel begrijpt, kan waarderen en een adequate respons kan formuleren.

13.5 De (re)organisatie Nationale Politie en sociale innovatie

Inmiddels is de reorganisatie van de Nederlandse politie al weer tweenhalf jaar (juli 2015) een feit. We hebben vanaf de reorganisatie tot op heden de gelegenheid gehad om een opdracht uit te mogen voeren in één van de politie-eenheden. Hierdoor waren we in staat om de reorganisatie van dichtbij mee te maken. Als we op dit moment de vraag zouden formuleren of de Nationale Politie baat zou hebben bij het inzetten van sociale innovatie om te komen naar een Intelligente politieorganisatie. Het antwoord daarop is: ja! De hefbomen van sociale innovatie kunnen ons inziens bijdragen in de manier (het hoe) om de gewenste veranderingen in de organisatie tot stand te brengen.[7] Deze hefbomen zijn echter alleen effectief, als een ander vraagstuk de aandacht krijgt. Dit vraagstuk zijn wij eerder tegen gekomen in ons werk, toen wij onze PS formuleerde. Er is sprake van een paradox. De algemene aanname bij de introductie van IGP was, dat door het toepassen van IGP de resultaten van politiekorpsen zouden gaan verbeteren. En als gevolg hiervan de veiligheid in de samenleving. Daar-

[7] De reorganisatie tot Nationale Politie wordt centraal aangestuurd. Er worden doelen opgelegd, die gehaald moeten worden. In de praktijk is er daarom sprake van “vinken” (de vink halen), terwijl het niet gaat over “vonken” (dat de vink ook adequaat werkt). Bovendien geven de “vinken” grotendeels over IGP-onderdelen (o.a. teambriefing, operationele briefing, inrichting informatieorganisatie). Hierbij is geen ruimte voor de diversiteit die er bestaat tussen de voormalige regio’s. Niet alleen in de manier waarop het werk wordt uitgevoerd (bijvoorbeeld door andere procesafspraken) maar ook in de invulling van het werk. Het mentaal kader van de politiemensen is in onze eenheid verschillend en soms botsen ze. Dit in een situatie dat ook een deel van de medewerkers teleurgesteld zijn doordat er door functievergelijking sprake is van demotie of “boventalligheid”.

bij werd voorbij gegaan aan het feit dat IGP zelf ook een veiligheidsprobleem vormt. Immers, repressie is een veel gebruikt middel om veiligheid te waarborgen, maar in wezen is repressie de aantasting van wat sommige anderen zien als hun maatschappelijke veiligheid. De grens is dus interpretatiegevoelig (Meesters, 2014, p. 31). Wij stelden daarom dat (1) het concept en (2) de toepassing van IGP helder moeten zijn. Wij hebben mogen constateren dat dit voor beide punten niet het geval was. Het gebrek aan deze helderheid zagen wij als het bestaande veiligheidsprobleem. In de (re)organisatie van de Politie is dit veiligheidsprobleem niet opgelost. IGP is nog steeds een dominant begrip in de reorganisatie, al wordt het nu "scherper sturen" genoemd. De aandacht hierbij voor nu gaat vooral uit naar het behalen van "vinken" (zie noot 8). Voor de echte inhoud van het politiewerk (waarom doen we wat we doen; politiezorg voor Blauw), lijkt er in de centrale (re)organisatie amper aandacht te zijn. Daarom hier een oproep aan het hogere politieleiding om het waarom van politiezorg centraal te stellen. Het richtinggevende antwoord vorm te geven in mensentaal, die aanspreekt. Voorts zelf de hefbomen voor sociale innovatie (vooral het dynamisch managen) toe te passen, om het hoe en het wat binnen de politieorganisatie verder vorm te geven. Hierbij dient er wel er ruimte te zijn voor diversiteit tussen en tijd voor eenheden, om elkaar beter te leren begrijpen. En boek vervolgens de resultaten voor onze veiligheid, waarvoor onze dank. Intelligent Blauw kan in dit proces van waarom, hoe en wat wellicht wat inspiratie geven: dus leer, leer verder en reflecteer.

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Chapter 14

Cloud revised and a cloud to singularity

Bart Bogaert

Abstract The path of continuous innovative ICT research by Jaap van den Herik and my path of remaining ambition to start a Ph.D. crossed in Rotterdam, back in 2008. Since that initial discussion I have the honour to work on my Ph.D. under the supervision of Jaap van den Herik for a period of almost four years. The research subject of Cloud Computing was new at that point in time. Now, four years later, the landscape has changed already. The pace of innovation and change in information technology is high, therefore I like to amend our initial findings with the following two conclusions: (1) Cloud revised and (2) Cloud to Singularity.

14.1 Cloud revised

Cloud computing is interpreted in many ways. Bogaert (2011) build a structure based on two dimensions; these were (1) the dimension of collocation and (2) the dimension of virtualisation. Today, we should extend these two dimensions as follows: For the first dimension of collocation we need to rethink the dimension. In the past the extreme level internal equaled on premise private and the extreme level external equaled off-premise public. Today we have to loosen these cohesions. We can therefore split

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the dimension of collocation into two new dimensions. (1) The dimension of collocation with the extreme levels of collocation: (a) on premise vs. (b) off-premise. (2) The new dimension of individuality with the extreme levels of individuality, (a) private vs. (b) public. Combing the extreme levels of the dimension of collocation and the extreme levels of dimension of individuality using a two dimension graph results in four quadrants. We show the idea in Figure 14.1.

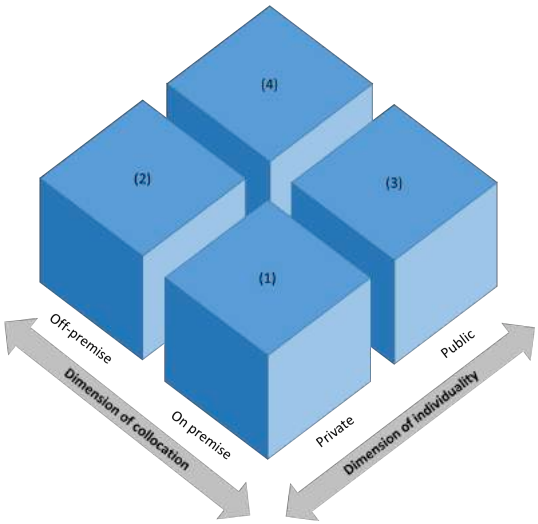

Fig. 14.1 Dimension of collocation and dimension of individuality

1. On-premise Private cloud: Cloud environment on premise of the organisation and for private usage only.
2. Off-premise Private cloud: Cloud environment off-premise, solely accessible by the organisation and for private usage only. An example is a private hosted cloud for an organisation at a cloud service provider.
3. On-premise Public cloud: Cloud environment on premise of the organisation, shared with other organisations. An example is the use within the new API economy organisations to share information or services with others using public accessible APIs, therefor an on premise public cloud approach can be used to cope with the dynamics of potential workload.

4. Off-premise Public cloud: Cloud environment off-premise, shared by many organisations.

For the second dimension of virtualisation we observe two major trends in the market. (1) The level of virtualisation is extended downwards within the infrastructure using new technologies such as software defined infrastructure, software defined storage, and software defined networks. This results in the ability to create and configure infrastructure by software, consequently new offerings called bare metal servers are available as a cloud service in the market. (2) The level of virtualisation is deepened at the level of Platform as a Service. Where in the past the Platform as a Service was provided as a single service, now the platforms become platforms of aggregated services. These platforms aggregate services from different vendors.

We have defined now three dimensions: (1) the dimension of virtualisation, (2) the dimension of collocation, and (3) the dimension of individuality. These three dimensions are used as axes in a three dimensional graph. We show the idea in Figure 14.2. We depict the extreme levels for each dimension, resulting in eight octants. When

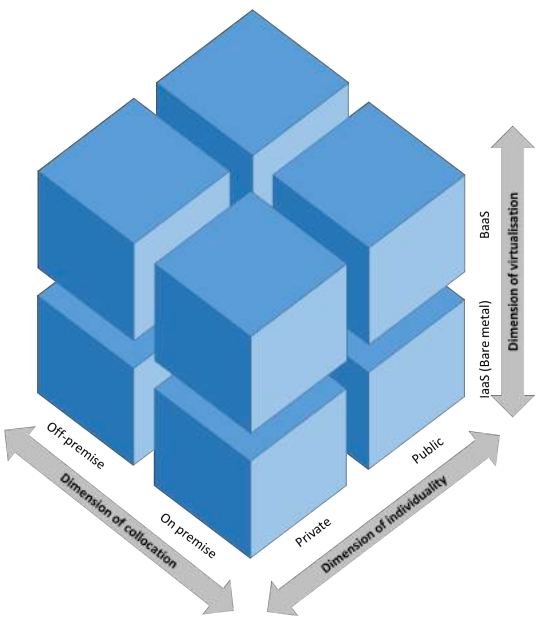

Fig. 14.2 Dimension of collocation, dimension of individuality, and dimension of virtualisation

we examine the industry along these three dimensions, we are able to define eight operational scenarios in cloud computing according to the eight octants.

1. On-premise Private Infrastructure services
2. Off-premise Private Infrastructure services
3. On-premise Public Infrastructure services
4. Off-premise Public Infrastructure services
5. On-premise Private Business services
6. Off-premise Private Business services
7. On-premise Public Business services
8. Off-premise Public Business services

14.2 Cloud to Singularity

Cloud might seems the future, as the world is moving rapidly to these technologies. However, it is only an intermediate step to the next wave of technologies. Let us take a closer look on what could be the future beyond todays promising technology of cloud. Cloud Computing is a delivery model of technology where the use of information technology is provided over the internet. This enables users to access technology-enabled services from the internet (in the cloud) without knowledge of, expertise about, or control over the technology that supports them. We defined three waves of computing which introduced the third wave as cloud computing (Bogaert, 2011). Cloud computing is the third wave of computing, characterised by two developments: (1) consolidation of technology and (2) sharing of resources among different users/applications on the same platform. This results in less infrastructure, software, and consequently in lower operational costs. The industrialised delivery model of cloud turns technologies into a commodity. If we look to the graph I used before, you might ask yourself if cloud computing is going to be the ultimate and final delivery model of information technology. Or, what is the next shift in technology that is going to trigger a new wave with associated superior increase in performance versus costs? We extended the previous graph and show the idea in Figure 14.3.

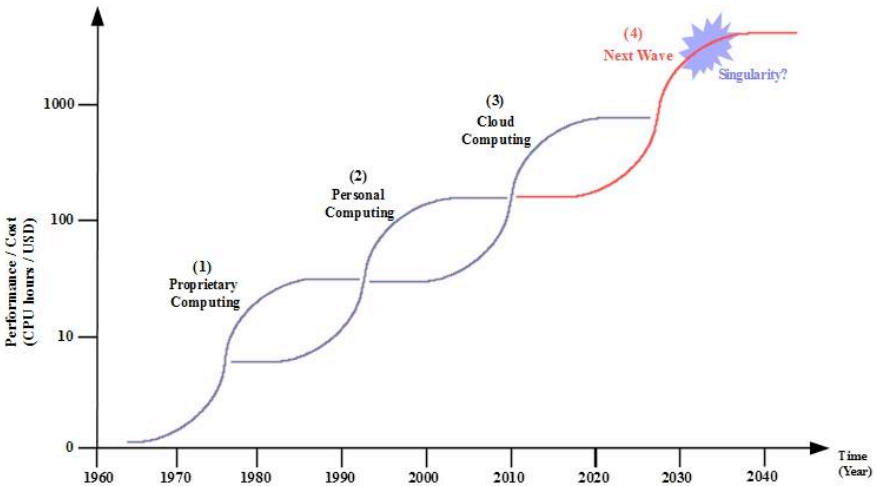

Fig. 14.3 The fourth wave of computing

Mobile technologies leverage the omnipresence of the internet together with access to information and services in the cloud. The growth of wireless access to the internet combined with the growth of available information and services is boosting the development of mobile technologies. Also here, whats next? While cloud and mobile are still growing, the key questions already are: what is the future after cloud and mobile have become mature? Which innovations will drive the next wave of information technology? Being home for a year caused by a scattered leg gave me enough time to think about this kind of philosophic questions. I came up with four drivers with an impact on the way we will cope with information technology in the near future. These four drivers are (1) consolidation, (2) data and service unification, (3) integration between the human being and the technology, and (4) cognitive capabilities of computer systems. Let me explain these four drivers.

1. The first driver is consolidation. Caused by the industrialised way of automated cloud services delivery there is the first development of consolidation accelerating in 2015. Global cloud service providers such as Amazon, Microsoft, and IBM deploy new cloud data centres on a regular basis and acquire small cloud solution and service providers. Moreover, the global cloud service providers announce growth rates pointing to this market consolidation. For example Amazon announced an 84% growth year-on-year mid-2015. This direction will have an

impact on small and local cloud service providers. A similar trend of consolidation happened before in other industries, for example in automotive and food. Information technology is moving into the same direction. Ultimately we will end up with a market of a few global cloud service providers and a small number of niche cloud service providers. Back in 1943 when a computer was a complex machine housed in a large building, Sr. Thomas John Watson made the statement: ”I think there is a world market for maybe five computers”. Maybe, one day he might be right.

2. The second driver is the data and service unification. Looking to the current evolution of cloud computing from a technology perspective we see a maximum sharing of compute infrastructure, storage, network, to some extend middleware services, and the associated human services. Looking from a data and service perspective this is becoming a whole other story. Data is getting scattered and replicated multiple times, so though we optimised the use of storage with cloud, we keep burdening storage due to scattering and replication of data. Let me illustrate this with a simple example. Your own personal data (for example your name, address, and contact details) are stored at each service provider and there is a continuous challenge to keep all these copies up to date. Ideally this would be stored only once, kept updated, and all other services would refer to this single source of data through a unique reference. Of course, this requires complex access control and security. Standardisation is a key to get to this point. This requires a single representation of information in format and more important (and challenging) in meaning. Your personal data is only a small piece of data compared to what is stored on the cloud, needless to say the level of optimisation that could be achieved. The same is true for services as the same logic is implemented over and over again by each application. Let me illustrate this with another example. Financial applications calculate the applicable VAT, and this algorithm is implemented by each application provider. Every change in legislation requires the implementation of all these applications changes. A single service could provide this updated as a service for all applications, thus implemented once, and kept updated to reality. Standardisation of data and associated services can simplify application development and maintenance. Further standardisation combined with current technologies such as service brokers will underpin this evolution. Once this is achieved the network becomes the core of the future computer!

3. The third driver is the integration between the human being and the technology. Over half a century the communication between human beings and computers evolved from punch cards over text terminals to a wide variety of graphi-

cal devices. Additionally, over the past decade developments enabled interaction through audio using text to speech and speech to text technologies. The entire interaction remains a slow process, limited by the speed a human can type (or speak) and read (or hear). Developments in bionic technology show novel alternatives to interact with technology. Bionic hands, eyes, ears show that ability to establish a communication between technology and the human nerve system. Though there is still a long way to go this looks a promising evolution. In the future we can expect a more natural way to communicate, ultimately enhancing our ability to think by interacting with technology to support our thinking.

4. The fourth driver is the cognitive capabilities of computer systems. Traditional computer systems use structured data as input and have programmed algorithms to process the data. The designed algorithms work in a binary way and in terms of analysis this means that the algorithm processes the structured data to seek for what the algorithm is looking for. Recent developments in cognitive systems go beyond this. A massive amount of information is processed using natural language processing, looking for relationships in the data, looking for correlations between pieces of information, and prediction algorithms to seek for the best possible answers. These systems are not pre-programmed according to the data set. Instead these systems are trained in a knowledge area using a massive amount of high quality data relevant to that knowledge area. The advantage of cognitive systems is their ability to disclose new correlations. These systems explore all different possible correlations instead of using a pre-programmed algorithm that processes according to the known and prescribed relationships. These systems also use a prediction algorithm to find a multitude of potential answers and add a probability to each individual potential answers. Correlating information is natural for our brain. We collect information through different ways and experiences. Our brain uses all this information and the correlation of it gives us one or more outcomes, this without a pre-programmed decision tree or an 'if-then-else' sequence. The ability to learn and to improve our thinking remains unique, but cognitive systems extend these abilities. Their ability to process a massive amount of information goes beyond our capabilities and therefore they can assist in our human thinking.

The next shift in technology is coming, and the above four drivers (among others) will likely impact this shift and bring us to the next wave of technology with an impact of on the technology landscape and a better cost versus performance ratio. This might also bring us closer to the technology singularity. Kurzweil predicted the singularity to occur around 2045 and Vinge predicted it for some time before 2030, so our next

shift in technology will most probably bring us very close to this point. Still lots of innovative ICT research is required, but lets think positive and look forward to the exciting times ahead!

14.3 Conclusion

Dear Jaap, it was a tremendous honour to work under your supervision. Working with you was an incredible once in lifetime learning experience. I will always remember your continuous drive for perfection, your curiosity for the details, and your attention for consistency. Thank you very much! I wish you all the best for the next episode in your personal life, and as all good things come in threes: (1) wish every day your life may be filled with love, (2) wish you a continuous good health, (3) and wish you everyday happiness!

Part III
Illustrations

Chapter 15

How I learned to stop worrying and love dancing professors

Sander Bakkes

Abstract

Numerous Ph.D. students can attest to a particular scene taking place inside Jaap's office. The office in question was usually a place of careful thought and neatly displaced stacks of paper. Every so often, however, it bore witness to Jaap trying to explain – in a rather memorable fashion – that one's manuscript hopped "...from HERE, ...to THERE! To HERE, ...and HERE!" Indeed, as the forthcoming illustrations attempt to convey, Jaap succeeded quite gracefully in his endeavour to get the point across. And perhaps – will we ever know for certain? – he got yours truly to hop in the right direction too.

Sander Bakkes (Illustrations by Tamar Hestrin-Grader & Brechtje Schipper)
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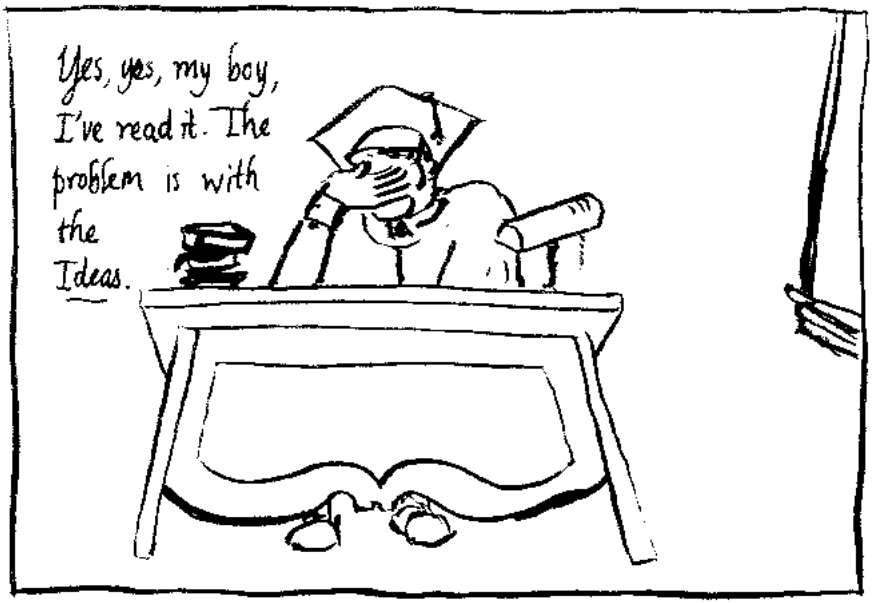

Fig. 15.1 Thou shalt not hop hop hop (1/8). Illustrations by Tamar Hestrin-Grader.

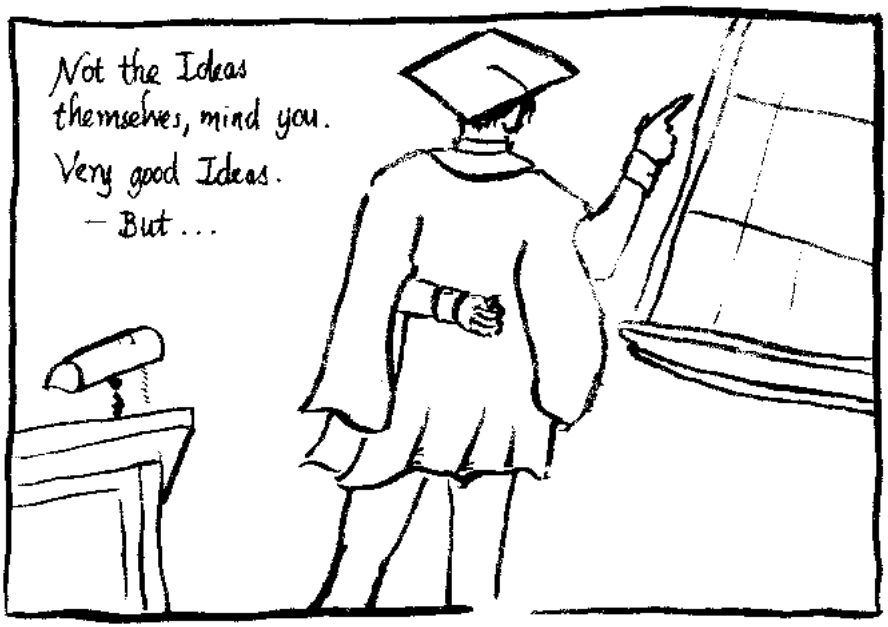

Fig. 15.2 Thou shalt not hop hop hop (2/8).

Fig. 15.3 Thou shalt not hop hop hop (3/8).

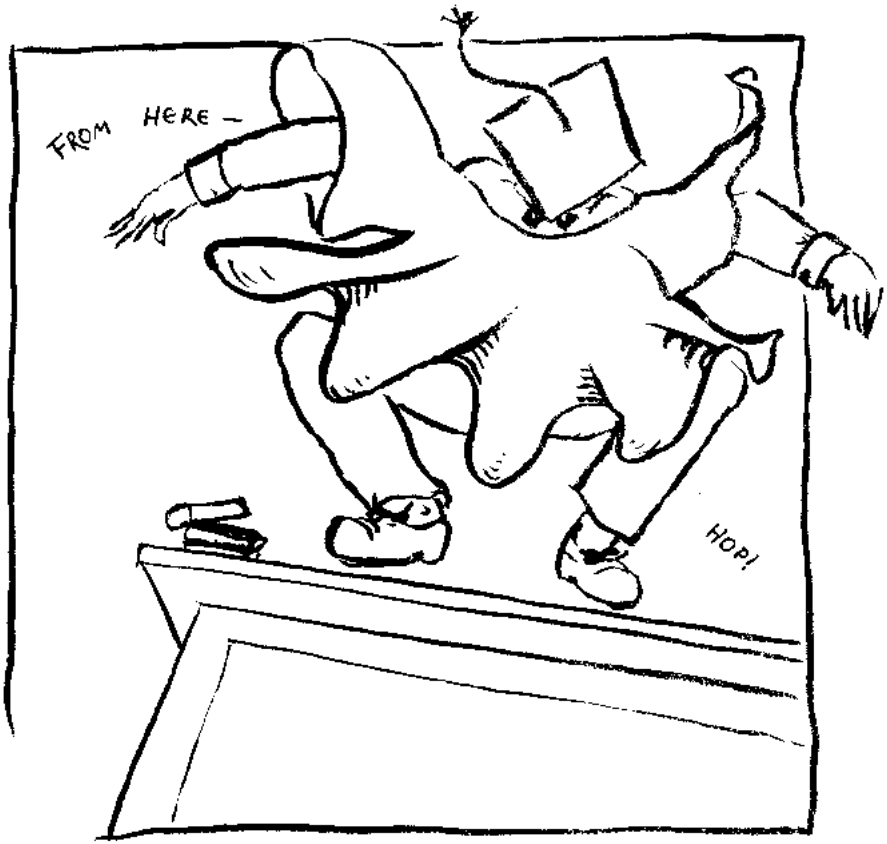

Fig. 15.4 Thou shalt not hop hop hop (4/8).

Fig. 15.5 Thou shalt not hop hop hop (5/8).

Fig. 15.6 Thou shalt not hop hop hop (6/8).

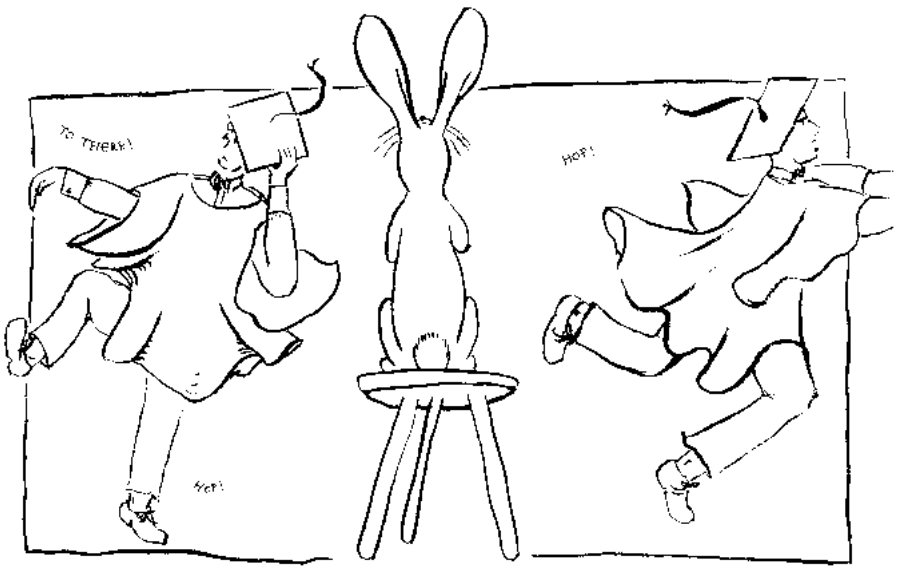

Fig. 15.7 Thou shalt not hop hop hop (7/8).

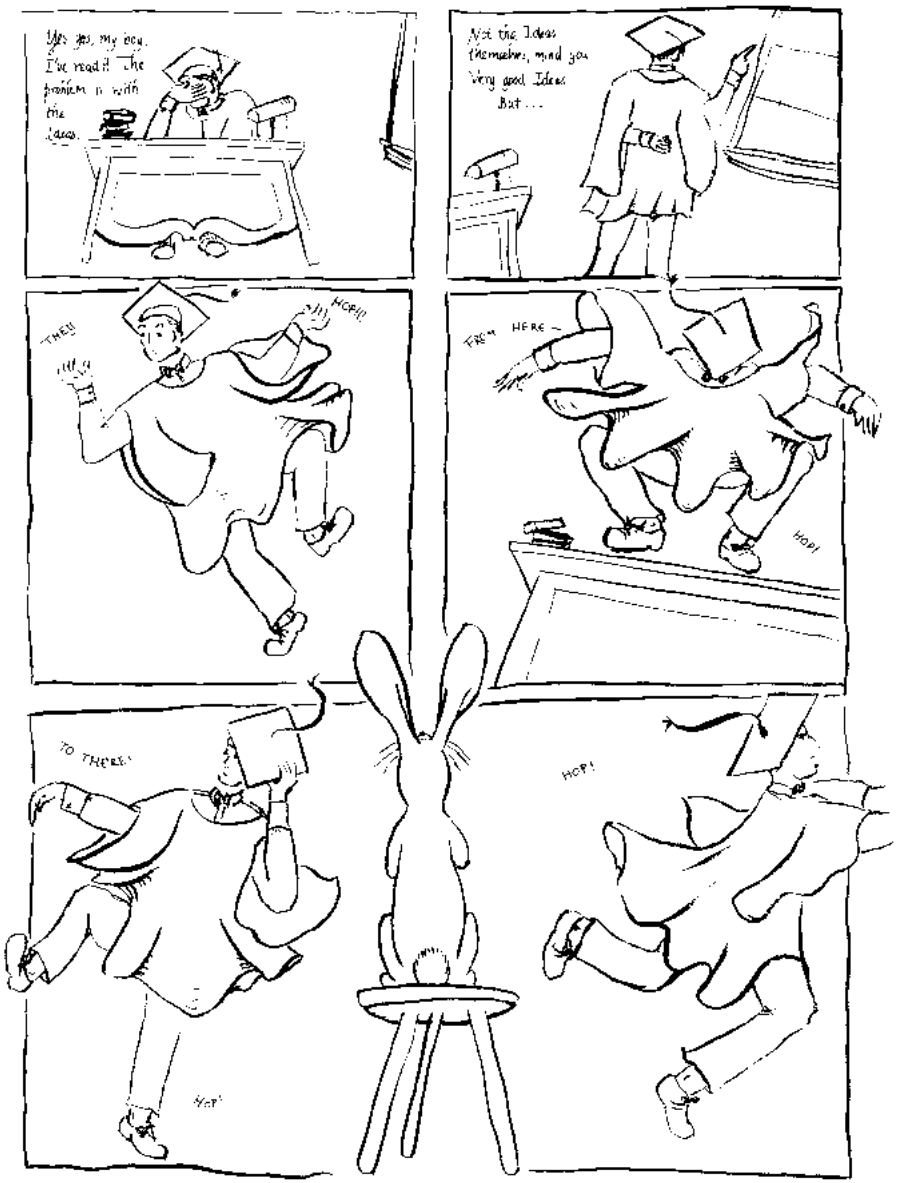

Fig. 15.8 Thou shalt not hop hop hop (8/8).

Fig. 15.9 Go with the flow; let's play chess. Illustration by Brechtje Schipper.

Appendix A

Tilburg Ph.D. Students Supervised by Jaap van den Herik

List of Ph.D. Students

1	**Ph.D. Student**	B. Torben-Nielsen
	Title	Dendritic morphology: function shapes morphology
	Date	3 December 2008
	University	Tilburg University
	Supervisors	Prof.dr.H.J. van den Herik, Prof.dr.E.O. Postma
	Daily advisor	Dr. K.P. Tuyls
2	**Ph.D. Student**	H.R. Stol
	Title	A framework for evidence-based policy making using IT
	Date	21 January 2009
	University	Tilburg University
	Supervisors	Prof.dr.H.J. van den Herik
3	**Ph.D. Student**	F. Reul
	Title	New Architectures in Computer Chess
	Date	17 June 2009
	University	Tilburg University
	Supervisors	Prof.dr.H.J. van den Herik
	Daily advisor	Dr. J.W.H.M. Uiterwijk
4	**Ph.D. Student**	L.J.P. van der Maaten (cum laude)
	Title	Feature Extraction from Visual Data
	Date	23 June 2009
	University	Tilburg University
	Supervisors	Prof.dr. E.O. Postma, Prof.dr. H.J. van den Herik
	Daily advisor	Dr.A.G. Lange

5	**Ph.D. Student**	I. Berezhnoy
	Title	Digital Analysis of Paintings
	Date	7 December 2009
	University	Tilburg University
	Supervisors	Prof.dr. E.O. Postma, Prof.dr. H.J. van den Herik
6	**Ph.D. Student**	S.C.J. Bakkes
	Title	Rapid Adaption of Video Game AI
	Date	3 March 2010
	University	Tilburg University
	Supervisors	Prof.dr. H.J. van den Herik
	Daily advisor	Dr.ir. P.H.M. Spronck
7	**Ph.D. Student**	B. Bogaert
	Title	Cloud Content Contention
	Date	30 March 2011
	University	Tilburg University
	Supervisors	Prof.dr. H.J. van den Herik, Prof.dr. E.O. Postma
8	**Ph.D. Student**	X. Mao
	Title	Statistical Language Models for Alternative Sequence Selection
	Date	7 December 2011
	University	Tilburg University
	Supervisors	Prof.dr. H.J. van den Herik, Prof.dr. E.O. Postma
	Daily advisor	Dr. N. Roos, Dr. A. Salden
9	**Ph.D. Student**	J.H. Stehouer
	Title	Airport under Control
	Date	25 May 2011
	University	Tilburg University
	Supervisors	Prof.dr. A.P.J. van den Bosch, Prof.dr. H.J. van den Herik
	Daily advisor	Dr. M.M. van Zaanen
10	**Ph.D. Student**	N.T. Kakeeto-Aelen
	Title	Relationship Marketing of SMEs in Uganda
	Date	1 February 2012
	University	Tilburg University
	Supervisors	Prof.dr. J. Chr. van Dalen, Prof.dr. H.J. van den Herik
	Daily advisor	Dr. B.A. Van de Walle
11	**Ph.D. Student**	T. Vis
	Title	Intelligence, politie en veiligheidsdienst: verenigbare grootheden?
	Date	6 June 2012
	University	Tilburg University
	Supervisors	Prof.mr. Th.A. de Roos, Prof.dr. H.J. van den Herik, Prof.dr. A.C.M. Spapens

12	**Ph.D. Student**	N.A. Pascall
	Title	Engendering Technology Empowering Women
	Date	19 November 2012
	University	Tilburg University
	Supervisors	Prof. dr. H. J. van den Herik, Prof. dr. M. Diocaretz
13	**Ph.D. Student**	A. Gunawan
	Title	Information Access for SMEs in Indonesia
	Date	19 December 2012
	University	Tilburg University
	Supervisors	Prof.dr. H.J. van den Herik
	Daily advisor	Dr. M.A. Wahdan, Dr. B.A. Van de Walle
14	**Ph.D. Student**	G. van Lankveld
	Title	Quantifying Individual Player Differences
	Date	27 February 2013
	University	Tilburg University
	Supervisors	Prof.dr. H.J. van den Herik, Prof.dr. A.R. Arntz
	Daily advisor	Dr.ir. P.H.M. Spronck
15	**Ph.D. Student**	J.H.M. Janssens
	Title	Outlier Selection and One-Class Classification
	Date	11 June 2013
	University	Tilburg University
	Supervisors	Prof.dr. E.O. Postma, Prof. dr. H.J. van den Herik
16	**Ph.D. Student**	P.A.M.G. de Kock
	Title	Anticipating Criminal Behavior.
	Date	10 September 2014
	University	Tilburg University
	Supervisors	Prof. dr. H.J. van den Herik, Prof.dr. J. Scholtes
	Daily advisor	Dr.ir. P.H.M. Spronck
17	**Ph.D. Student**	J. Maric
	Title	Web Communities, Immigration, and Social Capital.
	Date	18 November 2014
	University	Tilburg University
	Supervisors	Prof. dr. H.J. van den Herik
	Daily advisor	Dr.R. Cozijn, Dr. M. Spotti
18	**Ph.D. Student**	P.M.A. Meesters
	Title	Intelligent Blauw
	Date	1 December 2014
	University	Tilburg University
	Supervisors	Prof. dr. H.J. van den Herik, Prof.dr. T.A. de Roos

19	**Ph.D. Student**	J. Kyogabiirwe Bagorogoza
	Title	Knowledge Management and High Performance
	Date	24 November 2015
	University	Tilburg University
	Supervisors	Prof. dr. H. J. van den Herik
	Daily advisor	Dr. A. de Waal, Dr. B.A. Van de Walle