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●○○ Entertaining article, no scientific content. A puzzle or a Cover related article are examples of this category.

●●○ Easily readable article on a scientific topic. Should be comprehensible, even without any prior knowledge.

●●● Scientific article that explores a certain topic in depth. Might assume the reader has taken a course that's related to the topic.

EDITORIAL

BY: *Isabela Constantin, editor*

Suppose it is a nice Sunday afternoon, you go to meet up with your old friends in the center to hang out with them and then head to your uncle's countryside house to enjoy the lovely weather. Ten minutes after the set time, you discover that all but one of your best friends, Mr. J., are there. You ask about him and suddenly everyone gets quiet. Somebody tells you about his recent illness and that he is going to spend six months in the hospital. "Bad news, but he is going to recover", he claims. "Sure", you say, "that is what happens when you wander naked around town".

...Or probably you would not say that now. But if you are seriously taking into consideration becoming a spy, you should know the secret language of espionage by now. You should know that friends denote the members of a secret intelligence service and the uncle represents the headquarters of the espionage service. Now that the story has got a whole different turn, it is time to reveal that illness means being under arrest, hospital is a prison, and a naked "friend" implies a spy operating without a backup or a cover.

Language is a key to understanding a story, but espionage has much more to it than that. Over time, it has taken different forms but the goal of espionage and the reason behind it has never changed: the craving for information. A mystical veil was created around it along with clichés embedded in popular culture. Books and movies presenting fictional characters, like Bond, or real ones transformed into legends, such as Mata Hari, stirred the imagination of people. This is also seen in video games, such as Velvet Assassin, which is inspired by the life of the famous French spy Violette Szabo, who served as an agent during World War II.

So, how to separate myth from reality and how did technology shape espionage? How difficult is it to spy on somebody nowadays and how much do we, as citizens, expose ourselves through the use of social networks? These are some questions that we try to answer in this edition: Espionage. Furthermore, if you want to put your cryptographic skills to the test, there is an exciting puzzle to get your head tangled up in. Then, for a little bit of diversity, we will make a switch from the current theme by showing what happens when League of Legends and stock markets simulations meet halfway.

We hope that you will enjoy decrypting this magazine as much we did encrypting it.

PHOTO: *Isabela Constantin*

BY THE BOARD

BY: Sybren Römer

'Obtaining information considered secret of confidential without permission'

Even though spying on people, the military or the government seems like something that only happens during wars, it happens a lot these days. Let's take the NSA as an example. They have an advanced network through which they obtain, analyze and store information about millions of people. They don't just collect information about individuals, but also spy on foreign governments. All of it just to protect their own country against terrorism.

Unfortunately for them, Edward Snowden (a.k.a. The True HOOHA) used the skills they taught him to counter-spy and share his discoveries with the world. It's interesting how the NSA can spy on people without their permission and get away with it, but when someone spies on them it becomes 'theft of government property' and they have to move to Russia to avoid being locked up for life. I'm not really sure when my incognito browsing history became property of the United States government, but apparently they believe it is. And unless you want your laptop to be taken by the US customs so they can plant bugs in it, you are better off leaving it alone.

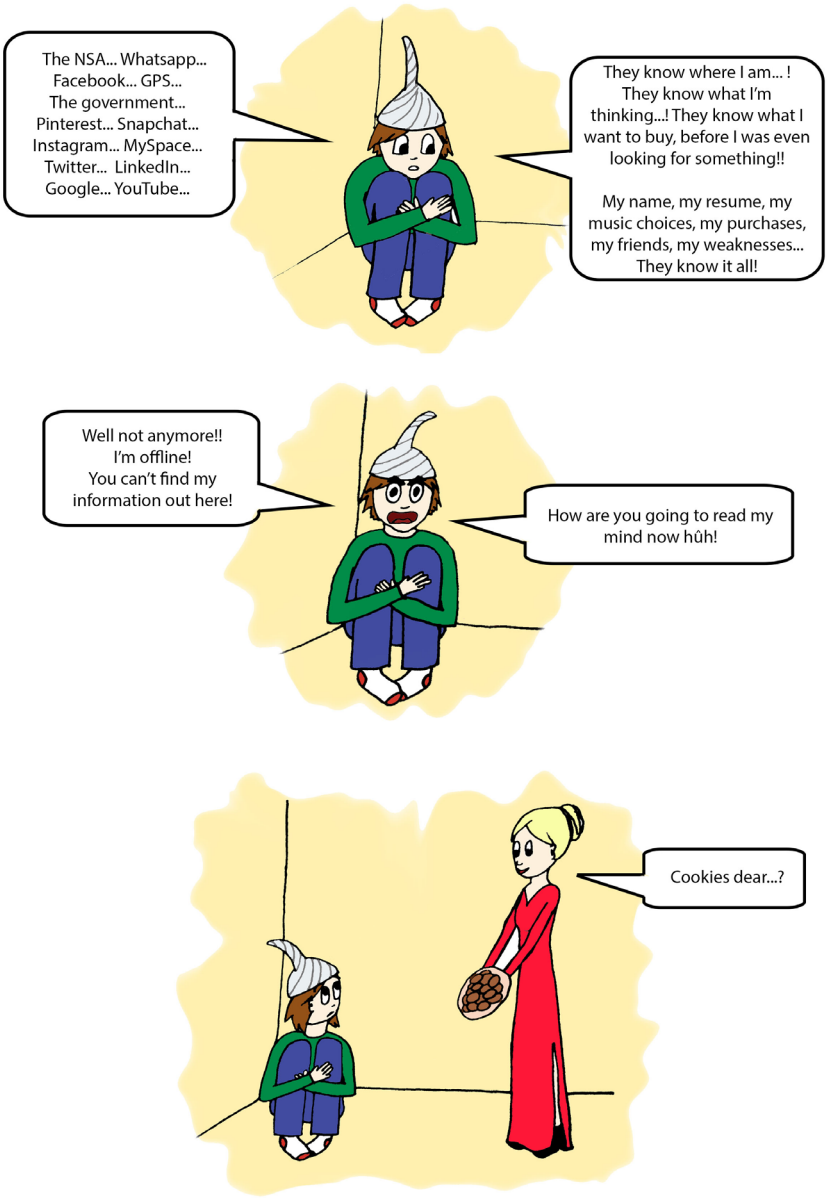
Another great example of a spy who got caught is Bradley Chelsea Manning. He showed the world how the American army killed innocent civilians and when he was prosecuted he figured that the best course of action was to change his gender.

Now, how is all this connected to the board? As a board member you constantly get asked about things that are not public yet or choices you made. Keeping in mind that eventually everything will come out, the best policy is to be as open as you can about it and admit to people when you've made a mistake. I'd hate it if someone from Cover finds some dirt on the board, shares it and afterwards 'decides' to stop with his study on the RUG or to move to another city. Because let's be honest, Cover is - in its own way - almost as powerful as the NSA.

PHOTO: Sybren Römer

COMIC

BY: Joke Kalter



BREMEN

by: Maikel Grobbe

Thursday the 6th of February, the StudCie organized a trip to Bremen. After long consideration, taking into account all the other trips Cover would go on (Budapest with the ExCie and at the time London with AWAI), I decided to go anyway, seeing as it was Germany, land of the Beerfest, big schnitzels, wurst and more. This was the main selling point for me at the time and boy, did Germany deliver, but more on that later. We left Groningen on a bus that would take us to Bremen at 7.45 in the morning.

After resting from the long trip for a bit, it was time to head to Atlas Elektronik, on the outskirts of Bremen. These guys produce all kinds of things, mainly coastal defence related systems, like unmanned mine dispatch boats, torpedos and communication systems. These guys have been around since the 1900's and being there, seeing everything on the display and listening to the presentation, really reminded me why the Germans are known for their engineering. After we had seen a general presentation about the company and the exhibits of their products, it was time for a presentation about sonar and how it worked. And what do you know, of course, a Dutch guy was there telling us how it worked, which was nice as that meant not another presentation in the typical German accent that we had gotten used to really fast.

When the presentation ended, so did our tour at Atlas and it was time to get something to eat and drink, or well, almost. First, we ended up walking through the city, seeing all the scenery and looking at what Bremen had to offer in terms of leisure and shops. After walking around for a bit, having seen the famous Bremen town musicians statue (The story of the donkey, the dog, the cat and the rooster forming a band), it was finally time to sit down and enjoy a proper German meal. This we did at the Biergarten Hofbräu Bremen, a real treat to be at. We decided this was the place to spend our early evening, as they sold beer in mugs of 1 liter for only € 7,50, which was a real treat. And you not only had the choice of regular beer, but also dark and white beers for the same price. You can understand that just having a beer became just having a couple, which in turn even led us to order our food here. They had wursts, schnitzel, half chickens, roast beef and even a genuine 'Schlachterplatte', which was a combination of all sorts of meat thrown together. You can imagine that once we left, we were exhausted from drinking beer and eating. After playing some more drinking games back at the hostel, it was time to call it a night, because we were expected to be at the university at 10 o'clock the next morning.

So, the next day, we went to the university where we first got a tour through the Cognitive Neuroscience Computer Science working group. At first this felt like home because the hallways and offices really looked like the ones we have in Groningen, but once we came to the room where the real research was being done, this feeling was gone completely. What they had there was a giant ball that could rotate freely, meaning

that you could use it to navigate through a complete virtual environment and do tons of research with that. The thing they had laid out for us, was that of a triangular set of hallways which had straight corners. Of course, this is not possible, but they were testing what people would do and how their minds would take the information they had and make a map out of this. This resulted in me thinking it was a square set of hallways and hilarity ensued when this eventually was not the case.

The tour continued with us going to a robotics working group, which had this awesome robot that could make popcorn in a real life kitchen and even do the dishes afterwards. This included getting the pan from the cupboard, pouring the popcorn in, putting the lid on, turning on the stove and pretty much everything else. For the people interested in seeing this robot, it is called the PR2. Afterwards we got to go to the Space Exploration Hall. Those guys make their own robots and do a lot of stuff with hardware. They attend contests regularly and even have had some of their robots in outer space doing exploratory tasks. To us this seemed to be great engineering, they only thought of it as regular work. One of their recent projects we managed to see in action was a robot called the iStruct, which was developed to replicate a real life chimpanzee. It looked real promising and it was very cool to see how they were able to make a big bipedal robot like that walk real steady.

This was the end of the tour at the university and left us with more free time, which we spent walking through the city and going to the old city center with loads of tiny pathways in which you actually could get stuck. Once we were done cruising the city, it was time to determine where to eat. We decided not to go to the biergarten again, but after going to several places and being told that there was no place that seemed decent to us, we did end up there. Another great feast awaited us and the beer seduced us to stay till it was time to head to the hostel.

On our last day in Bremen we went to the Universum. I myself thought it was a bit childish, but the stamps of all the different elements were cool. However, being there did lead to something else. When we were eating something at the restaurant there, we noticed that the players bus of Werder Bremen was in front of the hotel next door. Seeing as we had decided to go to a pub and watch the game of Werder Bremen against Borussia Dortmund, this was a great opportunity to cheer on the Dutchman Eljero Elia. We stood at about ten feet from the bus as the players left the hotel and every time the doors opened we were hoping for a glimpse of Eljero. Time passed and so did a lot of players, but not Eljero, until finally the door closed and the bus rode of. Standing there, left confused, as we thought no players were in the bus when we first saw it, we figured he was injured or something and went to the city center and got our seats at the biergarten (yes, again). Eljero did play so we must have missed him, which was a real shame, but not as big a shame as the game was for the Bremen supporters, as they lost 1-5, with Eljero being taken off at the 55th minute. This left us saddened and as our time in Bremen came to an end, we headed back to the bus. Even though the bus was pretty packed, the trip back home seemed to take no time at all since a lot of us were exhausted and slept through most of the ride. All in all, the trip was a great success with great companies, a great university, and lots of beer and meat. What more could you want!

COLUMN: ESPIONAGE

BY: Arryon Tijsma

The boy woke up. He looked around with a hectic look in his eyes, then settled down. Something seemed to be disturbing him. He glanced to the right, to his desk where his laptop sat. Beside it was his cellphone. He reached for it and activated the display.

08:48
22 March, 2018

He let out a long sigh, got up, and walked to the cramped cubicle he called a shower, past the leftover packings and crusts of some indistinguishable flavors of Domino's pizza. Meanwhile he slowed, casting a mistrustful look at his laptop.

The boy sat behind his laptop. He cursed and hit the tabletop. "Oh fuck! What the hell now...", he muttered. The screen showed a sad smiley on a soothing blue background, with small letters below it. He pushed the power button a few times, waited with what seemed hopefulness. Then he let out an even longer sigh, grabbed a crust of the thing that might have gone for quattro stagioni four days ago, and took an angry bite.

"Welcome to the hotline of the National Security Agency. Please dial one of four available choices.
To apply for a job vacancy, please press one.
To play a game of 'I spy with my little eye', please press two.
If you want us to come in through a back door, please press three.
For other questions, please press four."

"This must be a joke", you could hear him muttering. He reluctantly pressed '4' on his smartphone screen, and got put on hold. You could faintly hear Coldplay's catchy song Spies playing in the background.

"Hello, National Security Agency hotline, how can I help you?"
"Yes, hello, this is..."
"Oh, okay, you know my name. I guess that's obvious"
"Yes. Sorry. I was referred by a friend of mine. My laptop broke down, with the latest copy of my thesis on it. I really need to continue working on it, so I would like to place a request for restoring my data."
"But...the machine wasn't even on! How did you get a whole copy of my hard disk while my laptop was turned off?"
"All right, I give you permission to debit my account and place the snapshot. Yes, thank you very much"

The boy sat behind his laptop screen. In the top right corner the date read "25mar, 12:33". The web page had a light blue background. On top it had a familiar logo:

There was more below these first paragraphs, but you couldn't read it because the screen got clicked away)

If you listened closely, you could hear him muttering towards his inanimate life companion. "You forgot the term personal espionage. Really, this is bollocks. The whole world has gone insane. Let me just grab my tinfoil hat and order my lead-suit on Ebay in order to not be spied upon!"

The boy stood in his room with his jacket on. He was frantically patting his pockets and peering into the chaos of stale dishes and foul clothing in non-belonging places. The entirety of it had a rather uncanny resemblance to how a bowerbird in the jungle would display a seemingly random collection of trinkets and call it attracting to the opposite sex, when, unfortunately for the boy, that only goes as far as bowerbirds are concerned.

After a subjective amount of time had passed in him reaching increasingly higher states of restlessness, he finally reached over to his desk and extracted his keys from underneath a pile of paper. As soon as he turned around, the universe decided to enforce the law of entropy to said pile of paper, spreading it nice and evenly across previously unoccupied spaces of the boy's dormitory.

He let out a curse and, then, a long sigh. Shrugging, he walked towards the door of his apartment. Had he looked left, he might have noticed his laptop screen flashing a notification overlaying a website for sufferers of clinical depression. The notification read:

"Feeling depressed often? OMNI might have a suggestion for you..."

The page read:
We are proud to present today the joint venture of two of our country's largest corporations, both corporate and public. Together with one of the largest tech corporations in the world, we launch a new initiative, giving the power back to the people, to you. We're calling her OMNI. The National Security Agency strives for accessibility of information, especially your personal information. One of the major changes carried out in OMNI is a small step for us, but a giant step in integration of new technology in your daily life. It is a new way in communicating with your familiar devices.

Big corporations gather big amounts of data about their users. Up until now, this data was only used for internal purposes, but not anymore. OMNI strives to bring convenience to you. It is a general purpose personal assistant capable of making suggestions about your daily routine, the places you go to, how you get there, whom you meet, what you need for groceries, how to plan your holidays. Every aspect of your life you can imagine, OMNI can help you with it.

At the foundation lies Google's Now technology, combined with a general understanding of the human mind thanks to years of extensive research. To personalize the system for everyone, we have enabled it to train on a vast amount of available information, to which you can only add more, in order to make it more precise and efficient.

PHOTO: Gameboard

BY: Gerben Bergwerff

Predicting people's reasoning strategies

Introduction

Theory of mind (ToM) is what makes us able to reason about other people. We use it for forms of social interaction, as for example playing games. There has been a lot of research about the performance of humans versus computer opponents on ToM tasks (Meijering et al, 2011). However, little research on ToM concentrates on the cognitive basis for ToM (Apperly, 2010). Research in cognitive neuroscience shows that ToM reasoning employs many brain regions (Gallagher and Frith, 2003). Therefore, it is probable that ToM reasoning consists of multiple serial and concurrent cognitive processes. Cost-benefit trade-offs have a cascading effect on cognitive load (Borst et al, 2010) and thus also affect ToM reasoning. The strategy people use is shown to affect the cost-benefit trade-offs between cognitive resources (Gray et al, 2006). The investigation of strategies is therefore likely to teach us more about the cognitive bases of ToM reasoning (Ghosh and Meijering, 2011).

In a recent study [Meijering et al,2012), the researchers designed and used a two-player game (the Marble Drop Game) to investigate the ongoing process of ToM reasoning. The current study elaborates on the research done by Meijering et al. by analyzing the research data collected with the Marble Drop Game.

1.1 The Marble Drop Game

The Marble Drop Game (MDG) is a strategic two-player game, where both players' goal is to earn as many points as possible. In the original MDG, as used by Meijering et al., four hues of blue and four hues of orange indicated the payoff. A darker hue indicated a higher payoff. The hue is isomorphic to a number of points $\in \{1; 2; 3; 4\}$ (Meijering et al, 2012). For convenience of reading and explaining we will indicate the orange and blue hues as number of orange and blue marbles, where each marble corresponds to one point for the player of that color. In the game, each player controls one or more trapdoors leading to bins containing marbles. Every bin contains one to four marbles of the colors blue and orange, corresponding to payoffs for the blue player and the orange opponent, respectively. A typical MDG trial has four bins and three trapdoors:

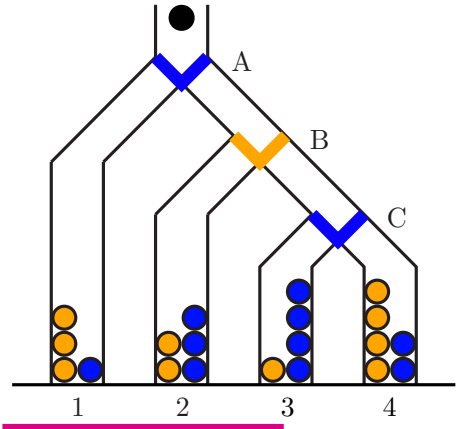


FIGURE 1: Marble Drop Game

In this particular game, the blue player can find his highest payoff in bin 3 and the orange opponent can find his payoff in bin 4. Backward induction (BI) will always yield the most optimal solution to solve this problem (Heifetz, 2012).

For the structure of the MDG, BI will always take 6 steps (Szymanik et al,2013). However, eye-tracking data from (Meijering et al, 2012) showed that participants are more likely to use another form of reasoning called forward reasoning plus backtracking.

1.2 Forward Reasoning + Backtracking

Forward reasoning plus backtracking (FRB) is a combination of forward reasoning and Backward Induction (BI) (Meijering et al, 2012). A player using FRB, starts using forward reasoning to find which side of the trapdoors should be opened to get to the bin with the highest score and then uses BI to reason if the bin is attainable. In other words: is it possible to get the marble in the bin with the highest payoff or will the rational opponent be likely to choose another path? This leads to the following hypothesis:

Hypothesis 1 - H_{frb}:
The reaction times on games have a significant correlation with the number of steps when solving the game using FRB, thus suggesting the FRB strategy is used.

1.3 Λ-difficulty

A paper about the complexity of the MDG (Szymanik et al, 2013) suggests that the difference in reaction time is mainly due to the structural difficulty of the game tree. They suggest that if a tree has a maximum payoff that is not at the bottom leaves of the tree, the tree can be substituted by a smaller tree, leaving out the leaves after the maximum payoff. To compute the difficulty of a tree Λ^i_{k+1} we look from the perspective of a player $i \in \{1,2\}$ and the number of k-alterations (k $\leq$ 0) between players in the tree, starting at the first node controlled by player i. This leads to the following hypothesis:

Hypothesis 2 - H_{Λ}:
The games having a difficulty of Λ_2^1 have a significantly shorter reaction time than games having difficulty Λ_3^1.

1.4 Research questions
Based on the two hypotheses discussed above, the two questions that will be answered in this study are:

1. Does the H_{Λ} explain the difference in reaction time between trials of the MDG?
2. Does the H_{frb} explain the difference in reaction time between trials of the MDG?

To answer these questions we will reevaluate the data collected by the research of Meijering et al. (2012).

Methods
2.1 Participants
Twenty-three first-year psychology students (14 female) with a mean age of 20.8 years (ranging from 18 to 24) participated in the experiment in exchange for course credit. All participants had normal or corrected-to-normal visual acuity. None of the participants had difficulties distinguishing between the two colors (dark and light) presented in the experiment (Meijering et al, 2012).

2.2 Experimental design
The participants were asked to solve 20 training trials of increasing difficulty and 64 experimental trials of the MDG. The experimental trials were divided over two blocks of 32 trials each. In the first block, 10 of the participants were prompted by asking what side of the trapdoor the opponent would choose. In the second block, none of the participants were prompted. All trials used only items with a payoff structure that required the participants to use second-order reasoning. In total, 16 different game trees were used as basis for the items. These game trees are henceforward called types. One of these types was chosen randomly for each trial.

2.3 Forward reasoning plus backtracking
We implemented our own version of the FRB strategy on the MDG. The algorithm is based on the description of FRB by Meijering et al. (2012), but it is more generic. Our algorithm can calculate the number of FRB steps for any binary 2-player game tree.
We count a step as attention to a value. For example, comparing two values in bins of the MDG would be two steps, since both values need to be attended in order to compare them. Using this method, the trials were divided into three classes: 5, 6 and 8 steps, accordingly.

Figure 2 shows the payoff structure for type 1 of the MDG. As an example, we will walk through this type using FRB:
At first, the player will attend all leaves until he finds his highest payoff. The highest payoff is in the fourth leaf, hence it takes 4 steps. After finding his highest payoff in the right

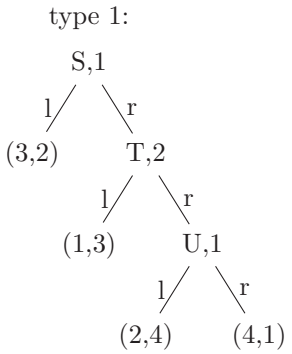


FIGURE 2: Pay-off structure

leaf of node U, the player needs to compare the payoff for the opponent in this leaf with the payoff for the opponent in the left leaf of node T. There are two nodes to compare, hence it takes two steps. The highest payoff for the opponent is in the left leaf of node T, hence the opponent would never let the player reach his highest payoff. The player's last step is to compare his payoff in the left leaf of node T with his payoff in the left leaf of node S. There are 2 nodes to compare, hence it takes 2 steps. The left leaf of node S has the highest possible payoff. This takes a total of 8 steps.

2.4 Lambda trees

The lambda-difficulty of a game tree with payoff structure is a suggested technique to indicate the complexity (Szymanik et al, 2013), see section 1.3. We calculated the lambda-difficulty of the minimal subtree for all trials of the MDG according to the definitions provided in that paper and we divided them into two categories: Λ^1_3 and, Λ^1_2 accordingly.

Figure 2 shows the payoff structures for type 1 of the MDG. As an example, we will determine the lambda-difficulty of type 1:
The highest payoff for the player is in the right leaf of U, so the minimal subtree containing the highest payoff has three alterations between players. This means the minimal subtree is of lambda-difficulty Λ^1_3.

2.5 Models

To create models for explaining the reaction times, we used linear mixed-effects (LME) models. LME models can account for random effects of participants and unequal numbers of observations (Baayen et al, 2008). In order to validate our hypotheses we created two models, one for the H_Λ hypothesis and one for the H_{frb} hypothesis. We used the log-transformed reaction times as the dependent variable in both models, in order to obtain a close-to-normal distribution of the reaction times. To validate the H_{frb} hypothesis, we used the following factors:

- An interaction between the calculated number of FRB steps and whether or not the subject answered with the correct (i.e. optimal) solution. This way we account for the reaction times of trials where the subject answered the wrong solution, since these trials have a different reaction time from correct trials (Falkenstein et al, 1991).
- The trial number, in order to account for learning effects.
- The block number, in order to account for learning effects.

To validate the H_Λ hypothesis, we used the following factors:

- An interaction between the calculated lambda-difficulty of the minimal subtree and whether or not the subject answered with the correct (i.e. optimal) solution. This way we account for the reaction times of trials where the subject answered the wrong solution.
- The trial number, in order to account for learning effects.
- The block number, in order to account for learning effects.

For both models we used an automated selection algorithm that evaluated all factors one by one. The selection algorithm returns a model with the combination of factors from the base model that has the lowest Akaike information criterion (AIC) of all models. The AIC is a score for a model

that is calculated as a trade-off between its complexity and the fit of the model and therefore is a way to select the best model out of a group of models (Akaike, 1974). The models returned by the selection algorithm will be evaluated by AIC and R^2. To calculate the R^2, we used a variant of the R^2 statistic for LME models (Nakagawa and Schielzeth, 2013) which calculates the Marginal R^2 and the Conditional R^2 statistic. The Marginal R^2 describes the proportion of variance explained by the fixed factors alone. The Conditional R^2 describes the proportion of variance explained by both the fixed and random factors.

Results

Table 1 contains the AIC, Marginal R^2, Conditional R^2 and factors of three models. Model 1 and model 2 are the models we originally created for validating our hypotheses. Model 3 is the model with the lowest AIC of any possible combination of the factors of model 2. Model 1 already has the lowest AIC of any possible combination of the factors of this model.

When applying a Chi-squared test on model 1 and model 3, we find that model 1 has the best fit, with model 1 $\chi^2 = 23.426$ and $p < 8.187e^{-6}$. Model 3 has no significant outcome.

Discussion

4.1 H_{Λ}: Lambda hypotheses

Model 3 is the selected model for evaluating H_{Λ}. This model does not predict the reaction times as well as the best model. The Conditional R^2 shows us it can only account for 38.49% of the reaction time values. We can see that there is an influence of the lambda-difficulty of the minimal subtree on the reaction time. However, the estimate for the lambda factor in this model is negative. This means the higher the lambda-difficulty of the minimal subtree, the lower the reaction time. This is the exact opposite of our hypothesis, so we cannot confirm our H_{Λ} hypothesis.

4.2 H_{frb}: FRB hypotheses

Model 1 is the selected model for evaluating H_{frb}. This model is the best predictor for the reaction times. The Conditional R^2 shows us it can account for 39.84% of the reaction time values. It tells us a higher number of steps combined with a correct answer results in a slower reaction time. The trial has a negative estimate, meaning that subjects were faster at the end of the experiment than at the beginning. This is the learning effect we accounted for. The interaction between forward reasoning plus backtracking steps and correct has a p-value of $p < 0.00974$, therefore we can confirm our H_{frb} hypothesis. The number of forward reasoning plus backtracking steps is a good predictor for the reaction times of subjects, thus suggesting subjects use the forward reasoning plus backtracking strategy.

4.3 Overview

The research done in this study yielded insight in the strategy humans use when solving turn-based games with a binary payoff structure. Based on earlier research (Meijering et al, 2012 ; Szymanik et al, 2013), and we made models of different strategies subjects could use to best explain the reaction times and thus the strategy. We created an algorithm that predicts the difficulty of this type of game for a player using the forward reasoning plus backtracking strategy. By implementing and testing this algorithm, we made it theoretically plausible that the forward reasoning plus backtracking strategy is indeed the strategy people use

Model	Marginal R^2	Conditional R^2	AIC
1	6.25%	39.48%	2827.793
2	5.08%	38.49%	2850.049
3	5.02%	38.49%	2847.219

TABLE 1: Model performance

when solving turn-based games with a binary payoff structure.

core for adding the cluster features, and found by testing different cluster sizes that the optimal average size of the clusters is around 10 words per cluster, with the F-score decreasing the more we move away from an average of 10. Automatically generated semantic clusters might be useful for future work, but probably only to improve more promising semantic information sources. We mostly focused on forward reasoning plus backtracking.

4.4 Outlook

However, there might be other strategies people could use that better suit our results. As a suggestion for further research we would recommend the study of the forward reasoning plus backtracking hypothesis using other experimental methods than the Marble Drop Game. It would be interesting to study turn-based games with larger binary payoff structures (e.g. six leaves instead of the four leaves we used). It would also be interesting to see whether turn-based games with non-binary payoff structures yield the same result.

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SWITCH: LoL &

BY: *Nikki Mascarenhas & Sybren Gjaltema*

Nikki:
The early dream of conquering and "becoming a legend" still etches the same fascination in our minds. It's a passionate subject that also sends us back to Roman times - when emperors craved territory and battle could be the adventure of a lifetime.

Real life and modern days aren't as dramatic. Taking up arms is regarded as anything but romantic. Still, we can satisfy our early dreams of battlefield glory with games such as League of Legends. One would not take me for a gamer and one would be right. For this article, I was sentenced to play a full "League" match - Sybren's favorite game and my favorite laughing stock.

The game is not very intuitive and I had trouble starting up. The buttons Q, W, E and R are used to cast spells and it became evident my little finger, assigned to press Q, has a bad case of underdeveloped motor coordination. My mindset, however, soon morphed from disdainful to bittersweet.

With an ever increasing enthusiasm, I made a couple of kills, bought my first items, and chewed my way through the game. Don't get me wrong: I will still mock the "an enemy has been slain"-voice and I will not start gaming anytime soon. Still, fairness requires me to admit: the switch changed my view on gaming in a good way. And as it is always good to have a secret, I will let you into one: I look forward to my next match!

Our legacy to the world depends on how many people's lives we have touched. Sybren reminded me not to make fun of someone's preferences before crawling into their skin and walking around in it for a while. In this switch, I also had the pleasure of passing on a bit of the experience I gained in these last four years of stock trading. Sybren made the rookie mistakes I already expected: buying a stock just because it went up that day or because he was familiar with the company. Still, amidst his confusion, I felt something awaken in him. It was not understanding of the market, but something much more powerful: interest. Where there is a will, there is a way.

As futile as this misjudgement of League may appear, it had a true cosmic meaning to me. I got much more than just a fairy tale gaming afternoon and a return ticket to reality. At the time, I thought of this switch as merely a fun experience, but now came to regard it as another step in my walk along Maturity Street. The curbstones are made of little experiences like these.

PHOTO: *Nikki Mascarenhas*

& STOCK MARKET

Sybren:
Then it was up to me, Sybren, to take over a part of Nikki's daily life, or at least pretend to. As a stock and options trader, Nikki manages capital on a daily basis. I'd rather not lose it all on the first day on the job. Therefore, before I could start this journey, I had to know the basics of the securities market.

There are plenty of tutorial websites, most of which also have a stock market simulator. Nikki recommended a website with extensive tutorials and a good simulator. I tried my hand at one and found that trading stocks has much more to it than meets the eye. Most people think it's just gambling, but I found out that if you look at the charts and pull up the numbers, it can sometimes be predicted whether a stock is going up or down. I tried my best, and at the end of the day I made $90. Apparently I could've easily made $500, but I'm happy I didn't lose anything to begin with! I probably didn't make as much since I only had a small hunch as to what I was actually doing. When asking for advice whether to buy a stock or not, Nikki immediately pulled up three charts with lots of colors and mathematical tools and instantly decided against this particular stock. Not much later, the stock actually went down. Incredible!

It's really interesting how stocks work, but I can imagine it is hard work to keep up with recent developments all the time. I saw myself constantly checking the tab in which I had my portfolio, to check if my stocks were doing well. I'm happy it was virtual, otherwise it would've been really frustrating to see my stocks go up and down. I already started to feel the tension, and it wasn't even for real!

I think it was fun for one day, but I don't see myself doing this daily. I'd have to do a lot more tutorials and read a lot of articles to have a good idea of what I'm doing. I'm going to leave it to the pro's!

I was glad I could pass on some of the fun that is League of Legends, and show that games are more than just a good way to spend your time. Not only did I change Nikki view on gaming in general, but she was actually having fun as well.

As Nikki showed me more and more of what it's like trading stocks, my idea of stocks being a big gamble got pulverized. They indeed have great potential and I can see now why so many people are interested in them.

PHOTO: *Sybren Gjaltema*

PHOTO: Nick Vollebergh

BY: Nick Vollebergh

Administrative data analysis

I expect the readers of this magazine to be technicians, who, when asked about espionage, will mostly think about project management, security (and avoiding it), algorithms, et cetera. In this article, I will discuss some mechanisms of public data collection from an administrative's angle.

In my opinion, the most important reasons for the state to collect data are public safety, evidence, research and use for policy optimization. Public safety is one of the state's main functions and includes not only terrorism, but also fields like public health, disaster management and law and order. For example, the Dutch RIVM (Department of public health and environment) conducts research on public health and the OM (Attorney General) or the FIOD (the investigation services of the tax collectors office) collect data which can be used as evidence in criminal and administrative trials. The state conducts research for internal use. The research data from Statistics Netherlands (CBS), RIVM, ProRail, public transport agencies and other agencies is used for policy optimization.

The benefits of public data collection are obvious and broadly accepted

The benefits of public data collection are obvious and broadly accepted, so I'd like to shortly discuss a couple of administrative disadvantages of public data collection on three levels: the individual, organizational and institutional level.

Individual level

Do public officials commit themselves purely to the common good or are personal interests involved? It's quite easy to distill an ideal type of public official from Max Weber's proposed ideal bureaucracy. In the eyes of the father of sociology, a civil servant was a rational, law-abiding professional who made decisions based on written rules, without personal interests.[1] On the other hand, public choice theory sees the public official as a man who uses his available knowledge to make the best decisions, and 'best' includes the rules as well as personal interests. These interests may be positive, like job satisfaction and functioning as an employee, as well as negative, like financial benefits, fame and preservation or expansion of power.[2] These different visions are relevant because they provide insight as to what underlying factors influence public policy and decisions made by public officials.

Politicians and public officials cannot avoid the knowledge problem

Politicians and public officials cannot avoid the knowledge problem.[3] In daily practice, the available knowledge, time and cognitive skills of decision-makers is limited, so policy isn't based on full knowledge of the underlying subject.[4] As a result, unpredicted, unpredictable and unintended consequences of policy may occur (let's call them 'externalities') and policy may not have the result planned. For example, databases lack proper security (the organization lacked certain technical knowledge) or people react to data collection

policy in a way nobody predicted (people switch from public transport to cars because they don't want to be monitored).

Organizational level

Some stakeholders enjoy great amounts of benefits because of certain public policies, such as income or power, for example research agencies, IT-businesses, police, political parties and public officials. Abolition of these policies would result in great losses, so it pays for stakeholders to invest a lot of time, money or manpower in upholding the policies. On the other hand, normal civilians lack the time, money, specialist knowledge, manpower or patience to invest in abolition of harmful policy. The gains from preservation of policy for the stakeholders vastly outweigh the potential gains from abolition of harmful policy for the civilian. Because of these 'concentrated benefits and diffuse costs', it's unlikely that individuals will attempt to solve their problem individually ('collective action problem'), while stakeholders surely will (lobbyism).

The state has a notoriously bad reputation when it comes to IT

Public officials who work at government organizations have an interest in continuing the organization and will use the efficacy of data collection as a justification for the existence of the organization. But, can we trust the state to provide us with the necessary facts needed to assess the efficiency and efficacy of policy and the resulting data collection? Influential public officials probably won't voluntarily give up budget, personnel and power and will twist or even hide facts that may reveal inefficacious policy. Even relatively benign organizations like Statistics Netherlands or public transport agencies may guilt themselves to this kind of behavior.

The state has a notoriously bad reputation when it comes to IT, so the security of data is at stake. The collection of large amounts of data may result in public officials and hackers illegally accessing the data and selling it. Even though it's quite an unrealistic scenario in in this country, it's possible that (sensitive) data is legally sold to third parties by the state; all it takes is a congressional majority. States have proven to have no objections against purchasing illegally obtained data from third parties.[5] Public officials can use collected (sensitive) data for personal purposes, such as nepotism, insider trading, blackmail or enrichment of any other sort. Intensive surveillance on people who have access to sensitive information is a good start, but not a final solution, especially when lots of people have access to the sensitive data.[6]

Institutional level

On the institutional level, mechanisms exist that hinder sudden political changes, for example concerning data collection policy. The first mechanism is the perverted feedback cycle of public safety policy. Because of the methodologically shady and indistinct causal relation between public safety and public safety policy (and the related data collection policy), the level of safety doesn't necessarily indicate successful public safety policy. When it's safe, it's attributed to successful public safety policy and the data collection will continue; when it's unsafe, for example in the case of terrorist threats, it's attributed to unsuccessful public safety policy and the policy (and related

data collection) is tightened. Whatever level of safety, proponents of privacy are never winners.

The first mechanism is the perverted feedback cycle of public safety policy

Another mechanism that significantly hinders quick institutional change – let's say the removal of harmful public policy – is our parliamentary democracy. Voters in a democracy are unable to correctly assign a value on certain policies (first problem) and there are barriers to entry for new political parties (second problem).

The first problem is the difficulty with which voters can enounce how they value certain public policies. In a (free) market economy, prices, profits and losses are the best indicators to see if society perceives certain market services as valuable. On the other hand, elections are a bad method of assigning value to specific government services. Because political parties rule (particracy), the voter is often confronted with a package deal: voting for a certain party because he supports the proposed policy on issue A, means that he automatically sends the signal of supporting policies concerning issues B and C, even though he might not agree with those proposals. Voters rarely support all the proposed policies of political parties. In the end, elections aren't a good indicator for the valuation of certain policies. The problem is partly solved by the election of one-issue parties, like the Party for the Animals or the Pirate Party. Because these parties generally focus on one related group of policies, a vote on that party is a better indicator for voter support of those proposed policies. This is, if the small parties have a chance of getting elected.

The barriers to entry for political parties to participate in national elections are steep. A political organization without seats in parliament has to set up a fairly large logistical operation and has to pay a pretty sizeable deposit to participate.[7] The argument that without these barriers, the number of participating political parties would be too high and the process would be unclear for voters is correct, but doesn't rebut the fact that it is a barrier to entry that decreases political choice for voters.

There are several solutions to these problems, like (partly) lifting the barriers to entry so (new) one-issue parties can participate in national elections, increasing the total number of seats in the House of Representatives so smaller political fractions can enter parliament more easily, more public referendums, and so on. However, the problem is that political actors, who have the power to lower barriers to entry for smaller political parties, are also the political actors who would lose political power if new parties entered the political playing field – why would they allow competition?

Public officials – even in large groups – have limited knowledge

In conclusion

In this article, I've discussed some mechanisms of public data collection from a public administrator's point of view. Public officials – even in large groups – have limited knowledge; as a result, their policies may contain errors, which have consequences. Their policies and decisions are intertwined with personal interests. Several stakeholders may have special interests in upholding data collection policies and have more incentives to invest more time, money and power to influence the political playing field than ordinary civilians. Changing policies via the political process is difficult as well, because of barriers to entry and the mechanism of parliamentary democracy.

It's clear that public officials do not have a better morality than other people: they usually work for the common good, but personal interests keep influencing their policy and decisions. The state consists (partly) of public officials, public officials are human, humans make mistakes. I hope this insight will help you form or adjust your opinion on public data collection.

References

[1] Max Weber, Economics and Society, pp. 956-1005

[2] For an introduction in public choice theory see econlib.org/library/Enc/PublicChoice.html

[3] The knowledge problem is an economic discussion. See Mises (1922), Hayek (1945) and Hayek's Nobel price acceptance speech The Pretense of Knowledge (1974)

[4] Bounded rationality (Simon, 1957)

[5] "German state buys Swiss banking data", Financial Times, July 14th 2012.

[6] Brenno de Winter, "Toezicht op toegang EPD schiet ernstig tekort", Webwereld.nl, February 3rd 2010.

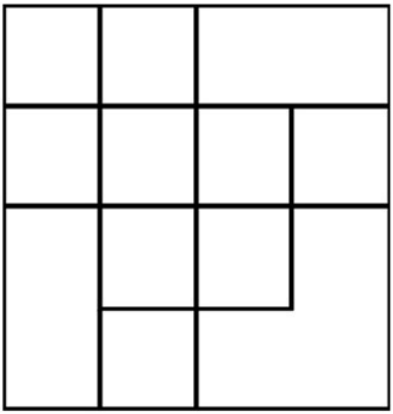
[7] An aspiring political party has to collect at least 600 declarations of support in 20 voting districts (i.a. the Caribbean islands). The €11.250 deposit is returned by the state if the party receives ±45.000 votes.

PUZZLE

BY: Joke Kalter

SINCE THE CURRENT ISSUE'S THEME IS 'ESPIONAGE', THE PUZZLE REQUIRES YOU TO DECIPHER A CODE MESSAGE. SEND IN YOUR ANSWER BEFORE JUNE 28TH AND YOU MIGHT WIN A NICE PRICE!

1. □?



2. LOOK

4. COMMON FACTOR

B

SHIT

HE

SILVER

VENUS

ATTACK OF THE CLONES

3. FILL IN THE BLANK

4 – 7 – 5 – 5 – 10 – 3 – ? – 1 – 80

6. GIDDY UP

W	D	H	A
R	D	O	S
R	E	E	T

7. COME TOGETHER

6 4 1 5 2 3

5. B?

-SUM IS 18
-C = LESS THAN A
-B + C IS LESS THAN A + D
-A*B = 2*D
-D = ODD NUMBER
-$(C+A)^2$ = D

A	B	C	D

ANSWER

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