I found this book to be very good. Even though the book did not contain any surprising scientific statements nor outright astonishing discoveries it was neither the less very interesting read. It contained a lot of interesting examples and overviews of experiments in order to illustrate the situations. It managed to explain in a very logical way how our intuition works – something that is seemingly far from logical decision making.

The most interesting though or idea

I think the most interesting concept from this book was the idea of “less is more”. This phrase has been used in many different contexts and I have mainly countered it in the field of art – in composition or design. It is pretty obvious why it holds there – overwhelming with details makes the composition confusing and does not let individual elements or details to shine out. But why can this concept be used for prediction was first unclear to me. Seemingly it makes no sense to state that having more data to base your decision on, is sometimes worse than having less information.

If we are trying to implement a prediction system in computer science field the common consensus is that having more data is at least as good as having less. If our decision making system is too complex, meaning it takes too many variable into account, then we can just detect the uncorrelated information and ignore it – or at least in theory. On the other hand if our prediction system is already aware of the optimal set of parameters then removing any of them just increases the ignorance and usually leads to worse performance. This does still not mean that having less data is actually better than having more. All we can conclude is that sometime having more data does not make our predictions any better. The reason why more data is still preferred is due to the fact that given enough examples from the past we can probabilistically determine the variables that have causal relationship with our prediction. Hence we can use even the less obvious clues to refine the overall prediction accuracy.

But there is a general problem with predicting the future – the uncertainty surrounding us. The world we live in is stochastic in its very nature. When we look at objects on a large scale they seem to be fixed and “certain” in a way. But as we start looking them on smaller scale
things start to look random pretty fast. At the very smallest particle levels we cannot use our deterministic laws to describe the objects nor their states. The certainty has been replaced with probabilistic models and in a sense events happen randomly. But on the large scale the randomness of individual particles is canceled out by probability. So our abstract laws and rules are never able to capture or determine the outcome of events with 100% probability. They only apply in our idealized worlds. For example in the real world there are no equivalents to the objects used in mathematics – line, dot, circle, infinity, etc. Yet we use these abstractions to describe our world. So we can say that nothing is perfect and everything could happen. Actually it is estimated, that there is even a probability of 2-65 for you to get hit by a comet within the next second. The changes of that happening are extremely low, but it is a possibility. I am guessing this is the main reason why predicting future is so difficult. In some limited domains it could be done with a reasonable accuracy but as our own world is not a “perfect environment” it cannot be done reliably every time.

So even if we know everything about the past there is no way to separate the random events from the ones that had causal reasons. In that sense if we base our prediction for the future on the previous knowledge we are bound to use erroneous data at least to some extent. If we are lucky, we could end up in a situation where everything that happened previously had been an outcome of deterministic causality. But at the same time it is possible that everything that happened before was just an accident – random series of events.

Now if we use the knowledge from the past to find correlations between different parameters we could end up finding something that is actually not there. Some random events or parameters could seem to be correlated, but this could be just the byproduct of the randomness. We can reduce the chances of that happening to 0, but in that case we need theoretically unlimited data (be able to observe the environment for infinite period). As the available information is actually limited, there is no way to avoid the correlation detection in random information. While we try to apply pure logic and strict math to find correlations we are bound to accommodate the errors produced by randomness as well. There is no way to determine if a correlation found in data is actually valid or just a result of an accident. Detecting the randomness itself is essentially an impossible task. If we keep choosing random numbers between 1 and 9 and end up with a series of 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9... then is our random number generator actually random? It is impossible to say for sure.

In this context it is impossible to know if anything that happened in the past is actually correlated to what will happen in the future. As there is no way to separate the valid data from the invalid, our complex rules for predictions could end up performing worse than simple ones. As the author of Gut Feelings pointed out, the power of simple prediction rules is the result of minimizing the chances of having to choose wrong parameter to predict on.
By selecting the most general and distinguishing feature it more probable that the event we are trying to predict is actually dependent on the feature.

So if the domain your trying to predict is complicated enough to be prone to misunderstanding of the data and random events, then you could be better off using only the most important feature for decision making. Still that does not mean than the entire field of machine learning is useless. When we manage to somehow limit the prediction problem down to a level where almost everything has casual relationships, then using more data can outperform simple rules.

**Ideas obtained from the book for building intelligent systems:**

This book demonstrated the power of simple rules and heuristics. While a lot of computer algorithms already take use of this idea it is mainly used to reduce the computational costs and guide the algorithm. Heuristics give a sense of right direction in search spaces that are too big to exhaustively go through. These methods often do not give any guarantees on finding the most optimal solution, but they do find a solution in a reasonable timeframe.

These constraints are very suitable for an intelligent system because the variables found in real world are usually continues and often a good enough solution is acceptable. Freezing in place to calculate the most optimal answer is not an option as the 4rd dimension of time is a natural part of our world. So form copying the idea of how human brains work we could implement simple heuristics to give us a fast approximation of a good solution. But I would also leave in the capability to just exhaustively calculate the answer using all the data available. If we have the time and need to come up with more (and possibly better) solutions, we still have the option to do so. This would be similar to the flexible rules of thumb were we can consciously evaluate them and decide if they are actually valid in current situation.

Giving just the concrete heuristics is probably not a good solution. Predefining a set of limited number heuristics will most likely not be enough. To allow the adaptability an intelligent system needs, we have to give the system just the tools to build them. Similarly to the adaptive toolbox described in the book we should give the system a set of advanced capacities and the ability to test them in different variations in all kind of situations. If a correlation is found in data by using those capacities, the system has found a usable heuristic.
Review

"Gut Feelings: The Intelligence of the Unconscious"

by Artem Kaliuk

The Main Idea

What are our momentary decisions based on? Does the logical reasoning always help to get the right answer? Does multiple conditioning make us predict the events better? In his book, Gerd Gigerenzer, the former Professor of Psychology at the University of Chicago and the current director of Max Planck Institute for Human Development, is providing us with answers based on his long-term research of human behavior. In “Gut Feelings: ...” he points out several major. Firstly, the gut feeling, which forces the detective to distinguish a drug trafficker from the crowd, helps the baseball player catch the ball and forces us to choose the right city in a million-dollar question, is nothing else but one of the so-called “rules of thumb”, which everyone of us possesses. Secondly, “less is more”. The author provides numerous examples when the lack of knowledge in some binary-choice questions leads to better results as compared to a complex logical analysis when it comes to decision-making. Hereon, Dr. Gigerenzer derives the next point – the recognition heuristic shows amazing results in experiments conducted among students in the United States and Germany. Recognition heuristic can be viewed as a domain-specific model for inference - it is claimed that, based just on a particular condition, a certain prediction can be made with a convincing enough probability to be right. Tit for tat method is a fourth important idea highlighted as a powerful tool which can be used for problems addressing to game theory. Trust between humans is considered to be the main topic of the last chapter. Dr. Gigerenzer possesses a strong style, provides sound examples and forces a reader (particularly myself) to dive in a long-term thinking on the topics he touches. There are some points on which I can not fully agree or which aroused me to think about the topic from a different perspective.

Being strongly impressed with the precursing seminar book, I could not find much satisfaction in the terms which the author used in the first chapters. Rules of thumb seemed to be just a less complex view of prediction based on an auto-associative memory and invariant representations. Still, I felt to have a lack of scientific explanation in the decision-making in the baseball and other examples. I clearly see that the
motivation was to give us an impression on how simple rules outperform complex mathematical analysis within a very short period of time; however, as opposed to Jeff Hawkins, Gerd Gigerenzer does not go into the details on how and of what the rules of thumb can be implemented (sad but true – studying for an engineer made me a much more boring person as I am willing to find structures, causalities and definitions in everything exposed to me). This question also encouraged me for some brainstorming on the role of the software in future AI, which I will discuss a bit more in the second part of this essay.

The second point which made me feel stressed about the book was the “less is more” rule. Not as much the rule itself caused my doubts as the experiments and their conclusions. Many of the human mistakes come from a false inclusion of irrelevant or highly improbable condition for the particular case. Let's recap an example of a man choosing a “secure” school for his son. Before coming to the final decision, the father has tried to take into account numerous factors while most of them were barely correlated to the desired probability of the son being dropped out. The author seems to say that reducing the number of factors will most likely lead to a right decision. Dr. Gigerenzer emphasizes on the beneficial ignorance of the German students, who, having barely heard about Milwaukee, have chosen Detroit to be their variant. Having more interest in geography or US travel experience, to my opinion, could have not spoilt the answer. In fact, the two cities differ slightly in population, but Detroit has an industrial fame, which makes it more recognizable. Had this question been asked ten years later, the whole “less is more” principle would have quite probably made the participant a bankrupt – in the last ten years, Detroit has experienced a decline in population of 25 %, whereas the one of Milwaukee is relatively low – around 0.4 %. Another point is that recognition heuristics is likely to come to a deadlock when making a multiple-choice decision. What would a person with a lack of knowledge do when choosing the biggest city from the list of Miami, Lagos, Barcelona and Nagoya? To my opinion, we can still be effective in decision-making by first defining the causal model for each particular question and then using it for decision-making. Simply speaking, each rule of thumb should be researched well, otherwise a wrong rule of thumb will lead to a wrong decision.

The last point I would like to mention considered the example about human children and chimpanzees. Being told that chimps were not likely to share as compared to children, we are brought to conclusion that chimps are do not possess an instinct to
share with group members without having any benefit. Human children, however, are ready to share and sometimes even sacrifice the sticker to another one. I would still say that the human-intrinsic will to share is mostly a result of primary education and manners taught by the elder people. You can often see a situation when a child will not lose some part of their benefit even if asked so by others (I can simply remember how greedy I was in the early childhood!). With years, we are getting used to the model defined by our society (well, some people are still not there – that is why we are not having much pleasure when interacting with them) and thus sacrifice small benefits to make others happy (and sometimes to win their favour). Thus, we can assume that to a considerable degree such our nice decisions can be seen as an evolved experience – we were taught to share - and so we did for long enough time; now we do this unconsciously.

Motivation for New Intelligence

Both discussion on the first book and some ideas from the “Gut Feelings” made me think about the role of software in future intelligent systems. After accepting the approach of using the brain structure for smart systems from the previous, I came across an idea that software could also be used to restrict the artificial brain from undesired decisions. The tit-for-tat rule can be widely used to define the behavior of the robots, but we still would like to be superior to them. If a robot uses a tit for tat and a human seems to act aggressively, then it is likely that the robot in some time will come to decision that it also has to act in an aggressive manner; but a properly programmed robot will not choose the hostile behavior.

Approaching the final chapters, this book made me think more about the human psychology and the influence of the environment on it. There were many examples which I could not map onto artificial intelligence as I strongly believe that making the hardware think does not necessarily mean that it should be acting like a human. I am convinced that the aim is not to create a metal friend, but rather silent servant. Still, “Some moral disasters can be prevented if one knows the rules guiding people’s behavior and the environments triggering them”. As we live in a multicultural world, we should always consider the moral values of the others – by doing so, we can obtain trust and significantly simplify our life within the society. In the same way, the social machines can obtain trust by learning the traditions and moral values of the community where they operate.
Gut Feelings, by Gerd Gigerenzer

Scott Kenealy

December 12, 2011

1 Introduction

In his book, *Gut Feelings - The Intelligence of the Unconscious*, Gerd Gigerenzer attempts to explain the results of his research into how humans make quick decisions and the performance of these decisions over the more formalized systems advocated by some professors, consultants, and businesses. These so-called “gut feelings” rely on low-complexity heuristics over difficult mathematical optimization with dozens of degrees of freedom. Gigerenzer argues that these “quick-and-dirty” decision processes are often better than one would first believe, and often can outperform their more complex counterparts.

2 Main Point of *Gut Feelings*

I didn’t particularly like this book, and perhaps the number one reason for that is what I saw as the lack of a clear line of thought in the content. While the whole book does focus on gut feelings, rather than presenting anything general and unifying, the book resembled more a jumbled collection of interesting anecdotes and hypotheses with limited scope. To try and sum up the main thesis as best as possible, it seems that the following phrase suffices:

> People are often able to make relatively good decisions based on simple rules of thumb, although they may not be able to clearly articulate or consciously understand the rules being employed.

The principle can be summed up nicely through an example. Towards the beginning of the book, there is a story involving baseball players catching a fly-ball. As one would guess, the players aren’t subconsciously solving complex differential equations to predict the path of the ball; they simply keep the ball in the same point in their field of vision. Of course, most players don’t realize that they are doing this, and by trying alternate methods which seem more obvious, their performance decreases. Gigerenzer claims that many other actions work similarly, and seemingly logical deviations from what comes naturally often hinder, rather than help.

The majority of the book then focuses on situations involving intuitive decisions. A couple of these seemed fairly insightful, while some others made me suspect the author was leaving out conflicting information to make his case sound better.

2.1 The Good Points

2.1.1 Can’t See the Forest for the Trees

When someone is too focused on small details to see the big picture, people will say that he can’t see the forest for the trees. Gigerenzer argues that knowing more is often worse than knowing less, as more
information might hide otherwise obvious patterns. He cites a simple test where Germans were better than Americans at determining whether Detroit or Milwaukee was the bigger city, which they could guess because they had only heard of Detroit. A few more examples are given, like the stock market and, if I remember correctly, dating sites, where less information also produced better results.

The reason for this, he claims, is that when prediction is difficult, a small amount big clues are better than many clues, because the small clues often contain “noise” which may or may not be relevant, but ends up being misleading. Very detailed information can lead to good conclusions as to why certain known events happened, but it often fails with prediction. I’d say the explanation seems logical enough, that even though the result is strange, it is plausible.

2.1.2 CYA - Cover Your Ass

A common phrase one will hear working a white-job, at least in America, is “CYA”. It’s an abbreviation for “Cover your ass”, and the basic idea is to try and make it so that you can’t be blamed for things that go wrong, regardless of whether you actually are to blame or not. The book has a chapter on doctors doing just that, even though they know they may be making a bad decision in the process. Like the baseball example, Gigerenzer claims that good decisions often can appear illogical, or at the very least, seem to be decided without any real consideration to what matters. He says that gut feelings typically perform well, and for now, we’ll assume that’s true.

The problem, then, is when the best decision isn’t picked due to CYA. It reminds me of a class I had to take, where the instructor loved these algorithmic decision processes, and kept trying us to get to apply them to our projects. I usually saw them as garbage-in garbage-out processes, at best a waste of time. I don’t really need an $8 \times 8$ matrix to make pick what is obviously the best choice, and if I ever used it and got a result I didn’t trust, I’d either ignore it or redo it and tweak the numbers to get a more reasonable result. After seeing about a dozen of these things, I figured it out: bad results can be shrugged off by claiming to have followed the process correctly, so they exist to CYA.

The book seems to imply that these processes are usually inferior to the intuition approach. I’ve got a family member who is fairly successful, including having an upper management position at a Fortune 500 company, so I asked him if he ever used them. He told me he uses them rarely, only when he is really not sure. He uses them more for organizing his thoughts than anything else, and ignores the results if he thinks they don’t seem right. In short, he told me he goes for an intuitive solution over an algorithmic one before I’d even mentioned the book, so Gigerenzer appears to be right.

2.2 The Bad Points

2.2.1 Limitation of Scope

One thing I found annoying in the book was the limited scope and applicability of the evidence, which was often simply anecdotal. For example, he goes on and on about the recognition heuristic, and keeps throwing examples where recognition and the relevant metric are clearly related; e.g. the recognizable city being larger, or if it is recognized as small, the unknown city being larger.

As a counter example, consider three brands of American beer: Bud Light, Lucky Bucket, and Big Flats. You’ve probably only heard of Bud Light and know that it’s mass-produced watery garbage, but if I asked you to put the three in order from best to worst, my guess is you’d have no idea of even where Bud Light stood. If I tell you now that Big Flats is made by a national chain of convenience stores and Lucky Bucket is a microbrewery, you still know next to nothing about the beer, but you can easily guess that Lucky Bucket is the best and Big Flats is the worst.
In this case, both the recognition and reputation heuristics fail. Bud Light is not the best, despite being the most significant beer, but it is not the worst, despite being recognized as a terrible beer. Another heuristic easily identifies the answer. The problem, then, is the number of heuristics. Most questions have a wide variety of heuristics which seem reasonable, but now the problem comes to deciding which is the best heuristic to use, which Gigerenzer doesn’t even mention.

2.2.2 Prejudice

Our intuitions are often terribly wrong, and it is never more apparent than when it manifests itself as prejudice. A few years ago, I read a newspaper article about a study involving police officers. They claimed the race of the suspect had no impact on how they handled confrontations, such as when to shoot a suspect that is endangering their safety. However, when a team of scientists set up simulations of various conflict scenarios, they found that, even in the controlled simulator, a black suspect was more likely to get shot than a white one. I believe the officers truly tried to be race-neutral in their decisions, so it was simply a matter of intuition messing things up when a quick decision was needed. Gut feelings are much more subject to prejudices than logical thinking; since the officers had to rely on intuition for quick action, they actually had to learn to retrain their intuition to not associate danger with other races.

Of course, sometimes prejudices are based on some degree of evidence, but there are good reasons to ignore them. After 9/11, a debate emerged about profiling in airports. If I’m a security checker in an airport, from an actuarial standpoint, the brown-skinned guy named Muhammed is probably more likely to blow up a plane than an already drunk white girl named Ashley on her way to Vegas, so intuition would say to double-check Muhammed. However, our buddy Muhammed is almost certainly not a terrorist, and double-checking him would undoubtedly be racist. In this case, institutionalizing racism is certainly worse than the miniscule chance that profiling prevents an attack, so the logical outcome is to implement a policy which ignores the gut feeling.

Overall, I was rather disappointed by the exclusion of a significant discussion on prejudice and gut feelings. It seems like a show-stopper for the book, and would have been a far more relevant chapter than many of the others in the book.

3 Application to the Construction of Intelligent Machines

This book didn’t seem to have very much that was relevant to intelligent machines, short of a few heuristics and the “less is more” concept. Gigerenzer actually dismisses the idea, claiming that the architectures of computers and people are so different, the concepts don’t really carry over. However, the book does seem to serve as a nice afterthought to the previous book by Jeff Hawkins, which talks about making a brain-like computer architecture. Hawkins relies on making good predictions quickly, and Gigerenzer focuses on quick-and-dirty heuristics for doing just that. Unfortunately, Gigerenzer mostly just says these heuristics are important, and doesn’t say much about development of these heuristics.

4 Conclusion

*Gut Feelings* seems to put forth a number of interesting ideas focusing on the desirability of simple and quick heuristics over complex multidimensional optimization. While he does show the applicability of some of these heuristics, the book lacks a good method for unifying these heuristics or truly understanding intuition, focusing instead on a potpourri of subtopics which have to do with intuitive thinking.
Gut Feelings – Gerd Gigerenzer
The Intelligence of the Unconscious

“But why are only 12 percent of Germans potential donors, compared to 99.9 percent of Austrians? After all, Germans and Austrians share language and culture and are close neighbors … something very powerful must be at work, something that is stronger than deliberate reasoning, national stereotypes, and individual preferences: Is there a default, do nothing about it.” (Gigerenzer 2007, S. 182)

How does it feel to be a potential organ donor without even knowing about it? I was surprised to hear that, as an Austrian citizen, I am supposed to be one. I had never heard that before and so I started gathering more information about that topic. As for me, personally, the citation above was the most interesting thought of the book; I would like to have a closer look at it. I will start with the definition of the different legal regulations.

**Opt-out Solution** [Spain, Austria, Italia]
Persons who are, in case of a brain death, not willing to donate their organs have to contradict that during their lifetime. Furthermore they have to carry a written document with them all the time. In Austria and Belgium it is also possible to register at the central contradiction register.

**Extended Opt-out Solution** [Greek, Ireland, Finland]
Forms an extended version of the Opt-out solution; Relatives can act as a courier and deliver the dead person’s last will.

**Information Solution** [France, Sweden, Norway]
People who are not carrying a written contradiction are automatically offering their organs. Relatives, however, who have to be informed if organs are needed, can raise objections against it.

**Extended Information Solution**
If there is a donor card available, organs can be extracted. If not, relatives have to agree with the donation. They can also limit the donation to certain organs.

**Opt-in Solution** [Germany, Netherlands, Denmark]
Organs can only be used if a person has given permission during their lifetime. Relatives do not have a say in this case.

**Emergency solution** [Bulgaria]
An organ donation is always admissible even with a contradiction letter.

With this knowledge we can explore the topic a bit further. Think about it for a minute, which donation regulation would you prefer and why? Also, have you ever asked yourself whether you would want to donate organs? I was thinking about this issue for a long time.
Some days ago I went to a birthday party and asked the guests the same question. In addition I wanted to know whether they knew that they have to donor anyway as long as they do not object. Here are the results of my survey:

![Bar chart showing results of survey]

Indeed, almost all of them claimed to be potential organ donors. Some were indecisive at the beginning but in the end most of them agreed. Interestingly, the only two who did not want to donor were well informed. By the way, for those of you who are about to spend their skiing holiday in Austria, be aware that the rule is also valid for tourists on vacation.¹

In my opinion there are many good reasons for donating organs, however, I would like to tell a story for reflection. What had begun as a sunny summer day for Martin S. in the Alps ended in a nightmare for him and his family. Martin, an experienced mountaineer, starts slipping, he can find hold but a follow-up rolling stone hits him at his skull. He was immediately taken to the next hospital. Clinical specialists examined Martin and after some time they declared him brain dead. In the same hospital a person was waiting for a donor liver. Martin’s liver would have been suitable. The faster the recipient of an organ transplant can get the organ the better. As Martin had never revoked to spend his organs they were now under control of the responsible physicians. They decided to stop the life-support and transplanted everything they could use.² Later on Martins wife sued the Hospital. She was blaming them for not waiting long enough to be sure that there was no chance for her husband to recover and that they rushed into the decision of stopping the life-support in order to get his organs. She lost the case. By law there is a set of measurements and with its results brain damage can be diagnosed. However, these tests only have a certain degree of probability and thus I think this method should be questioned.³ ⁴

During my information acquisition I came across the following story which supports the theory of insufficient testing methods. A young woman returned from her vacation in India. During her stay she got bitten by a dog, but she did not think it was important to mention it at home. Some months later she died from a cardiac attack. Her organs were tested for the most frequent diseases and were then transplanted. Some weeks later, however, the first

⁴ [http://www.aktion-leben.de/Euthanasie/Organspende%20und%20Euthanasie/sld01.htm](http://www.aktion-leben.de/Euthanasie/Organspende%20und%20Euthanasie/sld01.htm)
person who had received organs died. Shortly afterwards the next victim passed away. Finally, three out of six who had received the woman’s organs died. The concluding autopsy revealed that the donator was infected with rabies. In my opinion the testing standards should be improved and it should be guaranteed that even as an organ donor everything will be done for you in medical terms.

**How can we apply what we have read to the construction of an intelligent machine?**

This time I would like to point out the different ideas which I find relevant for the creation of intelligent machines.

*“More is not always better”* (Gigerenzer 2007, S. 36)

I would suggest reducing the data input for an intelligent device to the most relevant information; as it is even in a simple situation like for example shopping in a supermarket hard to decide if there is too much choice. This is further confirmed in the chapter *“The less is more effective”* (Gigerenzer 2007, S. 119) where the simple Take the Best method could draw even with a complex Bay’s Network. Also reducing the available data by forgetting, as it was already mentioned in the previous book, can be a way of improving the performance of an intelligent machine.

*“The Structure of Environments”* (Gigerenzer 2007, S. 79)

In my opinion the example of how ants decide where to go shows that we should not focus too much on detailed implementing of every single behaviour for an intelligent machine. Instead we should provide a limited number of possible movements and then try to equip the device with effective and fast algorithms.

*“When optimization is out of reach”* (Gigerenzer 2007, S. 86)

The Fifty City Campaign Tour illustrates how limited our calculation possibilities are even though we are applying sophisticated algorithms and using ultra fast computers.

*“If our intuition worked logically and treated the English term and as the logical AND, we would not notice the difference.”* (Gigerenzer 2007, S. 98)

This example shows that even if we were able to teach languages to intelligent machines, we could still not tell them whether they should use *Mark got angry and Mary left or Mary left and Mark got angry* and why the first sentence has a completely different meaning although both are using correct grammar and share the same words.

*“Fast and Frugal Tree“* (Gigerenzer 2007, S. 173)

I think that this different approach to a classical Full Decision Tree might be a good option for certain solutions. It is easier to implement and sometimes faster in terms of decision making.

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5 http://www.thieme.de/viamedici/aktuelles/news/tollwut.html
Gerd Gigerenzer writes in his novel *Gut Feelings* about the intuition of the mind, and the intelligence of the unconscious, which forms everyday gut feelings. He not only describes instances where people have gut feelings, but describes several referenced examples which prove (in those specific cases) that one’s gut feelings are actually more reliable than excessive knowledge. Furthermore, he contends, with evidence, that the laws of logic have nothing to do with how the brain processes decisions and analyses problems. This is one of the problems he sees for artificial intelligence to overcome – the embodiment of human emotion. Rational decision-making is not always the case in many situations – it is irrational for the rat in the example of a T-shaped maze (with food at the extremities of the upper horizontal line) to ever go to the end with food only 20% of the time. To visit the end with food only 20% of the time only reduces the expected return. Gigerenzer considers this as a result of evolution, and the nature of animals to match the probabilities, and to still visit the 20% food end. So how can disembodied intelligence machines ever do similar things, which are so intricately linked to our being and our actions in everyday life?

Memory, all things stored in the grey matter. But can we always remember everything? Is it always in your brain, there waiting to be recalled? The Shereshevsky (mnemonist) example shows that there are people who remember everything. But is this a gift sent to Shereshevsky from god? Or rather is it a curse that prevents him from living a 'normal' life? As Gerd puts it, the one thing his memory couldn’t do, was forget. It is a bit similar to how Charles Dickens ridicules in Hard Times “facts alone are wanted in life”. Given that Shereshevsky had a memory that was comprised of extremely large amounts of facts and evidence (that was easily recalled), he was unable to abstract. There is mention of his struggle to remember faces given their constantly changing nature, and of his struggle to be able to summarise a story without getting caught up in the facts. So forgetting is a beneficial character of the mind? Adaptive forgetting, to avoid painful memories, or to simply de-clutter the mind is a positive thing. Gerd states, “that cognitive limits are not simply liabilities, but can enable good judgment”. So forgetting is not an error of the mind, put potentially an evolved capability that improves everyday living and functioning?

Another very interesting point made in the novel is the view of ignorance as a positive attribute in some cases. The laws of logic would state that “more is better” and that all decisions should ultimately be
rational (logical laws are the basis for AI programming). Yet in many cases being ignorant and lacking information seems to be a positive thing. In the case of the 3 brothers, the youngest obviously being limited in knowledge, and the eldest brother with knowledge of many countries in Europe. The middle brother, who has heard of one country but not both in the pairs of countries, scores better than both other brothers. The eldest brother new all the pairs of countries, and this clouded his judgment. The middle brother relied on the recognition heuristic, assuming that since he recognized one country and not the other, this implies that the recognized country has a higher population. So to look at where he has heard of the countries before would explain why recognition of a country is not simply linked to the population size of a country. The middle brother recognized these countries from different forms of media – movies, TV, newspapers and word of mouth. However he did not score 100% as some countries were likely familiar for bad reasons like social uprisings, wars or other negative connotations. However recognition does closely follow the size of a country – the larger the population, the greater the industry and production that is exported etc. The elder brother performed poorer than his next of kin, as his memory was clouded with unnecessary information, which made him think too much about the question. This is also very similar to the example of German students vs. American students, about the size of an US city. The German students scored higher due to their partial collective ignorance, as they recognized the name of the larger city, and not the other. However the American students scored lower, since they considered too many other parameters as they knew both cities – size of industry, sporting teams – all too many indicators that clouded their judgment, rather than trusting their gut feelings.

I was quite surprised to read the example that Gerd presented about the financial market, where a group of highly knowledgeable experts were put up against a group on partially ignorant laypeople. Over the period of the mock investment, the laypeople outperformed the experts. The experts not only recognized every share, but also knew about each company, its planned ventures, previous share history, and much, much more. The laypeople however, relied on the recognition heuristic, inferring that recognition implied a quality share. Whilst some shares, like the previous countries example, would have been recognized due to scams and shams that were made public by the media, on the whole the laypeople mock invested in trustworthy shares that had a steady rise in value.

I have since pondered some of Gerd’s ideas, and I think limited (partial) ignorance really is a good thing. Gerd does not mention the negatives of being partially ignorant, but simply refers to specialist examples where many people are ignorant as it is a question that is specific to an education, or a geographical area. Is ignorance really that
good to find ‘short cuts’ to decision making? I know ‘gut feeling’ in a multiple choice mathematics exam will most likely leave you worse off than someone who understands mathematical algorithms. As such, partial ignorance can only be extended to events/occurrences/examples that are outside of a person’s direct environment.

How to abstract these ideas into AI systems? Can AI systems incorporate not only logic, but also intuitions (not only intuitions but also the ability to evaluate and reject/accept these intuitions)?

„Good intuitions must go beyond the information given, and therefore, beyond logic... ...the laws of logical thinking... ...have disregarded the psychological processes themselves”

p103

But machines at current do not embody emotions, which lead to this development of intuitions. And if machines did embody emotion, would it not be possible that something like Will Smith's “i, Robot” or in “Tron: Legacy”, when robots, following their logical commands, rationalise that without humans, it would be easier to follow their commands?

Jeffrey Elmann (p24) tried to get a computer to 'learn' grammar, by reading complete sentences and making sense of it, however it failed. When he remodelled it to shadow how a child learns grammar, it subsequently succeeded! By forgetting after every 3 or 4 words, the program managed to learn small segments, making sense of smaller components before expanding the memory to several words and then to full sentences. So forgetting can be programmed into intelligent machines, a component that is very important for functioning.

The question remains – can intuition be learned/programmed for artificial intelligence? Furthermore, do we as humans, learn intuition or is it embedded in our genetic sequencing over thousands of years of evolution? I think that it would be hard to implement such abstract concepts of community and social instincts into programming, since instincts are much more than something learnt, but something that reaches far back into past epochs. I concur that it is instinct that parents speak “baby talk” with their children for more than convenience, but rather the historical knowledge that limited input aids learning and decision making.

“Just maximise your expected utility- you always write about doing this”

“Come on, this is serious”
My Thoughts on “Gut Feelings“ by Gerd Gigerenzer

By Marius Loch

Intro

In his book “Gut Feelings – The Intelligence of the Unconscious” Gerd Gigerenzer, head of the Max Planck Institute for Human Development located in Berlin, talks about human gut feelings. He describes how gut feelings shape our analytical processes every day and how they can be superior to rational thinking regarding not only speed, but also accuracy. As he acknowledges, this is not always the case, one of his main goals is to identify under what circumstances we can “trust our guts”. Based on many examples he introduces and analyses several rules of thumb or heuristics which we deploy for “fast and frugal” decision making.

Less is more

Gigerenzer gives several examples, when fewer resources lead to better results: The restaurant that offers the “zero-choice dinner” and is very successful, because it relieves the customer of the agony of choice; the supermarket study, where more products where bought when the selection was smaller; the Russian mnemonist, who could remember everything, but had difficulties with recognizing faces and overall abstract thinking; the experiment where expert golf players performed worse the more they consciously focused on what they were doing; and the investment competition won by laypeople buying only stocks of companies with familiar names.

While all examples have the common denominator “less is more”, there are different backgrounds: the zero-choice dinner and the supermarket study are a result of the fact that the human mind has a limit on how many information it can process (p.31) and therefore doesn’t like complex choices. The mnemonist shows “that cognitive limits are not simply liabilities, but can enable good judgment” (p. 124). The golfers show how expert motor skills are controlled unconsciously and therefore decline when one tries to interfere consciously.

The last example (the investment competition) is based on a principal that deems me the most interesting: “a beneficial degree of ignorance”. This principal comes into play when we employ the “recognition heuristic”; it’s very simple: “If you recognize one object but not the other, then infer that the recognized object has a higher value” (p. 113).

There is another example in the book: two groups (one American, one German) have to answer the question “Which city has the larger population, Detroit or Milwaukee?”. While 60 % of the Americans answered correctly, almost 100 % of the Germans did. This is because the Germans could apply the recognition heuristic, since most of them knew about Detroit but had never heard of Milwaukee. The Americans couldn’t apply it, because they all knew both cities. The Germans had the beneficial degree of ignorance.
This really is an interesting phenomenon: more knowledge is detrimental to a proper judgment. Since this heuristic does cannot always be applied (e.g. Heidelberg is usually better known than Bielefeld, but has fewer inhabitants), Gigerenzer went further to analyze when ignorance could be beneficial.

The two components critical to this question are validity of recognition (when I recognize a country, is it really bigger?) and validity of knowledge (do I not only recognize a country, but do I actually know if it’s bigger than the other?).

The author comes up with the simile of the three siblings:

Three brothers have to answer questions about the population size of countries in Europe. The youngest brother doesn’t know any of the countries and has to guess (no recognition, validity of knowledge: 50 %), the eldest brother has heard of all European countries, but doesn’t know much about them (validity of recognition: 0 %) – he has to guess as well (validity of knowledge: 50 %). The middle brother has heard of half of the countries and due to the recognition heuristic he achieves a higher score (validity of recognition 80 %, validity of knowledge: 50 %).

The same test is given to three sisters who basically have the same setup, but the older sisters have some specific knowledge about certain countries (e.g. Germany, France and England have the highest population, in that order - their validity of knowledge increases by 10 percentage points to 60 %). Therefore their results look similar to those of the boys, but the two older girls score higher than the older boys (see figure).

![Graph showing the comparison between the three siblings and three sisters in terms of correct inferences.](image)

What becomes apparent: semi-ignorance is better than total-ignorance. This is obvious, if nothing is recognized, the recognition heuristic can’t be employed. Afterwards “less is more” applies: in both cases the middle siblings have better results than the oldest ones. This is because the latter can’t apply the recognition heuristic – they recognize all the countries. But as the comparison between brothers and sisters reveals, there are diminishing returns: the
more one knows the smaller is the advantage of the semi-ignorant. The key is the ratio of validity of recognition and validity of knowledge (in this case a validity of knowledge of 70 % would yield the same results for middle and oldest sibling, any higher and the oldest one wins).

To sum it up: a certain level of knowledge is required to apply the recognition heuristic, but then less knowledge can yield better results until the knowledge level gets really high.

What can we take away for constructing intelligent machines?

Gigerenzer describes how rules of thumb can lead to faster and more accurate decisions. He tries to identify the conditions when this is the case (e.g. prediction situations with a high degree of uncertainty). Engineers working on artificial intelligence (A.I.) could profit from the insights psychologists like Gigerenzer produce, knowing which intuitions yield better results than complex approaches and under which conditions. Complex A.I.-systems could be replaced by frugal systems based on intuition-like heuristics. In the book there already are some examples when less hardware resources lead to better results, e.g. less memory in the context of neural networks learning language (p.24f).

Gigerenzer uses the analogy of a toolbox with instruments adapted to certain problems to describe human intuition; it consists of three layers: “evolved capacities, building blocks that make use of capacities and rules of thumb composed of building blocks” (p. 61). He explains why for example the gaze heuristic is fast and frugal: the capacities needed are “hardwired” (p. 62). This reminds me of using dedicated (hardwired) units complementing a CPU - like a GPU or an encryption module. Maybe very specific chips can be designed for intuition-based A.I. functions.

I image these two measures – using simple rules of thumbs instead of complex algorithms and the specialized hardware – could tremendously decrease the computational effort and therefore size, cost and/or power consumption for devices applying intuition-based A.I.; in the past such developments often enabled innovative applications in completely new fields never before thought of (e.g. smartphones).

On the other hand I’m not sure whether computer aided systems can really profit from the speed advantage of gut feelings as we do. After all the computational power of computers is far beyond that of humans and even complex calculations be done within no time – the speed advantage in absolute numbers might not be significant.

In this case Gigerenzer insights - since they reveal how humans make decisions - might help developing a) systems predicting human behaviour (e.g. security simulations) and b) human-like systems and interfaces. If we implement intuition-based decision making in robots or other systems interacting with humans, we might feel more comfortable with their seemingly “irrational” decisions. Robots probably won’t develop human emotions because of it – but at least they will have some (gut) feelings.
Every one of us must have wondered at least once why sometimes you know what to do, without quite knowing why you want to do it, or just decide the winner between two options because one of them "just feels right". I must say I started reading the book of Gerd Gigerenzer eager for a proper explanation. But it turned out to be something else than I expected; I waited impatient for an answer through the whole book but I only ended up irritated about it’s main ideas. Please let me explain why.

First of all, I think we would all allow ourselves to be convinced by the author that his theories hold if the used argument would be a strong, but more important, a logical one. As far as I am concerned, the proposed approach on understanding the human decision-making lacks a logic explanation. The author does make use of a large set of examples in order to prove his theory, but they are mostly fictive or inspired by animal behavior. Even the real ones cannot be widely applied in most of the cases. I found it therefore even harder to find the answer to my questions by reading this book, since I couldn’t once follow the argument of the author. I grudgingly admit that it just didn’t manage to convince me. So instead of writing about what most impressed me in the book, I will take another approach and write about the idea that most irritated me.

Even picking the latter was a difficult choice, but I decided settling for the following fragment: “The mind, in my view, can be seen as an adaptive toolbox with genetically, culturally, and individually created and transmitted rules of thumb. [...] Good intuitions ignore information”.

I had to ask myself after reading this: Is this how our brain really works? Can these straightforward rules of thumb seem to be using all the time really predict complex phenomena better then complex rules? Can information really harm? Can ignorance really be beneficial?

I personally think the answer is no. The way our brain works may not be fully understood yet, but it most certainly relies on building a model of the world from the scratch. As children we receive new pieces of information from everywhere, which we put together as puzzle pieces in order to get a unitary model of our surroundings. Then, as we grow older, we get in tough with less and less elements of novelty. We therefore adapt our model of the
world, but don’t go back to changing its “foundation”. I argue that the rules of thumb the author talks about are nothing else but “learned” fractions of this model.

Our brain works like a memory, it doesn’t “compute” any answers to questions or problems; it gets all its answers from the memory. Based on the stored model of the world, it is constantly predicting what we will see, hear, feel, mostly in ways we are unconscious of. I truly believe that these rules of thumb the author talks about are proves of the human creativity. But again, creativity can be simply defined as making predictions. It doesn’t have to be a difficult act of a genius; it is also the everyday, continuous act of perception and decision-making; It is a set of rules-of-thumb that are so common we don’t even notice them. They are therefore, in my opinion, a part of our intelligence, but most certainly not it’s basic building block as the author argues.

This also explains why information can’t do any harm, on the contrary. The more information you get, the better you can adapt your model of the world to the environment. The same with ignorance: it would only prevent making any predictions or using any rules on thumb, since we would have no knowledge of the missing part of our world’s model.

How can the knowledge obtained from the book be used for building intelligent machines?

When thinking about this, one sentence from the book keeps popping up in front of my eyes: “Intelligence means making bets, taking risks”. If that is all intelligence is about, can we even build truly intelligent machines?

I tried for a second not to think about my personal opinion on the book, but to take the author’s approach as granted.

Let us therefore consider the introduced set of rules of thumb once again. If they truly were the elementary unit of our mind, there would be no sustained need in coming up with a complex model of the human brain in order to endorse robots with intelligence. Putting together a set of such rules of thumb would solve the same problem in a very simplistic way.

Also, as the author wrote, “there is no uncertainty left in hindsight; we know what has happened, and, if we are imaginative, we can always construct an explanation. In foresight, however, we must face uncertainty. Intuitions […] tend to be accurate when one has to predict the future (or some unknown present state of affairs), when the future is difficult to foresee, and when one has only limited information”. Now think again about robots: disposing of an elementary set of rules of thumb would endorse them with the ability of predicting the future, even when the latter
is difficult to foresee. This would be a huge step forward especially for the human-robot interaction, since it would lead to humans being able not only to collaborate with the intelligent machines in order to achieve a task, but also to react in the same way in the different situations, to understand each other and predict each other’s actions.

I do agree it is a nice scenario, but again, it has the same drawbacks as the actual approach in computer science. Please consider the following fragment: “much of the time the gut feeling to “go with what you know” is a helpful guide in life. An effective use depends on two processes, recognition and evaluation. The first decides whether the simple rule can be applied, the second whether it should. People tend to follow the recognition heuristic intuitively when it is valid, and collective wisdom based on individual ignorance can even outperform experts”. Gut feelings may appear simplistic, but their underlying intelligence and therefore complexity lies in the above-mentioned processes of recognition and evaluation. We are back where we started: what is intelligence and how can it be implemented?

I might not have agreed with the author throughout the book, but I have to admit that reading it really had a great impact on my way of understanding human decision-making. I would therefore like to conclude with another quote from the book belonging to Louis Agassiz: “First people say it conflicts with the Bible. Next, they say it has been discovered before. Lastly, they say they have always believed it”. I might do that one-day, who knows? But for now, I choose to stick with the dogma of rational decision-making. Why? - Maybe even because of such an environmentally conditioned rule-of-thumb.
The book *Gut Feelings* explains what intuitions are and how they occur. The main idea of the book is that intuitions are rational. To me this was the most impressive thing in the book. As most I always made the difference between reason and intuition. I would not have dare think or say that intuitions were rational even if I have no problem with following or trusting them. This idea is, as Gigerenzer explains very rooted in the general opinion since Aristotle was already opposing reason and intuitions before year 0.

This “intuition is rational” theory first impressed me because I didn’t expect to read that in a “scientific” book. Usually the advantages of reason over any other thing are always proved and advanced in behavior studies. I stopped and asked myself: “Ok, to you intuitions are not rational but then what are they?” and I could not find any answer to my question. Do we usually think intuitions are whims? I googled intuitions and the first result is the Wikipedia page defining intuition as “the ability to acquire knowledge without inference or the use of reason”. This definition is quite nice since some other theories do not give any knowledge dimension to intuitions and just define it as unreliable whims. Nevertheless the alternative to reason appears clearly (without the use of reason). Intuitions are a subject of study since it is difficult to justify them. As Gigerenzer defines intuitions they:

- “Appear quickly in consciousness,
- Their underlying reasons we are not fully aware of, and
- Are strong enough to act upon.”

In the book the main point is that, first intuition should not be logical and then it is rational based on the intelligence of the unconscious. Why that? What I understood and what is to me the power of this book is that intuitions are the most intelligent and evolved reasoning of humans. Let me detail this point.

Intuitions are to Gigerenzer a decision taken by the unconscious under certain conditions. It involves both brain and environment. This leads to the idea that intuitions are like the next step of reflex. For example when you learn to drive, you learn to watch the road and understand it; you learn to maneuver a car and so on. At first everything is complicated and you must think and use your reason to take a decision (brake, accelerate…). Then your brain adapts to the driving and the “road environment”: decisions are taken in your unconscious and driving becomes a reflex. This is the intelligence of unconscious for “simple” situations or more precisely for repeated situations in which you can learn from your experience and then reuse without reasoning. The next step is a more adaptive form of this intelligence: intuitions. Let’s return to the driving example. Driving could appeal intuitions when for example a crash occurs just in front of your car. You cannot think and have a level-headed reasoning in such a situation and you never faced it (hypothesis) but you will make a good decision: your evolved brain is adapted to your environment and an intuition can save your life. The situation is not the same but the unconscious is able to make an accurate rational decision in a very short time just by having a few “irresistible cues” about its environment.
This interpretation of intuition reminded me the memory prediction framework of Hawkins exposed in the previous book *On Intelligence*. Actually to Hawkins intelligence was the combination of memory and prediction capacity of the human brain. Let’s remember about the brain structure allowing this framework. The senses send information to low layer and information is synthetized when goes in the upper layers. For very usual information, upper layer do not have to manage anything, we don’t consciously think about what we perceive but we know it! This could be the “reflex” step I mentioned above. Then the prediction plays it role and allows the adaptation to something new. Hawkins does not precise if it must be conscious or not but to me if it is unconscious (in particular situations) then it joins the intuitions as Gigerenzer understands it. And by combining the two theories in these manner intuitions is really the ability of the human evolved brain of adapting to its environment in all its layers (low and up) since they all have the same structure.

To me this explanation of how intuition works and in the same time why it is so often accurate is very satisfying but I should confess I am a real woman with good intuitions 😊.

The parallel made between a complex computed resolution and an intuition is very clear: the ability of taking into account to many information doesn’t help by taking a good decision since the next time it would not be exactly the same. The intuition has the advantage of making a synthesis of what happened just as Hawkins layer model. The unconscious uses only the important part and forgets about details, here is where all the intelligence and the difference between the reflex and the intuition are.

In brief, I totally agree with the theory exposed in this book but I was not totally enthusiastic about how Gigerenzer constructed his book. I had the impression of a lack of structure in the sense that the same idea was coming in different parts of the book and I did not feel any progression in the plan. But this illogical plan is maybe just a mirror to the importance of illogic concerning intuitions and to me it does not harm the book or the theory exposed in it.

This leads us to the second part of this essay, what would I use to build an intelligent machine. Unlike in the previous book *On Intelligence* the writer does not mention any further research about how his theory could help us building intelligent machines. As written before the manifestation of intelligence here is the ability of taking an accurate reasonable decision without being conscious of the decision making process.

Gigerenzer take in his book the example of the physicians with his patient in the quick/really important decision making. A good way of making decision for them is the simple and frugal tree. This idea would be the one I would try to use in an intelligent machine if I was about to build one. If reusing the example of driving I mentioned above I would try to build an intelligent car.

First of all my car would not just assist the driver but drive on its own when wanted (to let people how love drive still drive their car but help the one hating this). So it must be able to adapt to the road and to the traffic conditions. To do so a learning phase would be necessary as for humans for acquiring reflex but learning should not aim at giving the car an exhaustive experience of the road and interaction situations since “less could be more”. It means that the car should know the road environment and have reflex of driving to facilitate the “normal” driving but it should not store the more unusual situations possible because as Gigerenzer explains an unusual situation would never be exactly the same as the previous and by knowing to much details a guess about very unpredictable future would necessarily take into
account useless information and so be wrong. The road traffic and other drivers behavior is a high unpredictable environment.

So our car would learn reflex of driving just as we do when passing our driving license. To do so it would run on simulators like the ones we have in France for the first driving meeting. I explain it quickly for those who are not so familiar with the French process of driving lessons. The first meeting you have in your driving school can be very disappointed since you would not touch any car. Actually since a couple of years the first meeting you will sit in front of a computer and answer questions asked by a simulator. At the end of the test, the simulator guesses how many hours of driving lessons you will need to pass the license exam. The simulator is based on usual driving conditions and tests how the candidate observes the road. It could be compared to the game mentioned by Gigerenzer: it asks you twenty questions and finds the thing you were thinking about. So after the simulator phase the car would have reflexes on the road and would have started to develop an art of simple and frugal tree for the known situations.

Then the next phase would be to give the car important criterions for the decision making in dangerous/unsual situations and to prioritize them in order to let the car construct simple and frugal trees for decision making adapted to road conditions. One of these trees could be:

Now the car have reflex and is able to make decision by using simple and frugal trees. At least but not last it should be able to evolve and adapt to new and changing road conditions. To do so some reminder lesson could be a solution or if we make it just a regular use of the car could be enough to keep it up to date since it would evolve and adapt on its own during the outing on the roads.

Here is the end of what I thought after reading the book *Gut Feelings*. I hope I shared the enthusiasm I had.
What’s your opinion of the most interesting thought?
Where did the book give you inspiration for building intelligent systems and what is your inspiration?

As we have learned from Jeff Hawkins’ “On Intelligence”, solutions to complicated problems can turn out less difficult than one might expect. Referring to his theory, intelligence is based on pattern recognition and mapping inside of the neocortex. So there is a quite simple mechanism that underlies a quite complex process like the functionality of the brain. Following the “complicated is not always better”-strategy,” Gerd Gigerenzer introduces a concept of decision making that bases on fast and frugal heuristics and intuitions rather than on complicated calculations in his book “Gut Feelings”. Illustrated by various examples, he describes how the use of gut feelings and choices which are based on simple rules can help people in daily life.

I am not really surprised by the result Gigerenzer is presenting in his book. Still, I do like the thought of complicated problems being solved by simple rules or by trusting your intuitions. Too much thinking usually confuses and leads to postponing decisions. There is a typical every day situation: Six friends meet to go out together and enjoy “Christkindsmarkt”. After strolling over the market for 2 hours, everybody is cold and the group needs to decide what to do next. One person wants to go home but is dependent on other people who want to stay. The others want to go and warm up in a bar, but nobody knows where to go or where to start looking for a bar. Usually everybody keeps “passing the buck”, as Gigerenzer mentions in his book (chapter 10) until everybody is freezing and wants to go home. Eventually somebody makes the first step to check if there are still some seats available in a bar. Where is the problem to find out what to do? Why is there nobody who actually wants to make a decision? Usually people say they “don’t care” or “it’s up to you”, even if they actually want to do something else. In such cases the group usually gladly follows a person that does actually make a decision, even if it is not in their favor. If there were no such person, the group would end up like “Buridan’s ass”, which could not decide on which hay pile to eat and finally starved. In my opinion this is a general problem of society and it is really dangerous because one can never know who will be the one that takes the lead.

A situation where friends cannot decide what to do is rather annoying in that moment but it is not harming their lives (unless they keep standing there forever). In his ninth chapter Gerd Gigerenzer talks about simple rules that help to improve making the right decisions for doctors. This topic is morally very important and therefore the author spends quite a lot of pages on it. There is a conflict between the common assumption that good decisions need a lot of time and the actual shortage of time in critical cases. Moreover there is the problem between self protection of the doctors and their professional intuitions. How can an expert proof that he is actually right if his decision bases on gut feelings? If the expert is really fond of what he is doing, I am willing to trust him in his decisions. Moreover there is the possibility to double check decisions that are risky. In my opinion, this is the problem: When does a person reach the point to be considered an expert? When does that person have enough knowledge to be able to trust their gut feelings? What if the gut feeling is wrong because made on completely wrong
assumptions? Sure, even if a doctor weighs all pros and cons and makes a complicated calculation, he can still be wrong. But before using gut feelings on patients, a doctor needs to collect some experiences on how to recognize certain illnesses.

In my opinion this is a very important point mentioned by Gigerenzer. People cannot use their gut feelings on anything; they need to have enough knowledge and experience to make the right decision. So there is one basic question: When does somebody actually reach the point from which they can rely on their intuitions? For me, personally, intuitions are very important in my own decision makings. But I think that one should be very careful only to rely on gut feelings only because it might cause a lot of snapshot actions. People are most often driven by personal experiences and emotions, so how does one want to make sure that the first thought is always the right one? What if there is a girl that is treated badly by her father and her brother. She might assume that every man is bad and therefore not communicate with other men. She might actually want to talk to other boys, but her gut feelings tell her not to. This situation is unlikely to happen but it shows how irritating one’s intuitions can be. In my opinion, before actually making an important decision people should be aware of their own intuition, but also think thoroughly about the consequences of that.

How could the book give inspiration for building intelligent systems? I think, there are various ways this question could be answered. The first one is quite straight forward: As Gigerenzer suggests basing complex decisions on simple fast and frugal trees, programmers could simply tell their programs not to do complex calculations but to use such trees in their programs. As it is easy to feed information inside the machine, the learning process every doctor has to go through is not needed by the computer, the information is already there. This program could not be used to replace a doctor, but probably to predict stocks at the market.

Another way, which I personally consider very interesting, is to combine Gigerenzer’s theory with the theory of Jeff Hawkins in his book “On Intelligence”. Therefore I want to recall his theory once again: He says that the neocortex consists of several neuron layers, which are connected to each other; the top layer is called hippocampus. All the information entering the brain is represented by a special pattern. If the information is new, it is passed up to the hippocampus; otherwise it is passed to the layer which recognizes the pattern. The more a brain is trained, the further down the neocortex hierarchy the pattern recognition works. If someone has done an exercise for many times, the pattern for recognizing this exercise moves further down the hierarchy.

When patterns move down the hierarchical layers, they become more natural to us. So how can we interpret the lower levels of the neocortex hierarchy? As discussed previously, an expert needs a lot of training before being able to trust the own gut feelings. This means that those patterns move down his neocortex hierarchy as the knowledge grows and deepens. The deeper in the hierarchy the pattern moves, the more natural it becomes to use that knowledge. It becomes a gut feeling, the person does not need to think anymore to use it, it happens automatically. As the brain keeps making associations to everything that enters it, this can result in wrong conclusions. As several illnesses can have the same symptoms, it is not easy to
decide which illness the patient might actually have. Gigerenzer gives the example of patients who potentially had a heart attack, where there are more clues than severe chest pain. The important thing is that a doctor is able to learn and develop his skills. But how is that possible for a machine?

At this point, there should be a separation between intuition and instincts. Instincts are natural, we are born with instincts. In spite of that, intuition develops by learning things. Now there is the following question that arises: Does our intelligent system need instincts? Can an intelligent system develop intuitions without given any “natural” ways to feel? As Gigerenzer mentions, a person needs ways to feel its surrounding to be influenced; the same is true for a machine. This can be done by applying several sensors to it, but how does the system know what to do with the incoming information? When a child is born it has instincts: It cries when it is hungry or when it is cold. How can a machine know, what it needs? In my opinion an intelligent machine needs a point where to start from, its own instincts. As a baby does feel when it is hungry, inventors of intelligent machine need to come up with some creative ways to produce instincts. This is the basis of intelligence, because it allows learning. After being actually able to learn, the machine can start to develop intuitions on the special field which it is supposed to operate on.

So what kind of machines that have gut feelings would actually be useful for mankind? As gut feeling decisions are based on choosing the best or a fast-and-frugal-tree-strategy, there is no need for replacing human jobs. To rely on their gut feelings in jobs people need a lot of expertise. In a hospital or as a detective there is a lot of knowledge that needs to be fed into a system. Even if that would be possible there need to be some ways to react to changing environment or the changing condition of a patient. I cannot imagine that being done by a machine, but as discussed in previous essays, there are plenty of environments to use intelligent machines.

There is one last approach to make use of gut feelings for building an intelligent system: Using one’s own intuition while actually creating intelligent system. The problem is that there is a lot of expertise needed to actually create intelligent machines. But as that knowledge is gathered by some experts on the topic, their neurons may someday produce the right pattern which allows mankind to create truly intelligent systems. So by now acquiring more and more information about the brain and how it actually works, might be the right approach on that topic.

I like Gigerenzer’s theory on gut feelings but, still, in my opinion it is dangerous to rely on intuitions only, especially while making very important decisions. People can never be sure how accurate their intuitions really work.

An inspiration by “Gut feelings” is to use one’s own gut feelings to create intelligent machines. As this seems to become reality only in future, we could try to implement systems which work by Gigenzerer’s fast and frugal tree strategy. Referring to theory of Jeff Hawniks’ in “On intelligence”, gut feelings and intuitions could be found in the lower layers of our neocortex. So there is still the need to create a brain to actually being able to produce artificial intuition.
1 What’s in your opinion the most interesting thought/idea?

One, or perhaps the most interesting idea I learned from the book is the statement that not everything is as incredibly complex and difficult beyond a point of understanding as it might seem when we first look at it. Well, in fact it probably is. But only on rare occasions we make use of the knowledge gained by years of seemingly never-ending studies, book sized thesis’ tables of statistical measurements and their results Ph.D. students worked so long for. Seemingly there are occasions where we do not need that kind of knowledge. Unfortunately almost nobody but the author realized this. Someone should tell all the corporate and academic researchers!

Surprisingly, even the author did not really mention where to benefit from this insight. Otherwise the technique of ”putting his money where his mouth is” in the case of him believing in the ignorance of people he picked up in the street would have made him a fortune on wall street. Unfortunately, he fails to explain the source of emergence of gut feelings. ”Where do they come from and how can we make use of them” were questions that raised when I read the title. Yet I was left desperately waiting for answers. Especially the answer to the latter question or at least a ground basis of knowledge for the generations of the rules of thumb would inspire ones mind for
more ideas. Instead we are left with only a few rules sparsely seeded throughout the first half of the book, revisited in the second half. What the author could not achieve in his book is left for the reader. Maybe this should be regarded as the real benefit of the book. With this aspect as motivator I developed a feeling that not the search for the heuristics itself but methods for building rules of thumbs should be more closely researched. In the end not the rules of thumbs make humans evolutionary so successful - the ability to come up with new rules of thumb in unknown situations renders us enabled to cope with our ever-changing environment. If we want robots to evolve like humans they do not need a deterministic set of instructions how to react to their surroundings but a strategy on how to build new rules of thumb. A heuristic algorithm for developing heuristics would be a true artificial gut feeling. This is obviously a learning process since children have to learn things like catching a ball. It seems that these heuristics are not hard-wired into our brain. They seem to emerge from a learning process. And if we as humans can come up with a way to develop rules of thumb I am confident that it is possible to teach this to robots too some day.

2 Where did the book give you inspiration for building intelligent systems and what is your inspiration?

In case I was put into the position of building an intelligent love robot I would outfit it with a tit for tat strategy and a memory of size two. To achieve a high degree of right assumptions in a changing environment it would rely on ignoring information although the maxim of relevance told him to assume that any given information is relevant. Furthermore, I would outfit it with a neck fixed at one angle so that it could effectively catch the sacks of money I will make due to the fact that it will only be the second most expensive love robot on the market.

All ranting left aside I believe that the only idea I took from the book is that while doing his work one should from time to time take a step back. With this step back one might to find out that a completely new look on a problem might reveal itself. Moreover, the solution to ones problem might not always
be as complex and hard to grasp as you might think. Maybe, with a closer look, an astonishingly simple and therefore elegant solution will unveil itself in front of the observant viewers eyes.

This is not really a call to hourly coffee brakes for metaphysical discussions but more a little reminder that we might too easily get stuck with small problems although the solution could lie within a process we can observe in everyday life. Nature has kind of evolved that way. Why shouldn't our technical evolution? Does a technical system really need to be able to evaluate and act upon its environment within the last floating points position accuracy? Will it be able to grasp and compute the 'fuzzy' aspects of nature, the amounts of neuroscience we encounter every second by doing so? Or is simply the hardware we use incapable of doing otherwise?

Maybe, but this is just one thought, more academic energy should be put into the research of heuristics. Maybe someone other than Mr. Gigerenzer will come up with truely useful ideas. The RANSAC algorithm might be a good example for functioning sensible heuristic algorithms. It selects a random subset of a vast amount of data to quickly build a model based on the random data. The model is discarded if it appears to be unfit for the full set of data. If it proofs correct within a certain range of tolerance we take this model as a halfway accurate model for the whole set.

This algorithm is very efficient, easy and versatile. It is not deterministic but most of the time we don't need this feature. Why don't we have more algorithms like that? May that come from the scientists fear of uncertainty? Is the research of this kind of algorithms unscientific?
Brain, Mind and Cognition
Thoughts Regarding “Gut Feelings: The Intelligence of the Unconscious” by Gerd Gigerenzer

Sinan Taifour
December 12, 2011

General Impression

Professor Diepold pointed out that this book polarizes people between those who really like it, and those who don’t like. I like it. It has a very unorthodox approach to understanding thinking, one that is uncommonly seen. I can see how it can be provocative to people who adopt the current Western philosophy of the mind, which the author protests on, saying: “Logic and related deliberate systems have monopolized Western philosophy of the mind for too long”.

The author also supports his arguments with experiments at every corner, which gives such an out-of-the-box argument some credibility. He also mentions a lot of anecdotes here and there, rarely revisiting them. This made reading this book quite entertaining for me!

The books central idea, namely that intelligence is partly unconscious, goes very well with my own view. I believe that people probably don’t use rational thinking in every aspect of their life, even if they claim so. The book captured me at its opening sentence: “We think of intelligence as a deliberate, conscious activity guided by the laws of logic. Yet much of our mental life is unconscious, based on processes alien to logic: gut feelings, or intuitions.”

I also loved some of the statements he makes, for example: “Each year the ‘prediction industry’ — The World Bank, stock brokerage firms, technology consultants, and business consulting firms, among others — earns some $200 billion as fortune-tellers, despite its generally poor track record.”

I would read this book again.

Central Ideas

Less is More

Or actually, less can be more. In the words of the author: “Less is more means there is some range of information, time, or alternatives where a smaller amount is better. It does not mean that less is necessarily more over the total range.”
This idea is very attractive; not only does it allow one to take decisions faster, it also gives better results at the same time! The tricky part, however, is to understand when is it applicable. The author points out five situations where it is applicable: when a degree of ignorance is beneficial (to use the recognition heuristic), with expert unconscious motor skills, when the freedom-of-choice paradox arises, to create predictions in an uncertain world (by benefiting from simplicity), and when the information-acquisition costs are too high (for example, in clinical testing, where costs don’t just reflect monetary costs).

These categories suggested by the author seem to have been figured after-the-fact to explain the results of some experiments. There doesn’t seem to be a systematic categorization, which leads me to think there might be more cases where less is more that haven’t been recognized as so yet.

One very interesting example of less is more was the case of Shereshevsky. He had such a great memory that he could remember tiny details for years. However, knowing all the details did not allow him to see the big picture. Here the importance of forgetting for cognitive processes is highlighted.

We Cannot Always Spell Out What We Know

And this is crucial to the way we ask questions and base conclusions on them. If someone fails to answer a question, it does not mean that he has no understanding of the topic.

A good example is asking a person who speaks a language about the grammar of that language. She might be very fluent, yet fail to answer. Another example concerns asking about the reasons behind a moral stand a person takes.

The good news is that once the rationale behind an intuitive feeling is made conscious, it can be taught.

Humans tend to explain things after-the-fact in these cases. This could be useful in reflecting, and maybe surfacing the rationale behind a thought to the a conscious level. However, acknowledging that some things we know cannot be spelled out allows us to utilize them nonetheless.

Recognition, and its Relation to Branding in Businesses

It was very interesting for me to read about the experiments regarding brand-name recognition in consumer goods. People are biased towards the brands they know, regardless of quality. Although the author presents a general framework in which the level of recognition can be linked to quality (through the voluntary participation of the media), he also points out that business normally cut the middle man and go directly to the consumer.

By doing mass-marketing that solely emphasizes the brand name instead of advertising for the availability of a product, or advertising for quality and differentiators, the businesses utilize consumers’ recognition heuristic to significantly increase their revenue. This approach seems monopolistic; companies that have a lot of capital and can afford advertising a lot could eventually kill the smaller competitors.
Lessons for Building Intelligent Machines

This book, unlike “On Intelligence” has little to no focus on building intelligent machines. Actually, the framework in which gut feelings are explained presents a hurdle in the face of an implementor. In the author’s eye, having evolved capabilities is an essential ingredient in using rules of thumb. We are still at the phase of adding reliable evolved capabilities to the machines, such as tracking an object in a video (which is a trivial task for a child). As the author says: “Because many of our evolved capacities are not well understood, we can’t endow machines with the same abilities”. However, a few interesting ideas could be potentially useful for building intelligent machines.

Reducing Dimensionality of Problems

The book presents many examples of decision making that run better when considering fewer variables than available. One category of such examples involved the take the best heuristic. “A complex problem demands a complex solution, so we are told. In fact, in unpredictable environments, the opposite is true.”

Such an approach would be most suitable for making predictions of the future, or decision making based on predictions, in an uncertain environment. In a way, it avoids over-fitting the developed model to the available data.

This could be translated to intelligent machines by attempting to reduce the dimensionality of problems being solved. For example, a machine might choose to only choose a subset of the variables it has, run its decision making process, and keep for future reference the variables subset used, the result of the decision making process, and the outcomes of the decision in the few moments following the decision making. Should the machine be faced with a similar problem again, it could choose a different subset, until it finds one that has satisfactory results consistently.

The idea seems to be going along the lines of the RANSAC algorithm, which is known to be robust against outliers.

Another alternative that does not reduce the dimensionality but reduces the data taken into the decision making process would be to analyze all data at the input, and prior to them being saved, extracting interesting properties, and ignoring the rest. This would force subsequent steps of decision making to only consider properties that were deemed by the first step as important, and could also help in cases were the amount of input is overwhelming (for example, in the detectors at CERN’s LHC).

Start Small

The idea here is to grow the machine’s capabilities with time, as it learns, and not provide all the capabilities from the beginning. Also, match the expectations of learning and the input with the growing capabilities. This is analogous to how children learn their mother tongue: the parents start with baby talk, then the children starts pronouncing relevant words without being able to create sentences, only afterwards can they create sentences.

Jeffrey Elman’s experiment in building an artificial neural network to learn the grammatical relationships in a set of several thousand sentences brings this point home.

1. What is the main point of the book according to your opinion?

In the book “Gut Feelings”, the author, Gerd Gigerenzer, tries to show the reader that human intelligence is not limited to the realm of rational thought; rather, most of the thought processes that take place in the human mind are at a subconscious level.

The author pits rational thought, based on clear set rules, that takes into account all pieces of information and tries to see all possible outcomes against simple heuristics that humans naturally use. These heuristics manifest themselves as “gut feelings”, inexplicable sensations of knowing what to do in a certain situation, without having spent any conscious thought on the problem. The process through which they come about is subconscious and the framework of these decision making tools is called “rules of thumb” by the author.

The human mind uses these “rules of thumb” in problems where trying to predict the outcome would basically be computationally impossible. The author gives examples as to the kinds of situations where they are useful: either when the brain cannot process all the information at the same time (computing the trajectory of a moving ball) or when fast decision making is vital (driving).

Another point the author makes against blindly using “data fitting” approaches is in cases where the environment has a very high degree of uncertainty. Trying to take into account every little bit of information you can muster and to squeeze a prediction from that based on fancy mathematics works very well if one wants to explain the past, but pretty much fails when it comes to predicting the future (as in it is not much better than chance). The problem here is that not all the information available might be useful in the future, but these approaches try to unify and take advantage of everything that is given to them.

Heuristics, on the other hand, work in an entirely different way. They discard information and focus on the important pieces. While at first glance it might not make sense (why discard
information since knowledge is power?), it has been shown to be the case that these simplistic approaches outperform complicated algorithms. Sometimes, even ignorance can be beneficial, as shown by the “recognition heuristic”: if you have to choose between two things, always choose the one you know. While “rules of thumb” do not explain the past so well, they do a very good job in making good predictions about the future.

The author does not argue against rational thought altogether. This would be totally stupid. Instead he looks down upon the fact that in present day decision making at the job, in politics, etc. decision have to be supported by rational thought and the more complicated this decision process and the more information it takes into account, the better. Decisions based upon pure intuition are frowned upon. The reason here is that the latter type is not so well understood and the comparison is not unlike the one between science (rational thought) and magic (intuition).

This stigma against intuitive decision making does not stop people from trusting their guts altogether. Human beings are naturally programmed to follow their guts before their brains. This leads to people making decisions based on intuition “in secret”, but then looking for elaborate arguments to prove that these decisions were taken through complex rational thought processes; in essence people “feel” a decision, but then they “think” of a way to cover their asses.

The author’s view of a “perfect world” is one where people are taught to trust their gut feelings and educated on how they work, where decisions based on them are not dismissed from the start as having no logical basis and where rational thought does not reign supreme, but rather intuition and logic work together. In such a world, quick and intuitive decision making is fostered and trained, rather than discouraged and frowned upon.

I must admit that I have always been rather an impulsive decision maker. Sometimes I do not make the best decisions, so I have always wanted to be the kind of person that just sits down, collects all the facts, makes thousands of little lists with pros and cons, assigns weights to them, tries to think of absolutely all the possible outcomes and then and only then makes a properly informed decision (mind you, I am not a person who just takes totally uninformed decisions either). After reading the book, I don’t feel so bad taking the short route anymore, as it saves time, it makes at least as good and sometimes even better decisions and it keeps me sane by not having to turn my world into numbers and mathematical operations.

The main idea that I got from this book and this is an idea that I will make sure to remember is that less can be more and vice-versa. People don’t have to spend a lot of time and money (for complicated decision making tools) to get good results. They instead have to learn to trust their gut more, as the gut feeling beats Franklin’s rule on any day of the week.
2. How can the knowledge obtained from this book be used to create intelligent machines?

The obvious thing that the book teaches us is that we don’t need to focus on developing the most complex and data-hungry algorithm we can think of in order to build intelligent machines. Instead the focus of research should be on developing machine implemented heuristics.

Of course, in places where it makes sense, algorithmic and computational approaches are key (and would be key for humans thinking as well, but human brains are just slow). Machines can perform computations much faster than humans anyway, so they can afford to spend the extra effort where it brings benefit to do so. A very basic example for this is doing arithmetic. I am generally lazy and can’t do math very quick so I do a lot of approximations, based of course on a set of rules of thumb, when I do math and come up with guesstimates. Here, being able to accurately compute the result brings benefit and it makes sense to spend computational effort, rather than teaching a machine these rules of thumb.

Machines off the assembly line should, of course, come with pre-programmed tried and true heuristics, just as humans have naturally built in instincts perfected through evolution. They should, however, not be limited to them, but instead focus on principles of self-learning. They should be allowed to make mistakes and learn from them. Based on past experiences, heuristics could be inferred and if they turn out to be fruitful, they could be passed onto next versions of the model.

The downside to implementing machines that “trust their guts” would be that they would be much more difficult to “debug”. There wouldn’t be an easy way to figure out why a certain decision was made, because internal factors based on previous experience would take precedence over current inputs, but hopefully the benefits would outweigh the costs.

Building machines that think using heuristics and develop own heuristics from previous experience has the advantage of being less dependent on human programmers and leads to the possibility of constructing truly intelligent and adaptive artificial life forms.
In his book “Gut Feelings, The intelligence of the Unconscious” Gerd Gigerenzer gives a lot of examples which he illustrates how intuition works and why gut feelings in uncertain world is almost every time the best strategy to act upon. The examples come from different life situations and environments. Author speaks about sports, finances, marketing, advertising and even moral decision making.

In the beginning of the book author argues the deliberate reasoning not really leads people to be happy. One can calculate pros and cons but somehow there exist some kind of feeling that is stronger compare to logical calculations. So we possess intuition or gut feeling!

Basically gut feeling is judgment

1. That appears quickly in consciousness
2. Whose underlying reasons we are not fully aware of, and
3. Is strong enough to act upon “ p. 16

Intuition can not only make as happy but also be very useful in various life situations. But how can it be that deliberate reasoning not only do not lead us to happiness but also rarely help us to make right decisions in everyday life?! Basically the whole book is demonstrating this idea from different point of views in different situations and explaining a lot of studies. Author discuss how a baseball player catches a ball or later he explains why an experienced golf player perform better in time stress compare to when he has a lot of time to make moves consciously. In these cases as also in further examples the explanation is that less information is better or just less is more. The mechanism that enables us to catch a ball is pretty simple. Player dos not calculate some complicated differential equations to estimate a ball position in space-time, he just always moves so fast that the ball stays in same viewing angle. More precisely author explains the mechanism a bit latter using adaptive toolbox concept.

““The adaptive Toolbox has three layers: evolved capacities, building blocks that make use of capacities, and rules of thumb composed of building blocks.” p. 60

In the case of catching the ball this concept looks like that:

“(1) Fix your gaze on the ball, (2) start running, and (3) adjust your running speed so that the angle of gaze remains constant.” p. 61
In my opinion this concept is very important in creating an intelligent machine. Instead of trying to estimating an absolute position maybe it is possible to implement a strategy that as a human cognition is based on relative information, and secondly use as less as possible information to full fill the task. With constantly improving digital signal processing I think it will be possible in the near future to imitate similar tasks like catching ball with a human made machine. The biggest problem about conventional implementation of artificial intelligence based on predicting future trough calculating all possibilities is that even when in future computers will be very fast, in most complex cases it will not be enough time to execute the calculation. Author gives very good example about how much time the IBM chess computer “Deep blue” would need to calculate twenty moves in chess game ahead and to find the best one. The answer is almost 4 times as much as the planet earth exists. So in case more complex problem it will not be possible even in far future to solve problems through optimizing. Second very important part of intuition mechanism is ignorance and a concept of less is more. To prove this author present some studies. For example experts in investment and economics did worse on predicting future stock exchange values compere to laypeople. He explains that it is because of irrelevance of most past information for the future. Too much knowledge makes expert perform worse in predicting but on another hand better in explaining the past. In same time Gigerenzer presents another important part of human cognition – the recognition memory which is included in adoptive toolbox and represents evolved capacities. Second reason why laypeople did better was that they were relaying on recognition memory and simple thumb rule: the company you know will gain more value compere you do not know. Although the laypeople did only with fifty percent accuracy, the experts were right only in forty percent of cases. The same argument was proved by another study but in that case instead of using experts it was used a computer and multiple regression algorithm to make best judgment in some another problem. The study revealed the same results. Even in a case it is possible to optimize a solution with a computer in a proper time the accuracy was once again forty percent in predicting results compare to fifty percent predicting accuracy using simple strategy: use only few factors to decide. But algorithm was better in hindsight.

In creating Artificial intelligence very important to try imitate mechanism of finding solution of human cognition, which is far more effective. One possible approach would be strategy called one good reason is enough. It seems to be very effective approach widely used in the nature. Especially in finding a partner or selecting flower by the bees.

What I found too very important in the way to understanding intelligence is the way human researches. Author gives a very interesting example about the ant’s path rushing over a beach which is full of sand tales and hills. When one looks how the ant finds its way through this terrain in the beginning it might look very complicated and sophisticated. The solution to the problem might be
Grazvydas Ziemys

quite simple just some rules of thumb that ant is following in finding its way. The rules could be to avoid the sun and do not waste energy climbing to high.

“The ant’s path illustrates a general point: to understand behavior, one has to look at both the mind and its environment.” p. 75

This example shows how important to see intelligence in its natural environment. The same idea was proved with rats in T-maze which was acting from a first glance not very clever but after studding a natural conditions brought the answers.

“To understand what goes on inside our minds, we must to look outside of them, and to understand what goes on outside, we should look inside.” p. 92

On another hand the most interesting idea of the book for me was how do people make decisions in buying products, voting and how do the commercials influence us. All those activities have something in common. On the one hand it is based on partial ignorance and less is more effect on the other hand making judgment relays on recognition memory. Gigerenzer present some studies that illustrate that. For example if consumers have too many possibilities to choose from they will buy less compare to situation with optimal number of proposals. Secondly by choosing a product people rely on brand names despite the fact that normally consumers in blind test were unable to differ between products with a brand name and simple product. In voting same mechanism plays important role. Some studies reveled that most voters knew more unimportant details compare to political views of a candidates to American president. That leads that advertising something in no matter what situation it is always a good strategy to make receiver recognize your brand or face or name among the competitors. It Seems that associations with some special features of a product is not that important compare of getting in a recognition memory of a costumers. The best evidence for that is Oliviero Toscani advertising campaign for an Italian brand “United Colors of Benetton”. After some years working to this company “United Colors of Benetton” became one of five most known brands in the world, despite the fact that Toscani’s commercials ware often ugly or not really acceptable for most of people, and had less to do with the brand name. The secret of the success was attracting people attention through provocation. All in all human are quite ignorant to information but that fact often can be positive. On the other hand in our modern world people get huge amounts of information so ignoring and forgetting information is a gut strategy to get along in the modern world.