MAPPING THE FUTURE

The Power of Algorithms

LOGLINE

It sounds like science fiction: A world that is totally predictable, without chance, without surprise. But the vision is about to become reality - thanks to the enormous amount of data we generate each day, and thanks to new, powerful computer programs that use this information to predict the future. In this documentary we put the number crunchers to the test: Can they predict the future of our film crew?

BACKGROUND

In the last few years, the data stream flowing through the internet has turned into a tsunami: Ninety percent of the information sitting on the world's servers was created in the last two years. And it's growing exponentially: Every single day we generate 2.5 quintillion bytes. In 2012 we produced 2.8 zettabytes - 2.8 billion terabytes. In 2020 there will be 40 zettabytes.

Who produces all this data? We do, with our smartphones, credit cards, surveillance cameras and social network accounts. Facebook alone generates 500 terabytes per day. This total digitization opens up completely new possibilities. Suddenly, our entire lives can be modelled mathematically – and thus become predictable. The crucial factor is the precise analysis of the data by high-performance computers and increasingly clever algorithms.

Already, algorithms are amazingly good at predicting our behaviour. By analysing our cell phone data and looking at our digital address books, computer experts can determine our whereabouts up to one year in advance. In 2010, Google predicted the swine flu epidemic by analysing their users' search queries. The American Big Data pioneer Nate Silver predicted the outcome of the recent U.S. elections more precisely than all pollsters. Because of *predictive policing*, people in California are arrested for crimes they haven't yet committed. And companies like Recorded Future help intelligence agencies foresee future terror threats.

This film shows how algorithms can predict the future by interpreting huge amounts of data. We show how predictive analytics is already being used today. And we prove that this is just the beginning – because the majority of today's Big Data is still "Dark Data": unstructured information lying dormant in massive server farms.

But we also ask how our lives will change if our future becomes computable and predictable. What will life be like when we can predict how well a child will do in school, how suitable it is for a particular job or if it's at risk of becoming a criminal? Apart from the believers in the digital crystal ball, we also interview critics like the Belarusian internet philosopher Evgeny Morozin. Because the dream of a predictable future with no disasters, wars or epidemics can turn into a nightmare of an omniscient surveillance state that could easily surpass even George Orwell's most dystopian visions.

STRUCTURE

At the core of the film is an experiment: We want to know whether the Big Data scientists really do know more about our future than we do ourselves. So we put the world's best number crunchers to the test. We present them with our smartphone data and ask them to create an accurate profile of our future behaviour. We want to know:

- Where will our crew members live in three months from now?
- What will their fitness level be?
- Which psychological state will they be in?

We pose these questions to data experts at the Fraunhofer Institute for Intelligent Analysis and Information Systems in Germany, one of the world's leading research institutes in data science. The scientists' prediction results will be locked away in a safe until the end of the film, when we open to box and compare the forecasts with what really happened.

This experiment forms the main storyline of the film. As the film progresses, we keep coming back to the experts who explain how they use our data to predict the future. Hence we get an idea of how the digital crystal ball actually works.

Every now and then we leave this narrative to venture into various fields of predictive analysis. These excursions give us insights into a future that has already begun. Whenever things get too complicated, we use explanatory animations. Funny and fast-paced, they illustrate how computers can predict the future. So don't worry – we won't put you through a 52-minute lecture on computer science but rather take you on an exciting journey into your very own future...

LOCATIONS

Santa Cruz/Santa Clara, California - "Predictive Policing": A unique project was launched here three years ago. The idea: Police officers no longer wait until a crime happens, but pre-empt it. A computer algorithm calculates where and when the next incident is most likely to happen. Thanks to the new software, the police department has increased its number of arrests by 56 percent. We will be in the control room when the officers receive their instructions, we will travel with them while they check on their tablet computers whether they are in the right spot at the right time. And we will be there when they arrest suspects.

San Francisco, California - "Kaggle": Online platform used by mathematicians, computer scientists, and statisticians to compete against each other. The challenge is to create predictive algorithms and refine them to make them as accurately as possible. Data analysis as a sport. By the end of 2012, more than 60,000 data specialists around the world used this platform. Kaggle has partnerships with NASA and Wikipedia. We meet founder and CEO Anthony Goldbloom in San Francisco, USA.

San Francisco, California - "Self-Tracking"*:* They are the data collectors of the future: so-called self-trackers – people who use electronic bracelets and other tools to record every detail of their lives and convert it into data that might be useful for their own self-improvement – or for future health insurance plans. We meet Rachel Kalmar in Burlingame, California, who's a passionate self-tracker and pioneer of the Quantified Self Movement.

Cambridge/Boston, Massachusetts - "Recorded Future". Recorded Future's customers include security agencies like the FBI, the NSA and the CIA. No wonder: Recorded Future develops software able to predict uprisings, civil unrest or wars.

Cincinnati, Ohio - "Predictalator": Paul Bessire has created a unique prediction tool that is able to predict the outcome - and even the course - of sport events like football matches. We want to put Paul's algorithm to the test by letting it compete against an experienced sports journalist. Who can better predict who will win the game?

Zurich, CH - "Future ICT": At ETH in Zurich, Professor Dirk Helbing is working on an ambitious project. He believes that today's world is far too complex for humans to understand. Only a supercomputer can do that, and Helbing is working on an algorithm that will be able to model everything that is happening on Earth right now. All the information currently available will be fed into the system to make the future predictable. Helbing's dream: Predict and prevent political, economical and natural disasters. But in doing so, isn't he creating the ultimate science fiction nightmare: An omniscient robot?

VISUAL CONCEPT

As the first documentary ever, "Mapping the Future" will be filmed with the new Google Glass. With its built-in camera, microphone, and computer chip Google Glass can record video and at the same time display augmented reality information. Google Glass not only allows us to shoot spectacular images from a first-person perspective, it's also a relevant part of the story: Like no other device, this high-tech gadget generates huge amounts of personal data that can be used for even more precise predictions.

"Mapping the Future" is a narrative journey. The filmmakers are not only behind the camera but also in front of it as protagonists and human guinea pigs. Subjectivity is intended. Together with the audience they travel to modern, networked megacities and roam gigantic server farms whose immense computing power is the prerequisite of Big Data analysis. Reportage passages filmed with Google Glass alternate with cinematic high-end shots of bustling cities, traffic flows and gigantic server farms. Rapid, subjective snaphots from the filmmaker's perspective contrast with highly artificial, spectacular images of the cathedrals of hypermodernity. This look evokes the dawn of the "petabyte age": human masses and giant data streams become one.

PROTAGONISTS

- *Yevgeny Morozov,* philosopher: warns of an impending "tyranny of the algorithms, Belarus
- *Staffan Truvé,* CEO of Recorded Future, Cambridge, Mass., USA
- *Cynthia Rudin,* MIT, Cambridge, Mass., USA
- *George Mohler,* University of Santa Clara, Santa Clara, Ca., USA
- *Paul Bessire,* CEO of Predictalator, Cincinnati, Ohio, USA
- *Dirk Helbing,* ETH Zurich, Switzerland
- *Rachal Kalmar,* selftracker, Burlingame, Ca., USA
- *Georg Fuchs*, Fraunhofer Institute IAIS, Bonn, Germany
- *Alexander Markowetz,* University of Bonn, Bonn, Germany
- *Anthony Goldbloom*, CEO of Kaggle, San Francisco, Ca., USA
- *Steve Clark*, Chief of the Police Department of Santa Cruz, Cal., USA

DIRECTOR

After studying philosophy, history and religious sciences at the university of Bonn in Germany, Jakob Kneser began working as a film director, author and editor. Since 2002, he has directed numerous reports, features and documentaries for arts and science television programmes. Jakob has also written and produced various radio features about cultural and scientific topics. Since 2006, he has been concentrating on creating longer non-fiction television formats. In 2009, Jakob started working as a freelance lecturer in journalism at the Humboldt University in Berlin.

Films (selection)

WDR 2012, 45 min: "In the Arctic "

WDR 2011, 45 min: "The Secret History of Wine"

WDR 2010, 30 min: "Food for Thought".

Arte / ZDF, 2009, 45 min: "Collective Minds. The Intelligence of Swarms".

Arte / NDR, 2006, 52 min: "End of a Legend"

PRODUCTION COMPANY

Since 1995, a&o buero has produced more than eighty documentaries. a&o buero's films were awarded, among others, the Human Rights Film Award, the French-German Journalists' Award, and the Axel Springer Award. Recently, the Emmy Award winning "Children of the Taliban" by Sharmeen Obaid-Chinoy and Tristan Chytroschek, and "Caught between the Lines" by Tom Roberts and Marcel Kolvenbach have attracted widespread attention. Both films were co-produced by a&o buero and October Films in London, and broadcast on ARTE, Channel 4, and PBS. Similarly, the International Emmy Award winning documentary "Songs of War" by Tristan Chytroschek has caused a stir. The film explores the relationship between music and violence and was sold to 25 countries worldwide.

Atomic Africa, WDR, 2013, 90'
Nominated for the Grimme Award
Winner Green Report Greenscreen Festival
Environmental Film Festival Washington

Brain Doping, ZDF/ARTE, SIC, ERT, DBS, 2011, 52'
International Science Film Festival Athen - Innovation and Technology Award

Songs of War, ZDF/ARTE, SBS, Planete, TVI, VRT, 2010, 52'
International Emmy Award
Vivisect International Human Rights Film Festival
DOCSDF Film Festival
One World Berlin Film Festival
FIPA Biarritz
Steps Festival

Collective Minds, ZDF/ARTE, EBU, EC, 2009, 45'
Guangzhou Film Festival Golden Dragon
Japan International Festival Nature & Science Award
Best Science Documentary Greenscreen Festival

Caught Between the Lines, NDR/ARTE 2009, 30'
Amnesty International Best Documentary Award

Children of the Taliban, NDR/ARTE 2009, 45'
International Emmy Award
AIB Award
Du Pont Award