The Information summarized below is taken from the German book: "Künstliche Intelligenz" by Prof. Dr. Dr. Manfred Spitzer. He is a neuroscientist at the University of Ulm (Germany). He was twice a visiting professor at Harvard University and once at the University of Oregon.

It is necessary first to realize the amount of help and the amount of threat, that AI may cause in different areas. Only then it is possible and meaningful to find answers to the threats without losing the help.
Recognizing what you don't like is by no means the answer to how to successfully prevent it.

AI applications and social impacts

AI will not replace experts, but experts who use AI will replace experts who do not use AI.

AI-Help for Quantitative Challenges and Pattern Recognition

Natural Sciences

- View and classify galaxies (around 100 billion are observable). Who should do this and when? Where quantities are too large. AI-Support in analyzing images.
- Chemistry: the automated synthesis of complicated substances & the discovery of new reaction pathways: 200.000 commercially available substances, 7 million producible substrates, many 100.000 paths can be found for typical target molecules.
- Finding different substances that are just as effective but in a different way.
- Learn many patented steps to avoid these.
- AI finds something from large amounts of data, which can then be reviewed by experts.

Medicine

- **Pattern recognition**, skin cancer detection. Send photo of skin from mobile to AI, AI sends back diagnosis and can suggest => Visit your doctor.
- **Protein structure** analysis: Proteins consist of 20 amino acids. Chains of 100 to a few 10,000 amino acids are called proteins. Proteins are the basic building blocks of cells. They give cells their structure and function. Human genome can produce more than 20,000 proteins in which the order of amino acids is fixed. They are not present as a long chain but folded instead (like a ball of yarn). Number of protein structures solved with AI explodes.
- **Antibiotics and their resistance:** Finding structures to which there is no resistance (suspect selection). Since the 1980s, no new clinically applicable antibiotics have been found using microbiological screening in the laboratory. 100 million substances are the "search space". AI recommended 99 candidates from these 100 million substances. They were examined using microbiological screening in the laboratory. A good antibiotic effect was proven for 51 of the 99 candidates.
- In the area with pattern recognition, or decision-making problems with difficult data situations and little time for the decision, this is where AI can be helpful.
- Not every doctor's office can offer an optimal treatment based on current scientific knowledge. (Doctors' experience, further training, limited hospital resources, etc.) But AI could be consulted from any hospital or doctor's office.
- AI can help with the up-to-date status of findings and publications. AI has seen more skin samples and tissue samples for comparison than any single doctor. Diagnosis safer and faster. Early detection is safer. Chances of recovery better.

- MRI or CT with AI produces images faster. AI trained with images that tell you whether cancer has been diagnosed after a year. It avoids anything being overlooked. Findings significantly faster.
- AI can reduce the cost of medical services by 50%.
- Diagnostics of tissue samples, skin samples, colonoscopy, mammography (14% more polyps for removal at diagnosis)...
- X-ray images of the lungs => life expectancy indicators? => relevant for classification: region of the shoulder blades. Radiologists have never paid attention to this region.

Science of Humanities

- Detecting regular connections by learning, from patterns in bodies of text, without understanding the text and without awareness.
- AI can learn more than a single human.
- AI can reduce search spaces and thus lead to targeted investigations and solutions.
- Science is theory-driven looking for structural perspectives on a large set of details. AI helps to find new structures in a large amount of detail.
- AI helps to find opportunities depending on what AI is trained to do. The AI does not understand what it finds through trained syntactic and hermeneutic rules, but humans can understand what the AI found much faster.
- AI will become a part of science. Books allowed knowledge to be concentrated. This greatly accelerated learning processes.
- AI accelerates search processes and the evaluation of large amounts of data, which humans would not be able to evaluate.
- AI can show people the direction of its cognitive process without having understood anything itself, because AI finds the structures that people have previously overlooked and missed.

Monitoring resources/climate change

Climate change (AI uses a lot of electricity but can also help)

- **Trees:** Capturing trees through AI in satellite images on Earth and their biomass and storage of greenhouse gases. Recording trees in cities. Air and heat regulation for cities.
- **Methane** 60% of methane emissions are caused by human economic activities. Estimate: 30% of global warming caused by methane. Methane emission can be observation by satellites. Amount of data cannot be evaluated manually. AI trained on CH4 emission patterns found sources: 40% from oil and gas deposits, 30% from landfills, 20% from coal mines. Evaluation of earth surface with high resolution pictures is only possible with AI.
- **Golden hydrogen**: Naturally occurring hydrogen not as a deposit (like oil), but as a constantly newly produced gas. Could have the potential to replace all fossil fuels. Find H_2 source: circular depression of the ground with a diameter of 20m-250m. Evaluation of satellite images.

AI as a Threat

AI as a hindrance to the development of intelligence

- Perceiving, thinking, understanding, planning, evaluating, deciding, **changes the connections between the nerve cells.** This is how the brain is formed. When machines do this, there is less learning.

- Homework, seminar work disappears. Writing down own thoughts is not the same as talking about foreign thoughts. Writing is an important form of own thinking. You don't learn a musical instrument or football by talking about it.
- As a writer you are responsible for what you write. This is what children should learn. Chatting GPT instead of learning yourself is counterproductive for the education (developing brain capacity) of young people.
- If AI displaces independent thinking in educational institutions, then it can lead to the decline of our culture. We are then only focused on the past. AI gets its inputs from there.
- Our culture is based on experts who have trained their brains with independent learning processes, motivated by feelings such as pain and happiness, people in exchange with other people, and a vision of shaping the future for their purposes.
- AI cannot give us purposes. We must take on this responsibility ourselves. And also, about our path into the future.
- Otherwise, we will become victims of AI and its social consequences.

AI in everyday life

- Smartphone photos recognize faces and can expose them for a search on the internet
- Character analysis: Programs learn about our use of the Internet and give it to platforms.
  => Our personality is categorized for "personalized treatment" (advertising, news)
- Surveillance cameras: EU images may not automatically recognize and evaluate on a personal basis. This is done in China. Evaluation of the experiences of security authorities through AI.
- Predictive policing (UK, USA, CH, several federal states) determining the likelihood of crimes. (Place and time of the event, not the perpetrators). => Police presence.
- Personal prediction (to be banned in the EU)
- Pretending false facts. AI fake porn images for blackmail
- Voices of relatives on the phone, disorientating you to whom you give information.
- Rights to the image or voice of actors manipulated by AI.

Racist and Discriminating AI

- Example of emergency services in the USA: AI did not determine the severity of the illness but rather the treatment costs. Then acceptance in the hospital was rejected.

General problems:

- Historical data is used for training with associated biases. AI is therefore not unbiased if it has been trained with human decisions.
- Biased groups (race, gender not correctly represented) incomplete data => Bias in the data
- Inappropriate classification, biased training => bias in the algorithm
- Social prejudices, one-sided power structures => distortion by people
- AI regulation that ensures that the AI is not programmed to have these disadvantages. (NY State Law)
- Question asked to AI = purpose of the program

AI and Crime

- Social media / user data is evaluated with AI, => user profiles
- Hate comments towards minorities => lead to hate crime
- Facebook is used as a news source. However, messages are filtered by user profile. You get to see opinions and facts that you would like to see. => Distorted world.

- Facebook DE Afd Posts, USA, (Make America Hate Again). Hate comments are followed by hate crimes.
- Network Enforcement Act (in Germany) requires content to be deleted and access blocked for crimes like, torture, violence, murder, suicide, hate messages and cyberbullying, terrorism, animal cruelty, rape and child abuse.
- Money is made by distributing this content, but responsibility for the social consequences is rejected. AI in upload filters can be trained to identify this content.

Social networks

Summary:

- Facebook is spying on us
- Twitter favors fake news when it comes to spreading it
- YouTube radicalizes

Radicalization as a business model by YouTube

YouTube AI's goal in advertising is to keep people on the screen for as long as possible.
=> This works best by suggesting increasingly radical videos.
=> Radicalization as business model.
=> Political division of the country.
50% of students have Google Chromebooks with YouTube access preinstalled.
There is no reason to let a company make so much money while potentially contributing to the radicalization of billions of people and letting society bear the costs.
USA shows a dangerous division in society, with decreasing epathy.

X (Twitter)

Fake news spreads faster, wider and deeper than true news. Fake news have a greater novelty value and are more surprising. They are therefore shared 6x more often than true news.

Facebook

- Likes on Facebook allow an AI to know a personality well:
  9 likes as good as a work colleague
  65 likes as good as a friend
  125 likes as good as parents or siblings
  225 likes as good as your spouse (this is the number of likes that Facebook users give on average.)
- Violation of privacy is part of the business model => personalized advertising through AI Categorization for target selection for political and commercial influence.
- Facebook, YouTube and Twitter have a dangerous influence on democracy. Social influence, disproportionate spread of falsehoods, political incitement and radicalization,
- Emotional contagion via the Internet for personality-dependent manipulation was Cambridge Analytica's business model (micro targeting, special messages for specific targets selected by AI). The communication strategy for Brexit.
- Donald Trump's presidential election and another 200 elections and decisions were also won this way.

- Facebook has also collected such sensitive data from 180 million EU citizens in the EU. This contradicts the EU data protection regulation, which also became a model for California.

Military

- AI as co-pilot "ArtuMu" takes command for quick reactions. Soldiers are controlled by AI. They play a subordinate role. AI has to take command because humans are too slow (e.g. in dogfights or to fight swarms of drones). Humans would lose against AI.
- AI suggests tactics that humans can't necessarily understand.
- What ultimate goal of a mission does an AI learn during training?
  (Example: Operator is attacked because he said NO to destruction in the end.)
  After AI was programmed not to attack the operator, then AI destroyed the communications tower instead of the operator to suppress the NO-command.
   => You also have to talk to the AI about ethics
- AI causes a dilemma for military: When people want to keep control, they lose.

Chemical weapons

- AI trains, for medical purposes, to find molecules with high potency to heal and low toxicity. However, learning direction can be reversed to high toxicity. => Weapons development (AI is of dual use).
- Ki for drug development is also suitable for combat agent development.
- AI could develop a virus for the next pandemic.
- Intelligent students (without a professional background in life sciences) can use LLM chatbots to identify and source publicly known pandemic pathogens Sars Cov-2 has killed 20 million people.
- The life sciences literature is usually only available to experts and is not even completely accessible to them. But if chatbots make them accessible according to search criteria, even to people with no knowledge of biochemistry, then the number of people who can kill millions of people becomes much larger.

Regulation and Responsibility

- EU AI law regulates based on potential for harm. Intrusive and discriminatory AI applications in biometric surveillance and predictive policing are completely prohibited. High-risk-AIs are assessed before and after market launch.
- Example of global regulation. Reinforcement learning with human feedback (RLHF).
- Current regulation cannot prevent malicious actors from gaining access to expertise that can cause mass extinctions.
- Suggestion:
  1. LLMs like Chat-GPT must be regulated.
  2. The production and distribution of genetic material should be monitored.
- Without DNA there is no biotechnology Currently, DNA is manufactured by a few central suppliers and its delivery to customers is controlled.
- A new generation of bench-top DNA analyzers will soon allow DNA to be produced in a decentralized manner. This allows central security standards to be circumvented.
- Against terrorism with biological weapons Built-in SW and HW that monitors improper use of the machine, such as color copying, against production of counterfeit money.

- Devastating consequences when AI works with bias, and no one notices.
  Then the machine classifies and decides based on prejudices.
- Whoever publishes or markets the AI is responsible (Microsoft, Amazon, Alphabet, ..Start Ups, companies which introduce AI for internal use).
- Restriction of permitted training data: e.g. making explosives,
- Bio-weapons: to regulate access to less than 1% of the Pub-Med Abstract database in order to eliminate almost all risk of criminal misuse of this database.

Trust, Transparency, Responsibility, Accountability

No tool can take responsibility or be accountable.
As an author of scientific papers, AI tools are excluded.
SW that humans don't know how it works or can't know in principle, is excluded.

- AI as a reporter? (who programmed, what is to be considered as important and therefore worth being reported?)
- AI may be a planner to achieve world domination.
- AI as a know-how provider for illegal actions.
- Trust in videos and photos is being decimated. What are facts? How can you recognize them?
- Doubt can only be constructive and effective on a concrete level, but not on an epistemological level, where you would start to doubt everything all at once. This would destroy all orientation – an aim of political disorientation.
- There is a gradual historical progress of knowledge with varying degrees of tolerance at each step.
- Only people can be responsible for the accuracy of a finding, or measurement or theory. Not AI.