

CONSCIOUSCODERS

issue 01 – May, 2018

AI and Big Data:
Boundless Potential or Serious Threat
– *What Influence do we Developers have?*

Results from
Student Workshop and Panel Discussion
Saturday, March 3rd @CDTM Munich



Think before you code.





1 Editorial

What this booklet is about.

By Lukas Pöhler and Markus Müller

Dear reader,

We are proud to be able to share our first printed version of thoughts and discussion created within the community of ConsciousCoders with you. The presented ideas are from students, young professionals and experienced professionals from a variety of backgrounds.

They were developed at our first public event on 3rd March, 2018 in Munich during a student workshop, and presented and discussed in the evening in a public panel discussion. We hope to give you interesting insights into the current sphere of discussion about artificial intelligence (AI) and the collection and analysis

of big datasets, often only referred to as Big Data. If you have never heard from us before, good news: in the next chapter, we give an introduction to what we stand for, what we aim at and what our approach is to achieve thorough discussion and analysis of various aspects on AI and Big Data.

We hope you enjoy this booklet and welcome you in the community of ConsciousCoders!

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2 Why do we need ConsciousCoders?

Why we felt it to be necessary to start ConsciousCoders and what it is about.

By Lukas Pöhler, Markus Müller and Anna Szujo

Do we trust machines to make moral decisions?

With this question, the story of the initiative ConsciousCoders (CC) began in October 2017 in Munich. It was initiated by three students, passionate about novel and disrupting technology, but at the same time uncertain about not only

how their life would look like in the future, but also how the technology – they and their friends develop – would change the way we communicate, live and work.

Besides growing presence of digital technology in everyday life, decision-making tasks are delegated to often

data-driven algorithms. Several chances but also challenges arise from this development.

ConsciousCoders aims to provide a platform for interdisciplinary discussion amongst developers, ethicists, lawyers and persons that are interested in these changes. Further, we want to discuss the role and responsibility of each actor in this complex sphere.



ConsciousCoders | The idea



With opportunities, challenges and risks emerge.

shape development towards beneficial use of **Technology**



How to cope with complex technologies that influence the way we live?

enable **Society** to understand and cope with new technology



What impact does our work have and what is our role?

coordinate **Developers** for discussion and aggregate opinions

Our Goals

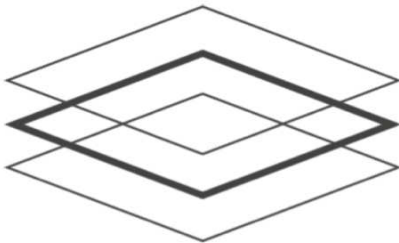
Our perception of the current sphere is that the novel technology impacts the society in both positive but also challenging way.

To **enable society and decision-makers** to cope with the changing environment, we want to **coordinate key actors and developers** to consider

the variety of aspects concerning this topic. Thus, we want to **actively shape the future of AI & Big Data.**

ConsciousCoders | The vision

Build and foster a community to discuss the impact and shape the future of AI & Big Data.



SOCIETY
DEVELOPERS
ALGORITHMS & DATA





3 ConsciousCoders.workshop

The first event of ConsciousCoders on 3rd March was a one day student workshop.

30 students from computer science, mathematics, electrical engineering and related subjects in 5 workshop teams, discussing how to concretely overcome challenges in dealing with AI and Big Data in study and professional environments.

This was the key idea of our first workshop taking place in Munich.

To get substantial input, the team of CC provided preparation documents for each group in advance to the workshop.

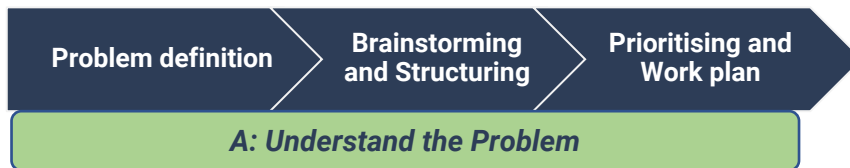
Further, a keynote by **Henrik Klagges**, Managing Partner at TNG Technology Consulting and an interactive talk by **John Grant**, Director of Privacy and Civil Liberties Engineering and **Kyle Owens**, Civil Liberties

Engineer (both Palantir Technologies) allowed discussion during the workshop day.

Each group had the possibility to contact an **expert** from science, industry and civil organizations and was guided by peculiar **moderators** for focussed and methodologically firm discussion during the day.

The Concept

How the workshop looked like.

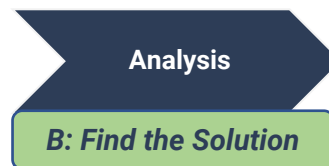


A: Understand the Problem

The morning was dedicated to clearly defining and structuring the problem before prioritising the aspects and planing the analysis in the afternoon...

B: Find the Solution

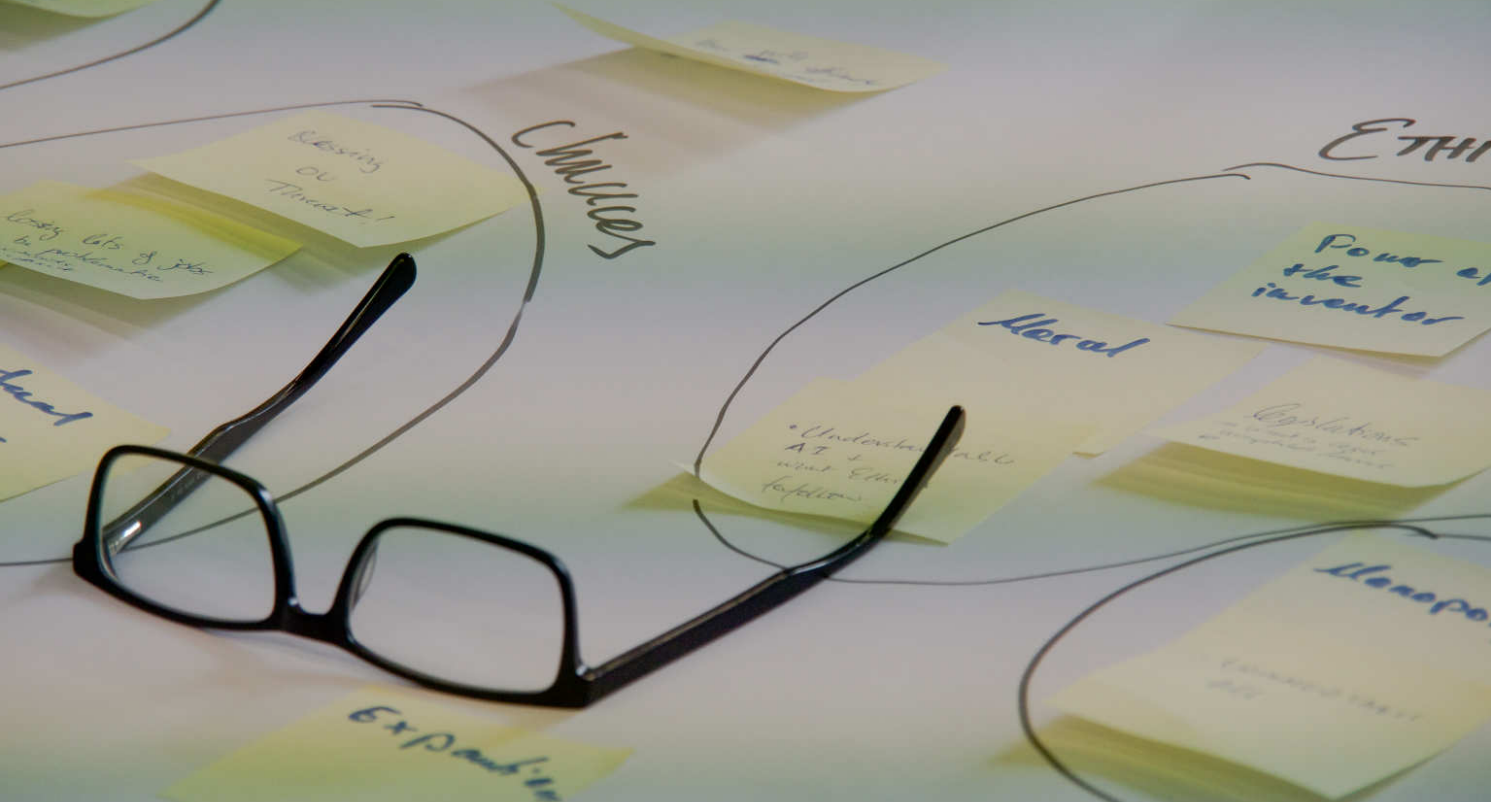
...after lunch, the groups worked on the work plan in order to find approaches to tackle their respective challenges. This phase included expert interviews either in person or via video conference...



C: Communicate

... at the end of the day, the results were presented at a public panel discussion, hosted from CC. Therefore, the participants synthesized their results.





Group Results

The five workshop groups developed solution approaches to tackle issues around AI and Big Data.

In the following, we present the results from the five workshop groups as they were presented in the evening event.

The topics were selected to represent various aspects of AI and Big Data related topics.

The first two groups **Delegation of decisions** and **Transparency of AI**

worked on how accountability, explainability and transparency of decision-making through algorithms could be improved.

Whereas group three, **Centralized data sets**, considered measures to prevent information assymetry from data agglomeration,

the group **Misuse of algorithms**, developed measures against dual usage of algorithms from a developers' point of view.

The last group **Future development** worked on possible scenarios about how the workplaces could change in the future and deduced possible recommendations.

Yes, No, Maybe

When algorithms make important decisions

Group 1 – Delegation of decision

*More and more decisions are delegated to machines.
What does this development imply?*

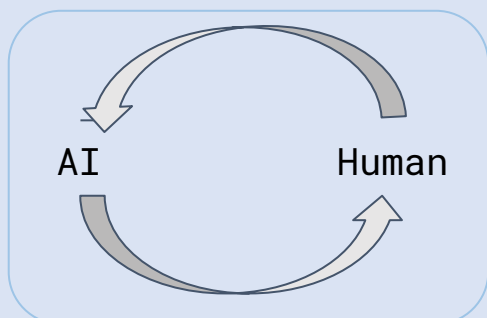
Group Members: Claas Brüß, Max Felsner, Jann Goschenhofer,
Nicolas Jakob, Alexander Jesipow,
Alexander Ladwein, Verena Zink

Moderator: Christoph Kocher, Neuroengineering

Expert: Matthias Uhl, Leader of the Junior Research Group “Ethics of Digitization” at the Bavarian School of Public Policy (TUM)

Background

Decision-making



Which ratio needs
which norms?

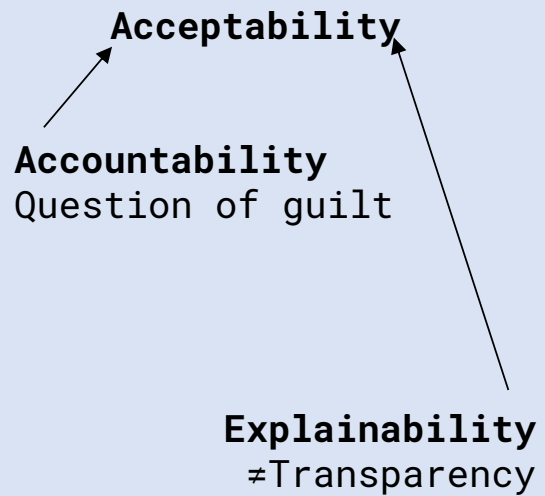
Data-driven decisions are increasing and more and more ethical dilemmas in these decisions concern users. The **ratio between AI-based decision-making and human control** range from automated decision-making with no human control up to decision support, with the algorithm only recommending actions.

Considering this characteristic of a degree of autonomy in decision-making, a closer look on **which norms are needed for which ratio seems promising.**

How decision-making can be accepted depends on accountability of the algorithm and question of guilt in case of an error. This means, that a **clear responsibility of the variety of involved actors**, such as developers, users and training data set deliverers is crucial.

To increase trust, a user needs to be able to get an **explanation from the decision-making system about the reasons for a particular outcome**. This does not necessarily require access to the source code.

Issue



Recommendation

Accountability

- Clearly assign legal and moral responsibilities
- ❖ Emotional satisfaction
- ❖ Detering developers from being careless

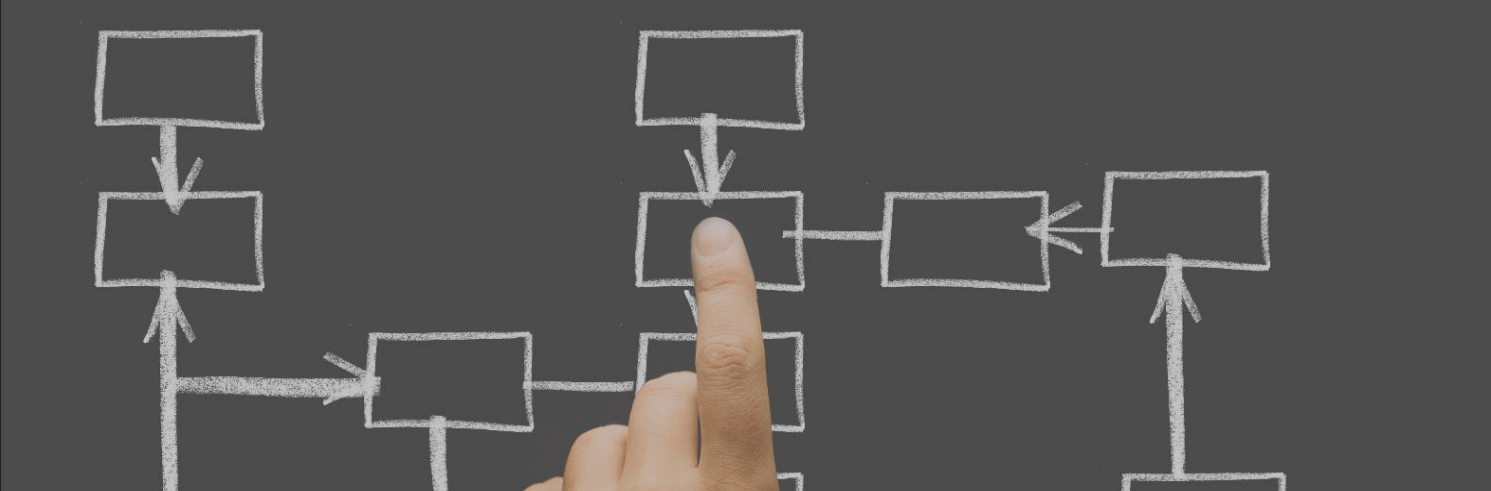
Explainability

- Institutionalize reviews
- ❖ cf. DIN norm
- ❖ cf. GDPR

Recommendations to counteract the main issues from above, would on the one hand be to increase accountability. This can be achieved through a **clear assignment of responsibilities** what would allow emotional satisfaction in case of an accident and **sensitize developers about their impact and role**.

Regarding explainability, the evolving field of *explainable AI* needs further research and seems to be promising. Further, **institutionalized reviews based on norms and legislation** for algorithms are an important step towards increased explainability.





German Angst of artificial intelligence

Transparency of AI

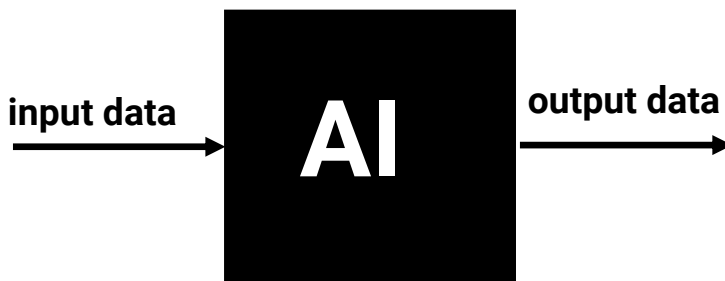
Group 2 – Transparency of AI

If algorithms are perceived as black boxes, various challenges for acceptance arise. When do we need transparency of AI and how to implement it?

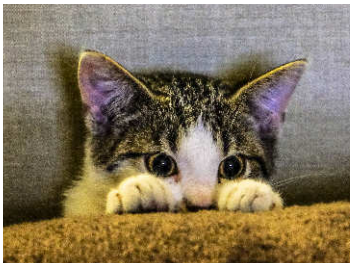
Group Members: Nicolas Berberich, Tim Heinlein, Radu-Cristian Rusanu, Valentin Schrader, Christina Schuster

Moderator: Lucas Siebeneicher, Program Manager Fraunhofer Venture Connect

Expert: Michael Lutter, Researcher Intelligent Autonomous Systems at TU Darmstadt

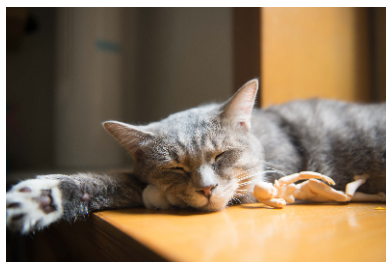


Complex problems often result in complex algorithms. Already today, **humans do not have a clear understanding of certain decision-making processes** anymore.

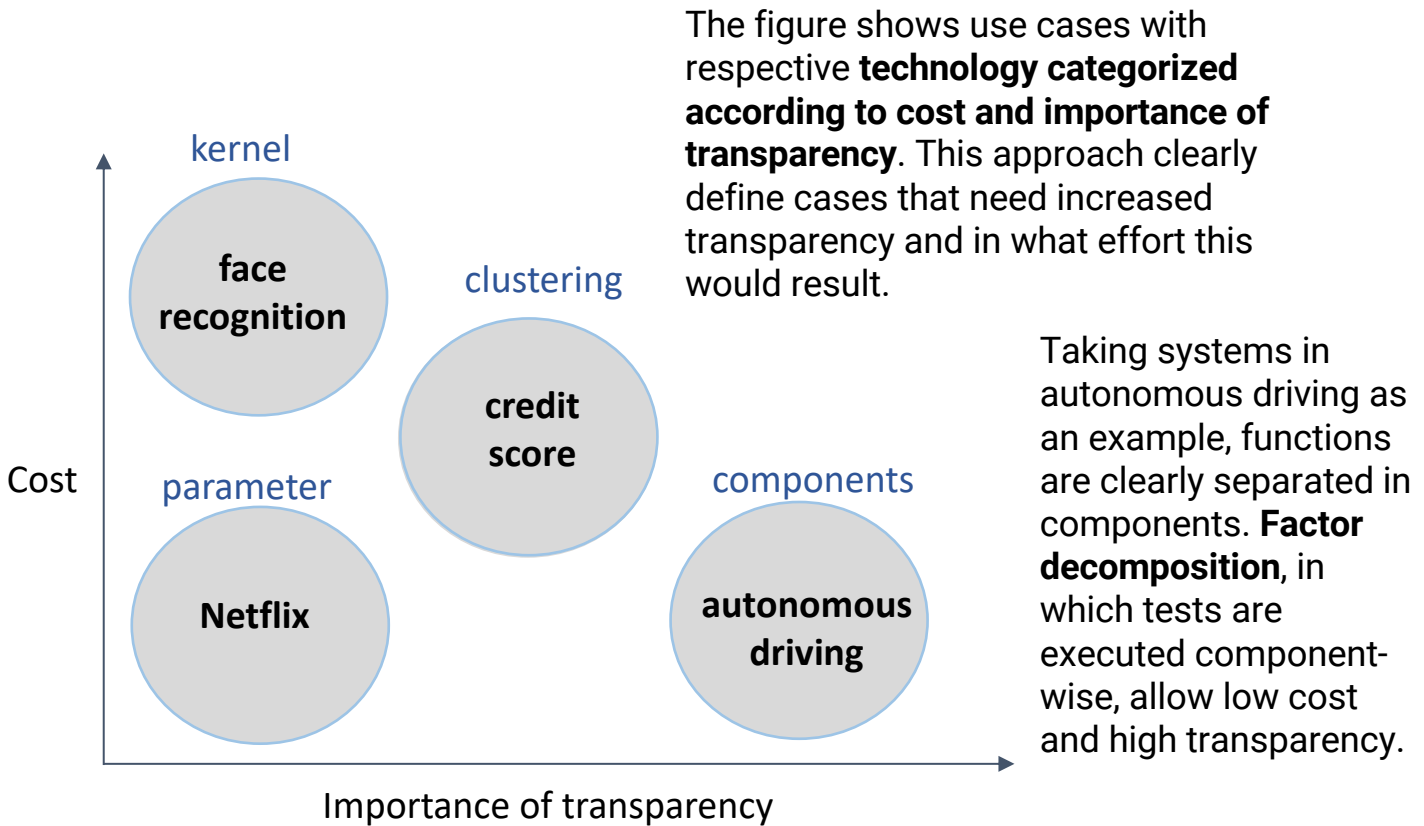


German "Angst"

Due to Transparency in AI



Considering deep neural network technology, even developers have issues in understanding the mechanisms happening within the layers. This often results in fear and mistrust, especially in Germany. The workshop elaborated on how the German Angst could be overcome by transparency in AI.



Recommendations

- Certification by independent institutions
 - training data
 - factor decomposition
- Legal framework
 - connect AI and law communities
- Raise awareness
- Notify about AI use

Independent institutions for analysis of the selection of training data and evaluation of algorithms through factor decomposition would bring trust to users.

Further, **transparency measures need to be embedded in a legal framework**. AI and law communities therefore need further **collaboration**.

On the individual level, **awareness about AI use in products** should be raised together with resulting implications.



China's "Citizen Score"

Today still 2018 or already 1984?

Group 3 – Centralized data sets

What are crucial aspects to keep in mind when dealing with centralized data sets?

Group Members: Viktoriia Bakalova, Hajer Ben Charrada,
Simon Kohlhase, Julian Koller

Moderator: Anna Szujo, Team Member ConsciousCoders

Expert: Ashwini Rao, Computer Privacy & Security Researcher at TU Munich

Issue

Asymmetric
distribution of
information
related to data

→ China's
citizen score
in Europe as
well?

Users evaluate the disclosure of their data on current data-processing possibilities. However, **future analysis based on changed legislation bring the threat of extracting sensitive information from data sets.**

This, together with **increased collaboration between companies and public agencies** in data-processing, raise the question on what measures should be taken to prevent misuse of data sets by companies and counteract the Orwellian vision of a surveillance state in the future.

This problem leads to the question on how to **manage a balance of power in data-driven societies.** Asymmetric distribution of information that users provide can be an issue. As an example, a health insurance company could get access to

Recommendation

Technological Solution:

- Privacy assistance tools
 - Personalized privacy settings
 - Privacy policy analysis
 - Predictive data value analysis

Political Solution:

- Mandatory data mining audit (private companies, government)
- Reporting on user specific data use (connected to privacy assistance tools)

→ Combining technological and political measures to achieve more transparency about data collection, distribution and processing

→ Empower individuals to achieve balance

camera systems in certain sensitive areas. This would allow **behavior-based smart contracting without user consent.**

Thus, technological recommendations are that **privacy assistance tools** provide users with the capability to create their own privacy settings based on knowledge on potentially future data

value. Politically, oversight on data mining companies could be limited through **mandatory data audits.**

Further, companies should regularly notify their customers on user specific data use without the user actively needing to demand it. A combination with above mentioned privacy assistance tools would

enable the user to dynamically adapt and control the specific data use in case of a change in company strategy.

The **combination of technological and political measures** would increase transparency about data collection, distribution and processing and thus empower individuals to achieve a power balance.



```

* @var boolean
*/
define('PSI_INTERNAL_XML', false);

if (version_compare("5.2", PHP_VERSION, ">")) {
    die("PHP 5.2 or greater is required!!!");
}
if (!extension_loaded("pcre")) {
    die("phpSysInfo requires the pcre extension to php in order to work properly.");
}

require_once APP_ROOT.'/includes/autoloader.inc.php';

```

AI and algorithms as new dual use goods

Can our code be misused?

Group 4 – Misuse of algorithms

What are dual use challenges for algorithms? Can we as developers prevent misuse?

Group Members: Lakehal Imad, Emanuela Trabaldo Lena, Lukas Rauh, Lorenzo von Ritter, Josef Seidl

Moderator: Lukas Pöhler, Team Member ConsciousCoders

Expert: Anja Kaspersen, Director at the UN Office for Disarmament Affairs

Issue

Dual Use
Example: Libratus



Developing an algorithm does not necessarily result in a restricted use case. In reality, civil (open source) algorithms might be misused in military or criminal activities. Such **dual use implications require new approaches in the prevention of misuse of AI or software** in general.

A prominent example for the dual use problematic of algorithms is Libratus, a poker software better than humans in bluffing. Libratus could be easily transferred to applications in strategic military planning and currently, no information is available on to what extent such **spill-in to the military from the civil sphere occurs**.

To prevent dual use of algorithms, at first a **global common ground on moral use of AI** needs to be developed.

Further, developers lack of knowledge about existing standards on good practices for algorithm design.

A crucial aspect is that misuse of publicated code currently is not prevented. The core problem, however, is that the current power-wielders such as governments and companies do not have strong intentions to change the situation what makes **top-down solutions not probable**.

Challenges

- Global common ground for moral values
- Standards
- Misuse of code
- Unbalanced power

Recommendation

- Raising awareness
- Teaching
- Embracing existing standards (IEEE)
- Blockchain for verification

To prevent dual use of algorithms, a **bottom-up approach seems necessary**. Thus, **awareness in the community of developeres and society needs to be raised** by civil society organizations but also in universities and schools.

Existing standards should be spreaded, embraced and further developed.

To trace and monitor changes in algorithms, **verification through blockchain** technology offers promising paths to further research.





VR, Google Glass and Autonomy

How are our lives going to change?

Group 5 – Future Development

What are future use cases and which business models will probably emerge?

Group Members: Rana Ali Amjad, Timothy Hönig, Florian von Keller, Till Kern, Franz Mader

Moderator: Lucia Loher, Advanced Data Analytics & AI Specialist at Microsoft

Expert: Johannes Plapp, CTO of Logivations, Volkswagen Nominated Supplier for Logistics Innovations

Issue

Interaction:

- AI actions/decisions understandable for humans?
- Humans, the weak part of the relationship?

Behaviour:

- Emotional/natural behaviour -> how human-like?
- AI responsibility?

Resources:

- New job requirements?

Disruptions in the workplace through novel technology can be clustered and analyzed in three areas.

Firstly, **human-machine interaction raises issues on understandability of actions** undertaken by AI. Further, the question on which balance between humans and technology and algorithms we want to sustain in the future.

Recommendations for this issue are clear explanations and accountability of algorithms and

the actions from autonomous and intelligent actors.

Secondly, the question on **how much human-like behavior, like emotions, we allow for machines** and if we need an **AI responsibility** arises. Even today, in autonomous trading, it is already possible that an AI acquires companies consisting of thousands of workers and sells shares, solely maximizing its profit.

Society needs to discuss on these questions and a legal foundation needs to be found to control the behavior and impact of algorithms into our real world.

Possible Recommendations

Interaction:

- provide explanations for actions/ decisions
- segregated environment and collaborations

Behaviour:

- measuring scale, Test Scenarios, expert opinions
- legal and society

Resources:

- new interdisciplinarity

*„I think that due to the current rapid progress in AI the way we work will change: **AI will take over repetitive tasks, whereas the role of human workers will transition into being operators to handle difficult 'edge' cases.***

*For this, we need both improved communication skills of AIs (see Alexa and Google Assistant), and a **growing understanding of AI and its limitations by workers.** If we succeed with that, I'm optimistic that we can make our **workplaces more productive and enjoyable by adding AI.**“*

Johannes Plapp, CTO Logivations

Discussion on the third issue on workplace resources is often limited to only considering job replacement by robotized manufacturing AI services. As seen in the last industrial revolutions, new jobs evolved with new technology coming. **AI usage already today is creating new jobs** such as supervisors for autonomous systems or social science research on user behavior.

As seen in the results of this study, changes in the workplace already take place today. The question is, **what impact and change we as a society allow and how we actively manage and shape the future of workspace.**





4 ConsciousCoders.talk

The workshop results were presented in a public evening event, followed by a panel discussion.

In the public evening event, **the ideas and outcomes of the student workshop were spread to a broader audience** and a platform was given to discuss the presented ideas (*links to videos in chapter 8*).

Further, a panel discussion with **Prof. Klaus Mainzer**, Founding Director of Munich Center for Technology in Society (MCTS), **Alexander**

Waldmann, Operative Director at the appliedAI Initiative at UnternehmerTUM, **John Grant**, Director of Privacy and Civil Liberties Engineering at Palantir Technologies and **Gigo**, Board Member of muCCC, the Munich branch of Chaos Computer Club (CCC) took place.

Moderated by Markus Müller, team member of ConsciousCoders, the

panelists discussed **how the impact of AI and Big Data issues should be shaped by decision-makers, developers, the legal community and the society itself.**

A multidisciplinary and joint approach was demanded by the panelists to achieve high benefits from algorithm-supported decision-making and a good future working environment.

5 Our Supporters

Thanks to everyone who made the day possible



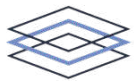
Our friends who supported us
in advance, during and after the event!

Special thanks to

- Poster Design: Julia Barth
- Event Technology: JA-TON
- Food: Christina Dosch
- Photos: Nils Hansen
- Music: Jonas Rall

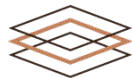
6 The Future & Next Steps

ConsciousCoders will continue as a initiative consisting of students and professionals with regular meetings and thematic projects. Outreach will be achieved with four formats.



CONSCIOUSCODERS.publication

- make **outcomes accessible**
- basis for **further discussion**



CONSCIOUSCODERS.blog

- provide **inspiring ideas** and **developments**
- share **best practices**



CONSCIOUSCODERS.workshop

- identify **challenges**
- explore **approaches** through **deep dives**



CONSCIOUSCODERS.talk

- present **findings to society**
 - spread the word through **public discussion**
-

7 Impressions & Statements



*„Rules and regulations are only going to go so far in protecting our rights in a world where new technology may fundamentally alter our society before we have a chance to truly understand its effect. If we are to have a chance at preserving these core values, then **it falls to the engineers and the coders to recognize the potentially far-reaching ramifications of their work.***

ConsciousCoders has embraced this responsibility, encouraging young coders to think more broadly about what they are building and channel their talents for innovation toward these challenges. It was a privilege to join this event, which asks exactly the right question:

What influence do we, the technical community, have?



*The clear answer – based on the energy and enthusiasm on display over the course of the day – is that **the next generation of developers is ready to take the lead.***

John Grant, Director of Privacy and Civil Liberties Engineering at Palantir



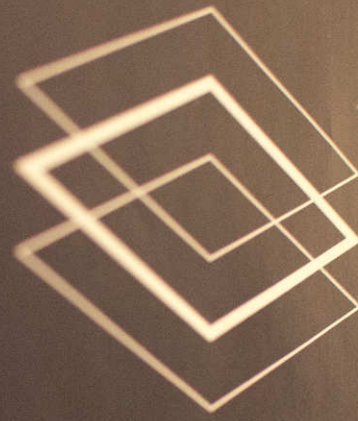
*„The student workshop organized by ConsciousCoders was very exciting and I can recommend it to anybody who is interested in the current trends of technology as for example AI. We had two **amazing lectures from representatives of the companies Palantir and TNG Technology Consulting focusing on current technology trends and the responsibility of software companies** when designing their products. Moreover, I enjoyed the panel discussion at the end of the workshop that focused on the **role of the software engineer and how AI can change our daily life**. A big thank you to the organizers who have done an amazing job and I am excited for upcoming event.“*

Timothy Hönig, TUM-BWL

*„I really enjoyed the Conscious-Coders.workshop. In a seemingly short time **we were able to discuss, make up our minds and finally put together some recommendations for a specific AI-related topic**. I was surprised at how well we collaborated event though our past experience in the topic differed quite a lot. I think the **variety of viewpoints and opinions is one of the strongest reasons why we had such lively discussions**, which at the end led to a balanced conclusion of our topic.“*

Franz Mader, Computer Science





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8 Contact

We would be happy to stay in contact with you!

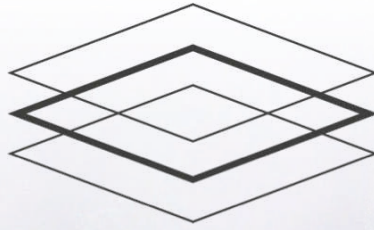
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- **Group presentations** on our YouTube channel **ConsciousCoders**
<https://www.youtube.com/channel/UCmfwBoBF0waaf8a2q7gtoPw>

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