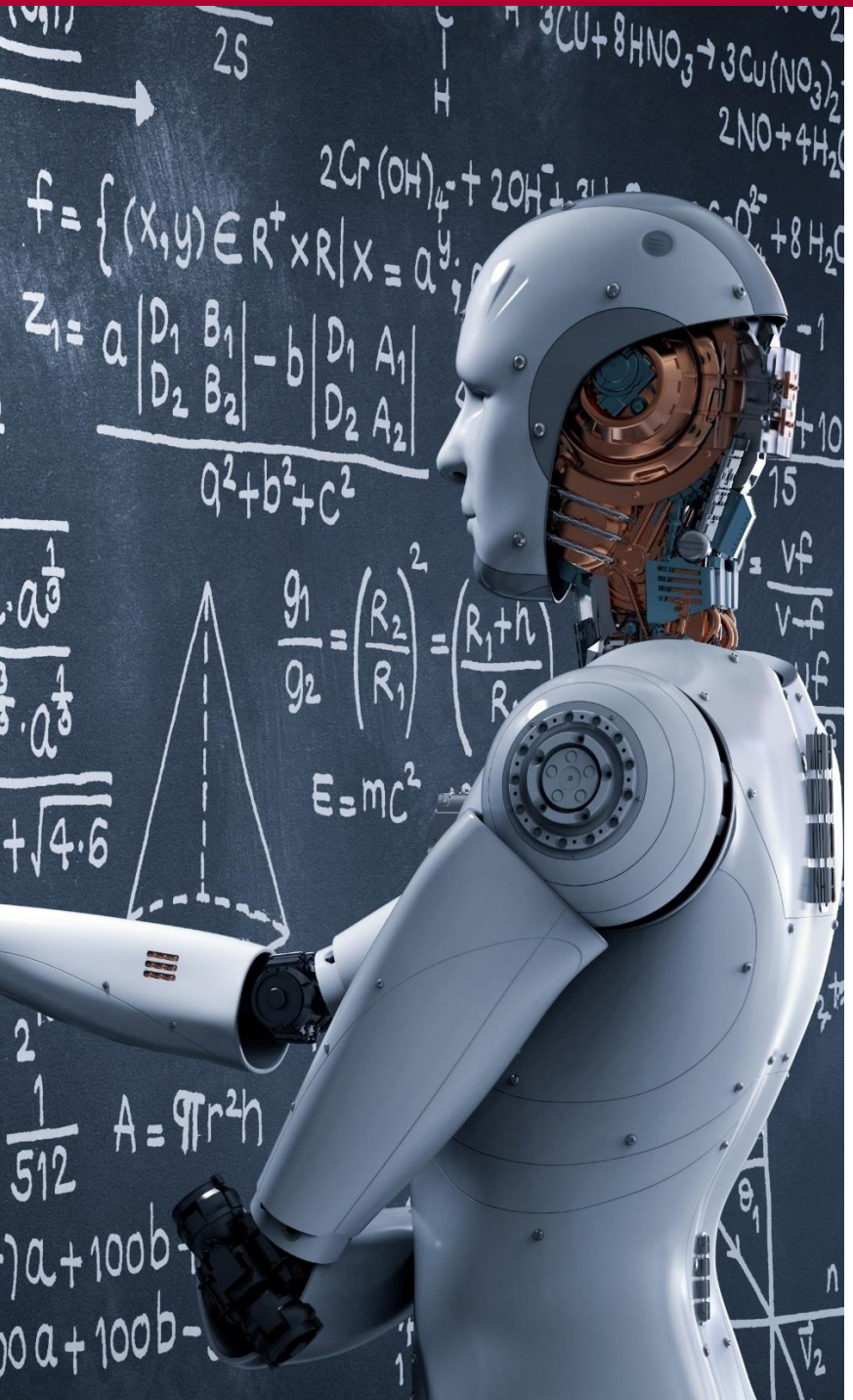
Filling out the registration form for group assignment

If not already done, please **fill out our registration form** so we can assign fair and mixed groups.

https://survey.fim-rc.de/index.php/466977?lang=en



Research Center for
Information Management

Fraunhofer
FIT

Smart Sustainability Simulation Game

Kick-off
23.04.2024

FIM Research Center for Information Management
Fraunhofer Institute for Applied Information Technology FIT,
Branch Business & Information Systems Engineering

Prof. Dr. Christoph Buck
Prof. Dr. Hans Ulrich Buhl
Prof. Dr. Torsten Eymann
Prof. Dr. Gilbert Fridgen
Prof. Dr. Henner Gimpel
Prof. Dr. Björn Häckel
Prof. Dr. Robert Keller
Prof. Dr. Wolfgang Kratsch
Prof. Dr. Niklas Kühl
Prof. Dr. Anna Maria Oberländer
Prof. Dr. Maximilian Röglinger
Prof. Dr. Jens Strüker
Prof. Dr. Nils Urbach
Prof. Dr. Martin Weibelzahl

www.fim-rc.de/en
www.wirtschaftsinformatik.fraunhofer.de/bise

Augsburg Bayreuth Frankfurt Luxembourg Munich Stuttgart

Agenda

01 | About S3G

02 | Organizational information

03 | Outlook

01

About S3G

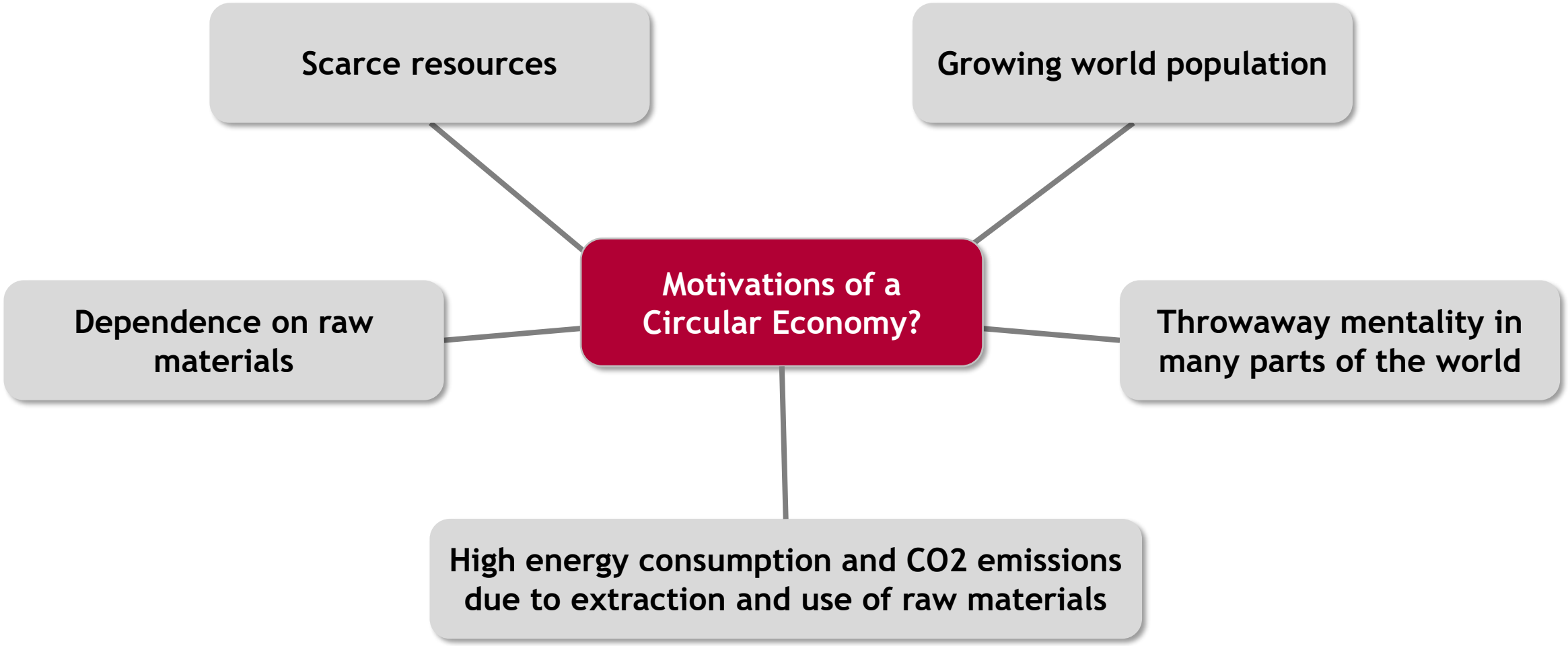
“Waste isn’t waste until we waste it.“

– Unknown

“The goods of today are the resources of tomorrow at yesterday’s resource prices.“

– Walter Stahel (2016),
Former advisor to the European Commission

What is the motivation of a Circular Economy?



www.europarl.europa.eu

The three key principles of the Circular Economy

Circulate products and materials

Design products to be **reused**, **repaired**, or **remanufactured**. When it comes to products like food or packaging, **get the materials back** so they don't end up in landfill.

Eliminate waste and pollution

Waste and pollution are the **consequences** of decisions made at the **design stage**. Harness new materials and technology, to **ensure** waste and pollution are **not created in the first place**.

Regenerate nature

There is **no concept of waste in nature**. Instead of trying to do less harm, **return valuable nutrients** to the **soil** and **other ecosystems to enhance the natural resources**.

“In the future, the automobile will be the most complex, most valuable, most mass-market Internet device. When we see that, we also understand why Tesla is so valuable from the analysts' point of view.”

– Herbert Diess,
CEO VW AG (2018-2022),
Süddeutsche Zeitung, 23.01.2020

Machine Learning can help achieving sustainable development goals


“Data are becoming the new raw material of business.”
– Craig Mundie,
Senior Advisor to the CEO at Microsoft

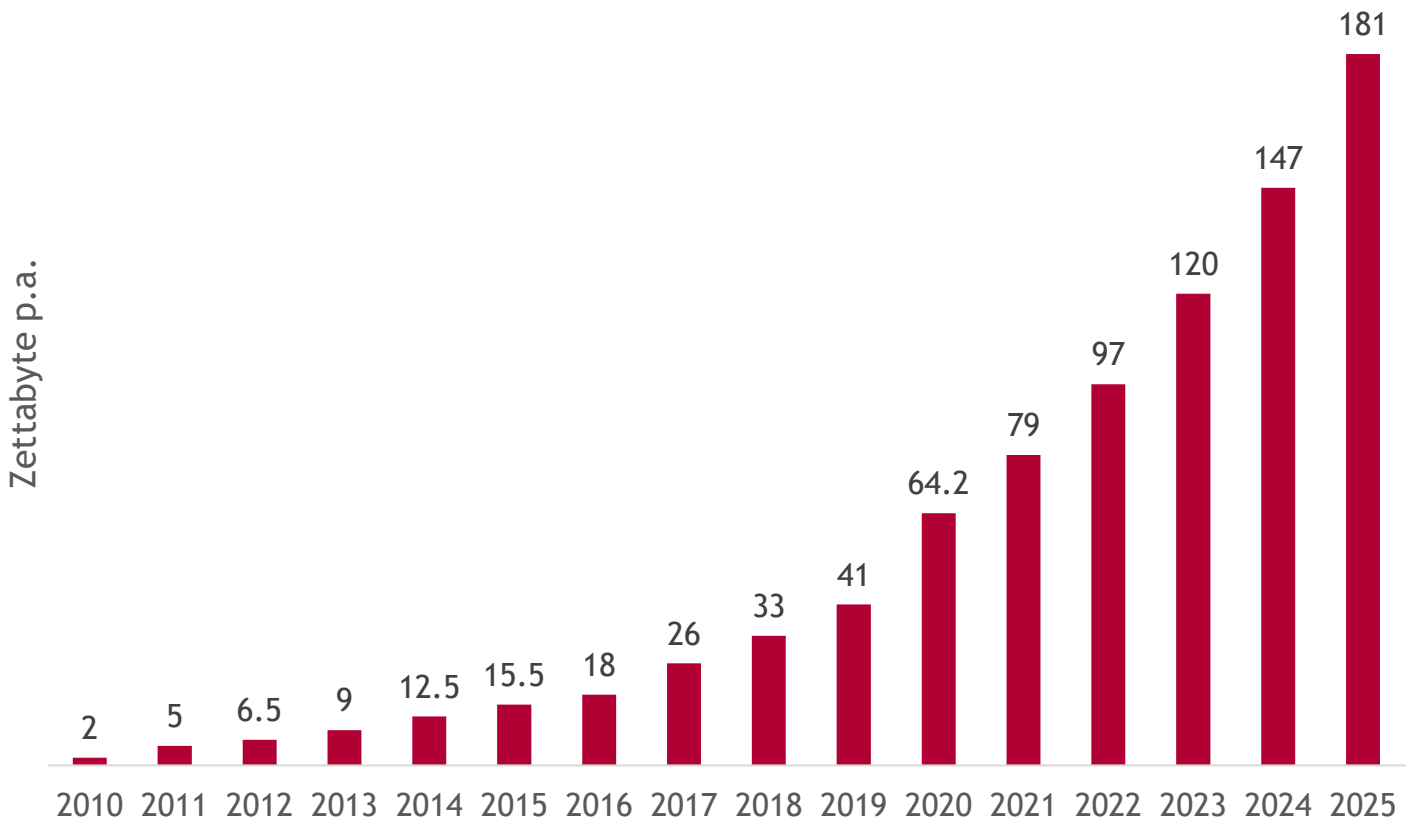
Data as a key resource for businesses and society

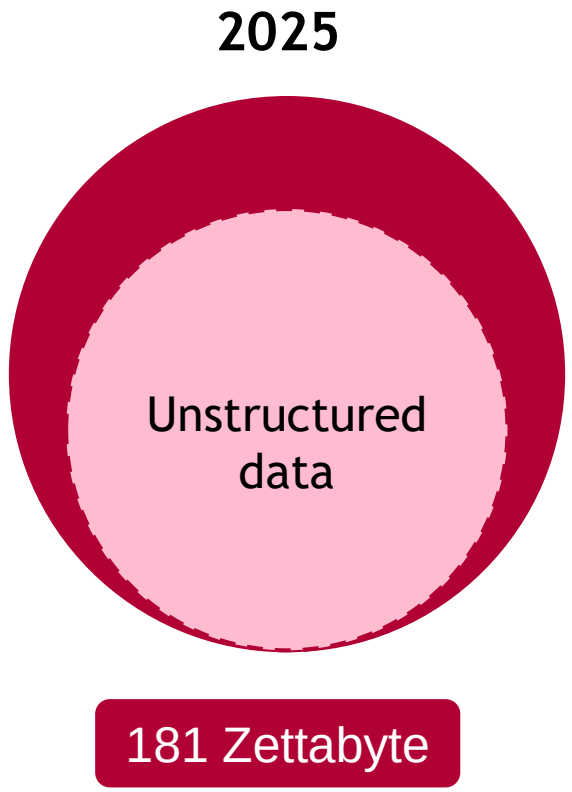
“So what’s getting ubiquitous and cheap? Data. And what is complementary to data? Analysis.”
- Hal Varian (2008)

“Information is the oil of the 21st century, and analytics is the combustion engine.”
- Peter Sondergaard (Gartner Group, 2008)

“Data is the information asset characterized by such a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value.” (Mauro et al., 2016)

The volume of data generated, consumed, copied and stored is projected to exceed 180 ZB by 2025

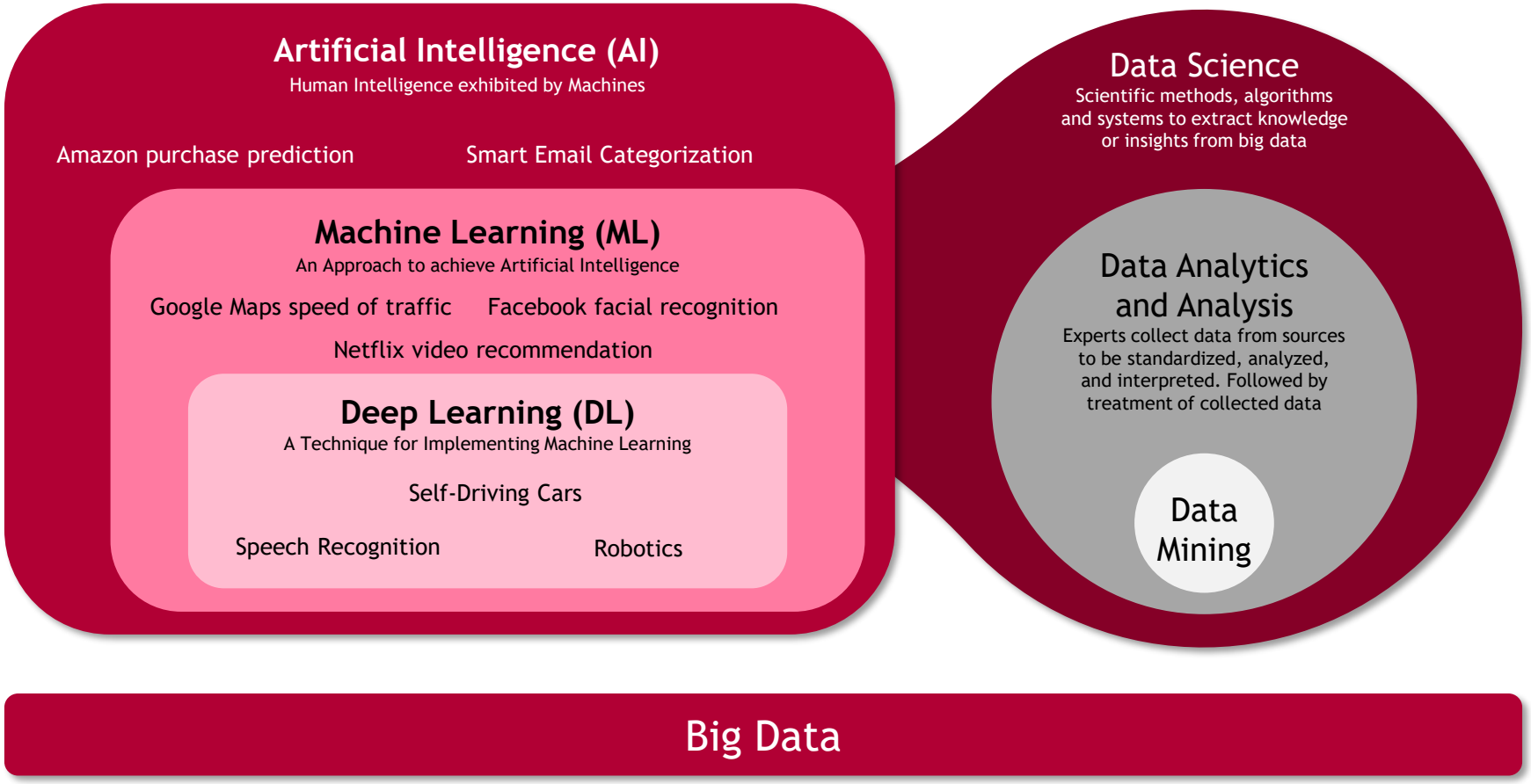




1 Zettabyte = 1.000.000 Petabyte = 1.000.000.000 Terrabyte

https://www.cio.com/article/220347/ai-unleashes-the-power-of-unstructured-data.html | https://www.statista.com/statistics/871513/worldwide-data-created

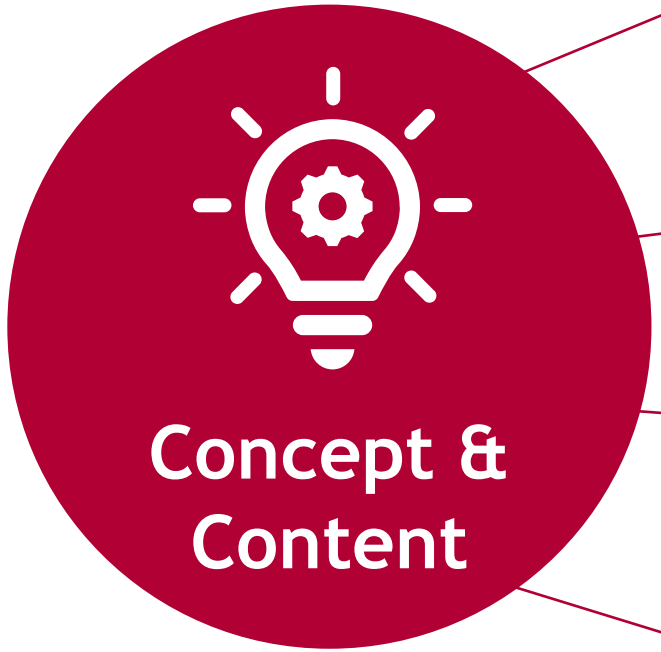
The difference between Data Science and Artificial Intelligence



Inspired by https://www.linkedin.com/pulse/how-make-simple-explain-ai-ml-dl-together-data-science-vollmer

02 Organizational information

Concept and content of the course



You work in **cross-university teams** with different study backgrounds together on four programming cases and compete against each other in an interactive simulation game.

The four cases deal with selected steps along a **circular economy** in the context of e-mobility.

During the case work, you analyze the available data through **machine learning solutions** and make business decisions based on that data analytics.

In every business decision, you must consider the various **dimensions of sustainability**.

Now it’s your turn!

What are you studying?

What are your expectations for the course?

What are you studying?

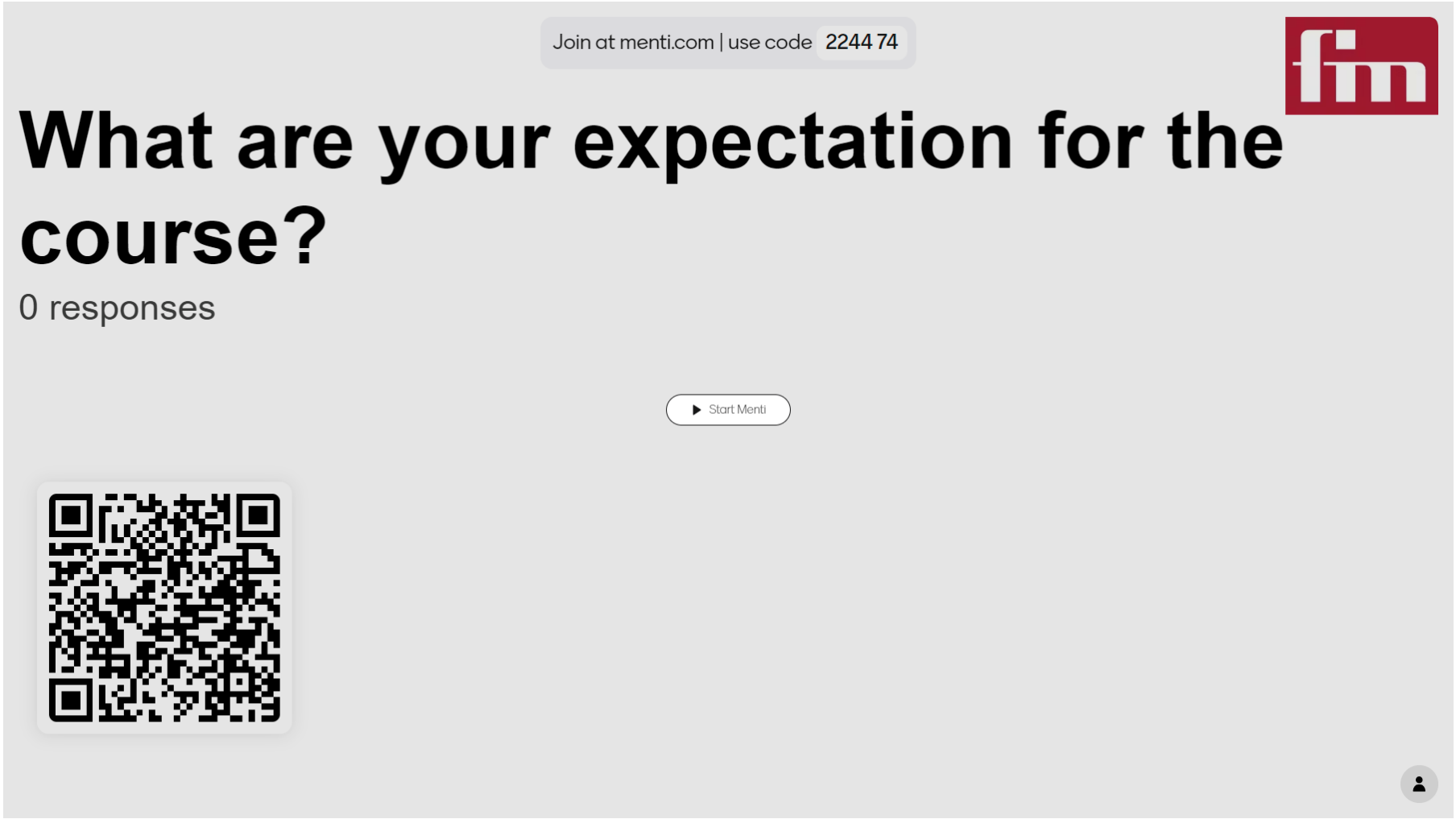
Join at menti.com | use code 2244 74

What are you studying?

31 responses

29

What are your expectations for the course?

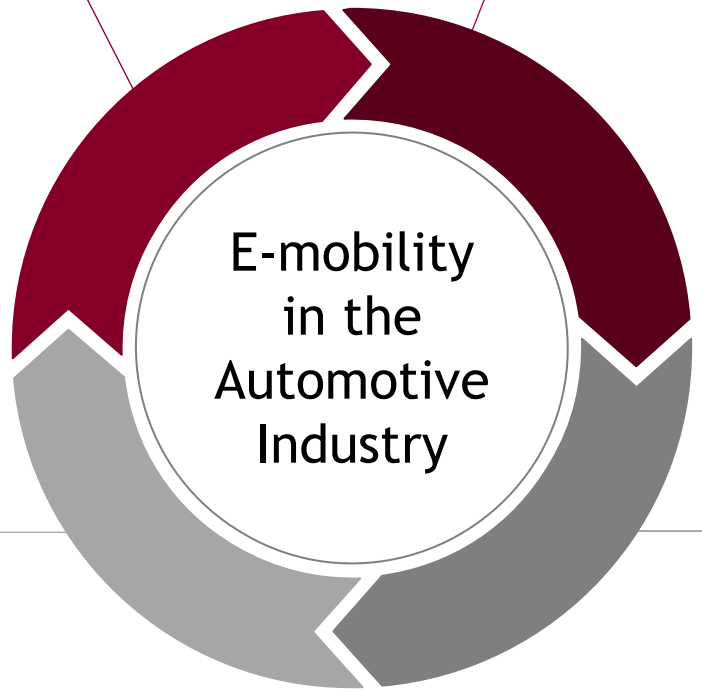


Overview of the cases

Case 1: Material procurement

- What materials should I buy and when?
- Value chain level: Procurement

→ Time Series Analysis



Case 2: Predictive Maintenance

- How often and when should I maintain my machine?
- Value chain level: Operations/production

→ Predictive Analytics

Case 4: Recycling

- How much effort do I put into recycling?
- Value chain level: After-sales-services

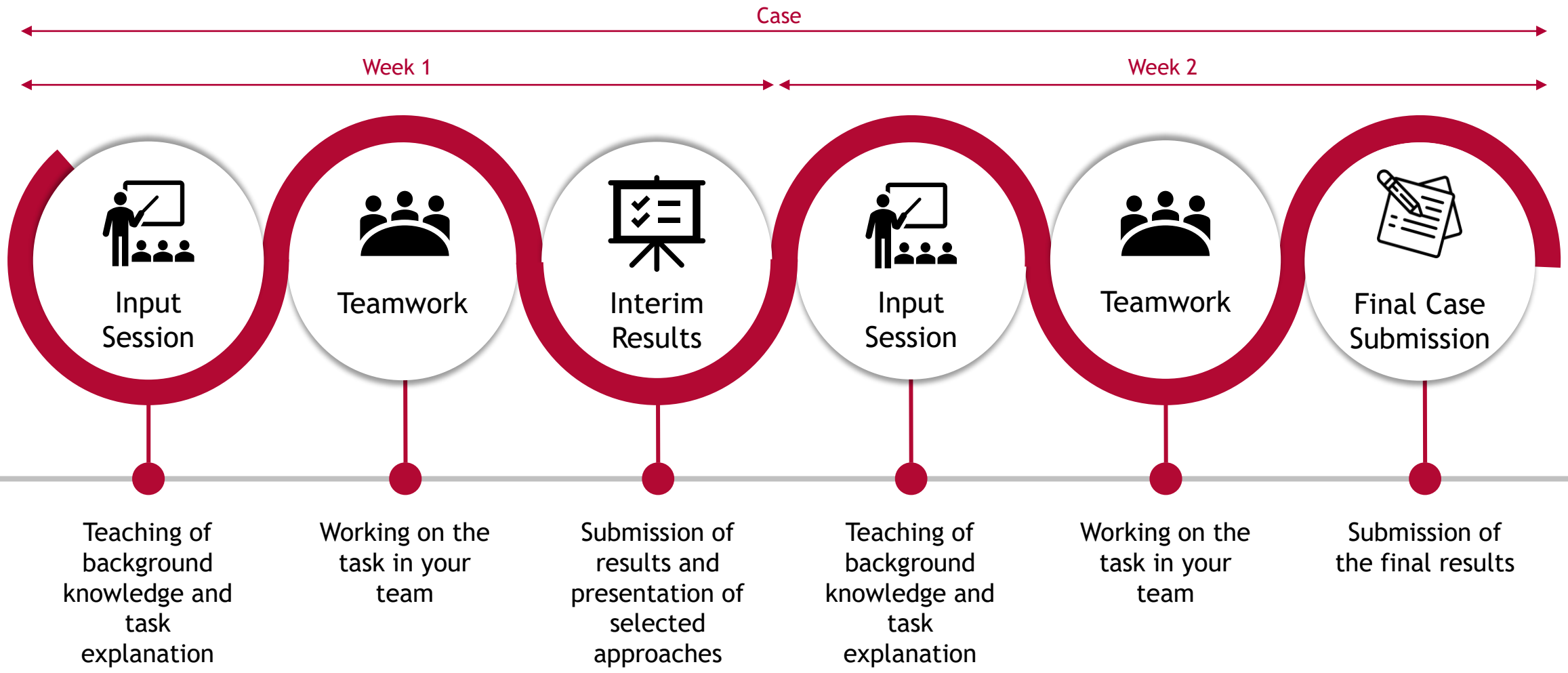
→ Process Mining

Case 3: Quality Management

- How to ensure good quality?
- Value chain level: Operations/production

→ Computer Vision

Case structure



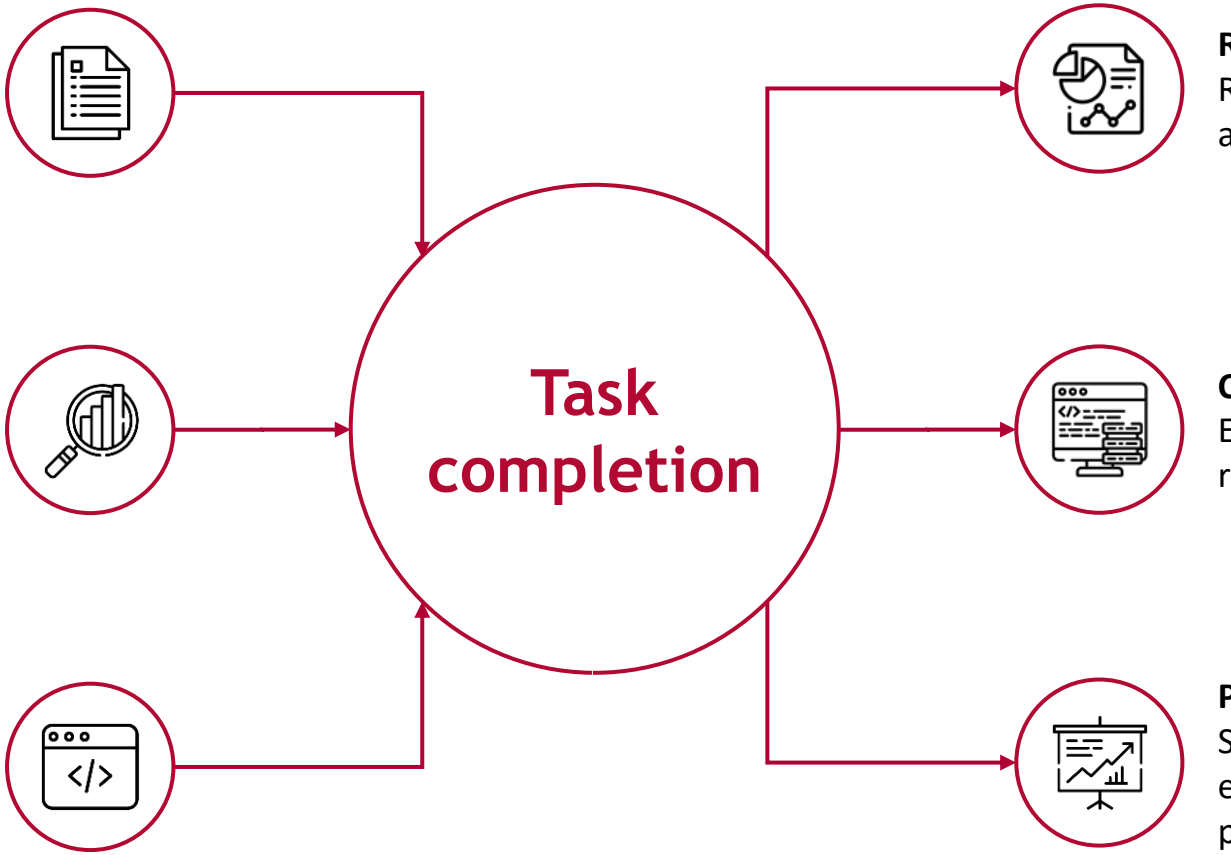
Detailed case structure

Input

Worksheet
Contains description of the task and the exact submission details

Data
Represents different phenomena and interrelationships

Code Template (if necessary)
Provides framework for the development and provides basic functionality



Results
Result of the respective analysis activity in a specific format

Code
Executable code to reproduce the results

Presentation
Summary of the results incl. explanation of the approach and possible decisions

Output

Learning Goals

Knowing and understanding the use and evaluation of various **machine learning approaches** to solving business decision problems.

Applying **techno-economic skills**.

Identifying **business decision-making situations** and analyzing available data.

Implementing machine learning applications technically and evaluating (potential) economic, environmental, and social impacts.

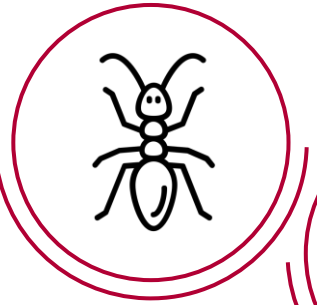
Practicing **team** and **project management skills** and **presentation techniques**.

Grouping of the cross-university teams

Are the teams correct like that?

Team Ant

Tim Blassmann, Florian Stoll, Tamara Kartheininger, Antonia Karl, Mücahit Savas, Ole Hammerschick

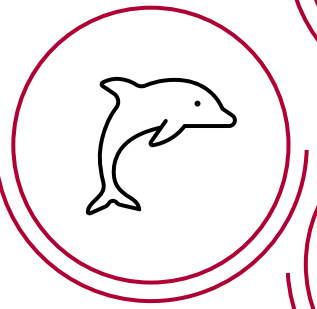


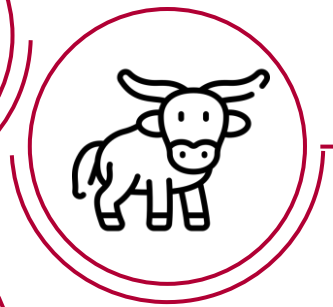
Team Goat

Alexander Hug, Linus Bieber, Theodoros Koletsis, Tarkan Yildirim, Dominik Kühltau, Nervana Chana

Team Dolphin

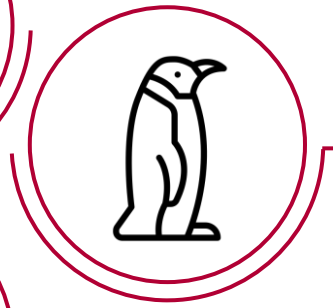
Alexander Meinert, Julius Hirsch, Lisette Latell, Qendresa Bytyqi, Hans Seidelmann, Thomas Jung, Daniel Bilic





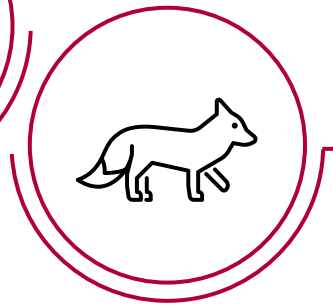
Team Gnu

Manuel Hensel, Alina Wunderlich, Lena Kirchenmaier, Quyen Nguyen, Atilla Ogul, Charlotte Maier



Team Penguin

Luis Lander, Fritz-Ferdinand Dörner, Benjamin Kusch, Simon Leitte, Peter Brötz, Maria Petkoudis, Julia Blaich



Team Fox

Adrian Stengle, Konrad Georg Carlson Illenberger, Maxim Gerassimenya, Ge Bin, Nicole Woop, Markus Hillreiner

Potential roles in the team

Developing communication plans to ensure effective communication

Facilitating efficient meetings by setting agendas, and managing discussion

Comparable with Scrum Master

Ensuring that products or services meet quality standards and expectations

Checking the form of submission, compliance with deadlines, and comprehensibility of explanations

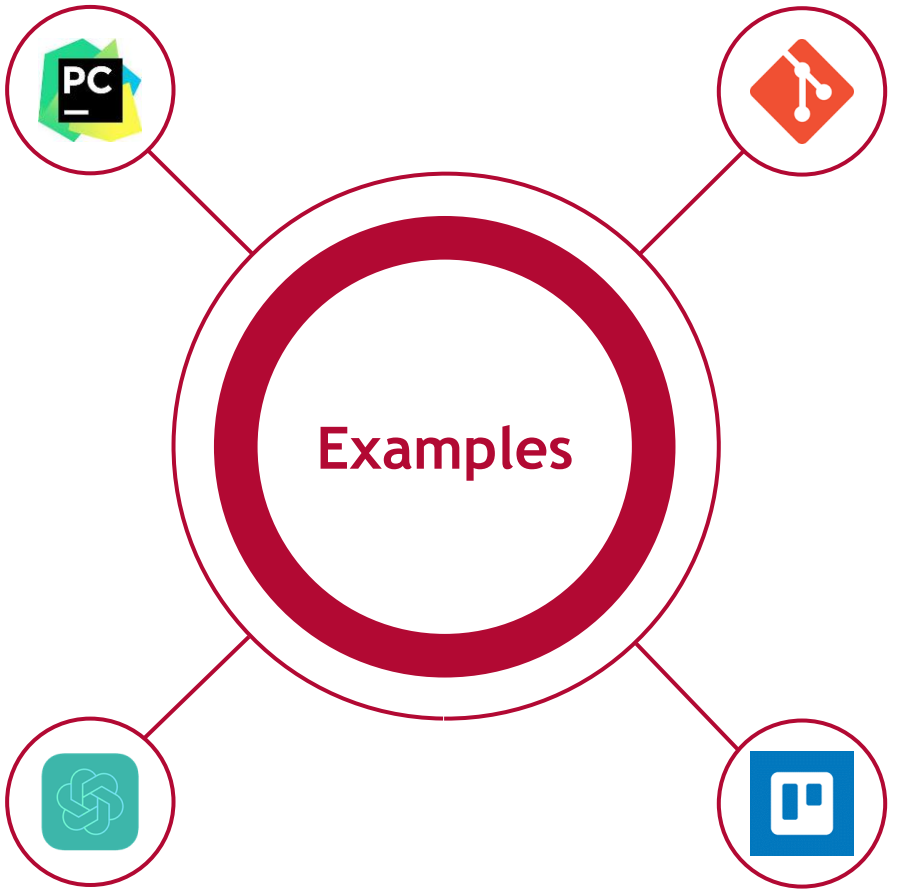
Comparable with Product Owner

Write the code to build the software artifact

Test the software or product to ensure that it meets the requirements

Exemplary useful (free) development tools

PyCharm
Integrated development environment for programming in Python, which provides tools for writing, testing, and debugging



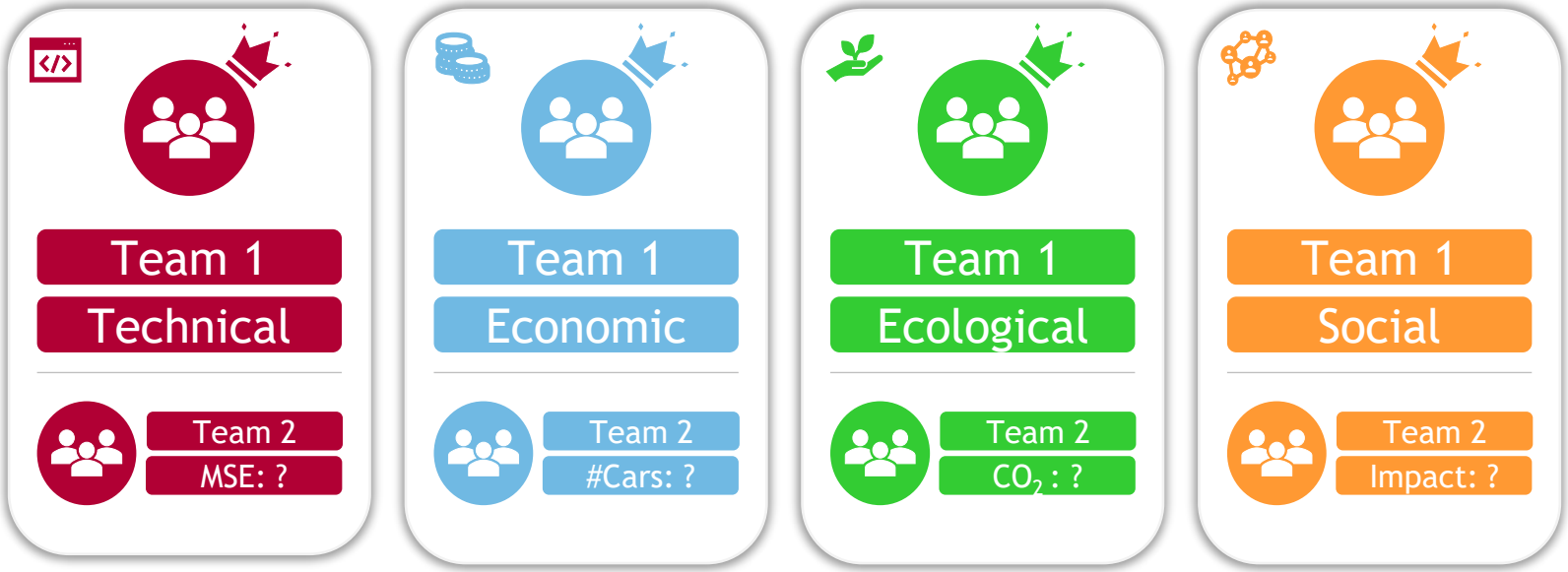
GIT
Distributed version control system used for tracking changes in source code, allowing for collaboration and the management of multiple versions of a project

ChatGPT
Assisting with queries, suggesting solutions, and explaining coding concepts, as well as providing guidance on commenting, debugging, and best practices

Trello
Project management tool that uses boards, lists, and cards to help teams organize and prioritize tasks and projects in a flexible and visual way

Leaderboard

- Leaderboard = visual representation of a **ranking** with relative comparisons of the different teams in four different dimensions.
- The four different dimensions are **technical**, **economic**, **ecological** and **social**.
- Leaderboard is intended to **motivate** and serve as **feedback**.
- The leaderboard is **updated every week**.



Examination performance

The **examination performance** consists of:

Analysis results and software code for four cases	*Project report*

Analysis results and software code for four cases

- Consists of 16 individual and clearly definable performances that are assessed individually.
  - 4 cases x 2 weeks per case x 2 results (code and analysis results per week)
- All 4 cases are weighted equally
- For each case, week 2 is more important than week 1
- You have the choice of submitting the deliverables individually or as a team.
- If you submit the deliverables as a team (which we recommend), indicate who did what (potentially: We made everything jointly).

Project report

- This is an at most five-page reflection on the content-related and methodical learning process and success as well as on teamwork.
- The project report is an individual performance.

03

Outlook

Learning materials for the course

UNIVERSITÄT BAYREUTH

Sign up to eLearning

https://elearning.uni-bayreuth.de/course/view.php?id=40278

UNIVERSITÄT HOHENHEIM

Sign up to ILIAS

https://ilias.uni-hohenheim.de/ilias.php?baseClass=ilrepositorygui&cmdNode=y7:m9&cmdClass=ilObjCourseGUI&cmd=view&ref_id=1552851

Technische Hochschule Augsburg

Sign up to Moodle

https://moodle.hs-augsburg.de/course/view.php?id=8175

Everything you need is in our GitHub Repository

https://github.com/AI-for-Business/SmartSustainabilitySimulationGame

Timetable until July, 2nd 2024

What?	When?	Where?
Kick-off	23.04.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 1 - Week 1	30.04.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 1 - Week 2	07.05.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 2 - Week 1	14.05.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 2 - Week 2	28.05.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 3 - Week 1	04.06.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 3 - Week 2	11.06.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 4 - Week 1	18.06.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Case 4 - Week 2	25.06.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)
Award ceremony	02.07.2024, 2:15 – 3:45 pm	Zoom, HS 36 (UHOH), J406 (THA) and S47 (UBT)

Your task until next week

Organize your **initial meeting** and get to know each other.

Discuss the following **guiding questions** during the meeting.

- What is your motivation to participate in S3G?
- How do we want to organize ourselves as a team?
- Are there any (time) constraints for individual team members to work together?
- What experience do you have with Python or other programming languages?
- What experience do you have in data analytics?
- What is a personal fun fact about you?

We will ask for your feedback several times

Topics and content

- What was the most interesting?
- What was the least interesting?
- Was anything missing?
- What would you like to see in the rest of the course?
- …

Style

- What should we keep?
- What should we take off?
- …

Which information or resources do you need for being equipped for the course?

Your S3G professors

University of Hohenheim

Prof. Dr. Henner Gimpel

Digital Management

henner.gimpel@uni-hohenheim.de

University of Applied Sciences Augsburg

Prof. Dr. Björn Häckel

Opportunity and risk management in digital value networks

bjoern.haeckel@hs-augsburg.de

University of Bayreuth

Prof. Dr. Torsten Eymann

Business & Information Systems Engineering

torsten.eymann@uni-bayreuth.de

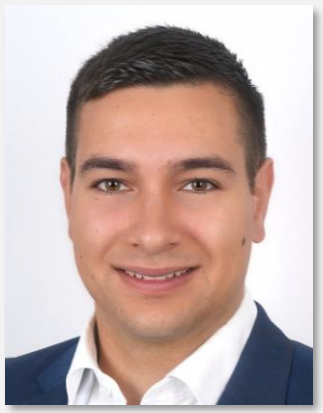
Your contact for organizational questions

FIM Research Center for Information Management

Niklas Gutheil

Niklas.Gutheil@fim-rc.de

FIM Research Center for Information Management



Dominik Fetzer

Dominik.Fetzer@fim-rc.de

OUT


“Globally, it is estimated that every second of all sea turtles have eaten plastic.“
- Wilcox et al. (2018)

“Waste isn’t waste until we waste it.“

– Unknown