Coronas impact on climate change via increase in internet traffic

Proposal

Martin Schuck 03683571
Michael Brandner 03681315
Alexander Griessel 03687564
Aladin Djuhera 03671760
Niklas Landerer 03671815
Felix Montnacher 03689999
Aron Endres 03689152
Maximilian Putz 03682862
Henrique Soares Frutuoso 00000000

May 27, 2020

Motivation

- corona
- unbekannte auswirkungen
- viel diskutierte positive effekte auf emissionen, aber wenig zu increase in emissionen
- stark vermehrte nutzung von technik
- co2 emissionen vergleichbar mit dem flugverkehr
- 10% increasing in a week due to corona because of : more meetings, more Netflix and youtube streaming also
- In Germany, all Servers need about 10TWh its the same amount of energy consumed in Berlin

-> interessantes thema in unserer themendomäne -> implikationen für zukünftiges arbeits- und konsumverhalten

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1 Project Description

- More and more CO2 emissions depending on Internet traffic.
- Normally increasing traffic by 30% a year
- we want to predict future development
- use ml models
- different scenarios regarding homeoffice, energy mix

Research Question

- beschreibung von traffic herkunft (bzw beispiele)
- inwiefern das treibhausgasemissionen beeinflusst
"What will the impact of increased Internet Traffic due to Corona be on greenhouse gas emissions?"

Goals

- fullfill research question with ml model
- visualize results with a webinterface
- make interface interactive so the user can run different scenarios with the model

Approaches

- data driven analysis
- create ml model
- data of data center energy consumption
- internet traffic history
- corona virus history

2 Work packages

- **Package 1: Data collection**
  - **Data compilation:** Find sources, make accessible
  - **Data inspection:** assess quality, feature selection
- **Package 2: Data preprocessing**
  - **Visualization:** gain insight on data, create data set
  - **Processing:** normalize, PCA, scaling, feature completion
- **Package 3: Model design**
  - **Model selection:** implement different algorithms, compare approaches

  - **Model architecture:** Hyperparameter search, validation
  - **Testing:** seperate model tests
- **Package 4: User webinterface**
  - **Visualization:** choose framework, select design, implement
  - **User interaction:** Choose different scenarios
- **Package 5: Video creation**
  - **Planning:** Collect ideas, write storyboard
  - **Production:** Capture, cut, music
- **Package 6: Project management**
  - **Communication:** Team coordination, document milestones
  - **Organization:** manage schedule, progress checking, weekly meetings

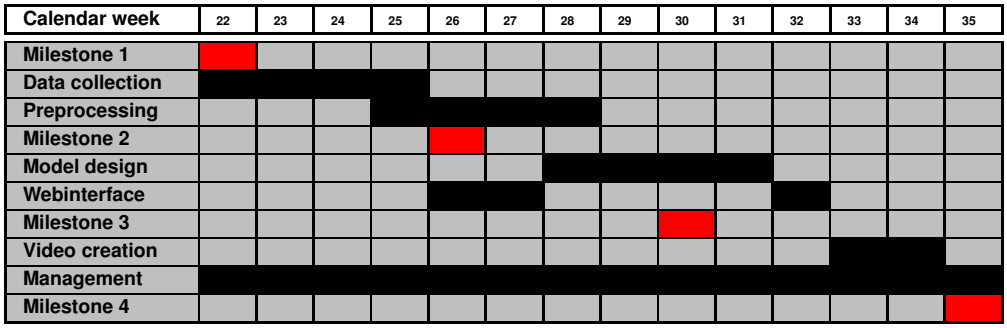
3 Workload distribution

for data collection: each member gets a specific topic assigned to look for data sets
- internet traffic (Maximilian Putz, Felix Montnacher) - energy consumption per country (Martin Schuck, Aladin Djuhera) - course of corona progression (Michael Brandner, Aron Endres) - electricity mix per country (Niklas Landerer, Alexander Griessel, Henrique Soares Frutuoso)

Name	Assigned work
Martin Schuck	Software architecture, Model design, Project management, Data collection
Michael Brandner	Data preprocessing, Model design, Software architecture
Alexander Griessel	Project management, Data preprocessing, Software architecture
Aladin Djuhera	Data collection, Data preprocessing, Video
Niklas Landerer	Webinterface, Video, Data collection, Software architecture
Felix Montnacher	Webinterface, Data collection
Aron Endres	Data preprocessing, Model design
Maximilian Putz	Webinterface, Data collection, Model design
Henrique Soares Frutuoso	???, ???

4 Time Table

- web development can start without data or model
- data aquisition as well
- model and pipeline have to be made sequentially
- first three packages take longest probably
- video makes most sense after project completion



5 Risk Analysis

table erklären

Risk	Countermeasures
Bad or missing data	adapt question
Bad model behavior	Simplify further, worst case: explain reason for failure
Time constraints	reassignment of member responsibilities
Hardware limitations during training	google colab and sufficient hardware from all members
Difficulties with user interaction	restrict input possibilities
Underperforming group members	Overperforming Nick