Technische Universitaet Berlin

Fakultaet IV - Elektrotechnik und Informatik

Fachgebiet AOT
Prof. Dr. Sahin Albayrak

Bachelorthesis proposal

Sparked, an intuitive user interface for the automated machine learning project CODA

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Inhaltsverzeichnis

1 Motivation

With the ongoing digitalisation and the generation of big data in most aspects of society, data driven approaches to every day problems become more and more viable. One way to evaluate these large datasets is with an machine learning approach. Machine learning, though powerfull is not a wonder box. Not every machine learning approach is applicable for every problem and not every algorithm will perform in reasonable time on every data.

You need a lot of intimate knowledge and intuition about machine learning algorithms to select a good approach to your given problem. Knowledge and intuition that is only developed in few experts. Even then, to optimize for a given problem still requires a lot of trial and error, as most of the time the best hyperparameter settings can only be found by trial and error.

To find a way to automate this process, DAI-Labor (Distributed Artifical Intelligence) and GTARC (German Turkish Advanced Research Center for ICT) have started CODA, a fundamental resarch project in algorithm selection and hyperparameter optimisation. (PROJEKTSTECKBRIEF!)

With this project, nicknamed Sparked, we create an interface to the CODA project, allowing machine learning enthusiasts and specialists to use the developed solutions and giving the CODA team an interface to demonstrate CODAs capabilities.

As such we will provide a user interface that is usable in demonstrations and can be used by persons with a background in machine learning without prior training. As such a focus is set on a clean workflow, good user guidance and a visual appealing display.

2 Objective

The overall objectiv of Sparked is to create a web application and a supporting backend to interface with the CODA backend.

To develop Sparked an architecture has to be chosen. This includes which technologies will be used in the development process.

The architecture has to support several criteria:

- Demonstration startup

  It should be easy to spin up a clean Sparked instance with empty databases for demonstration purposes. Sensible defaults should apply, to make such an instance immediatelly usable even by an untrained individual.

- Configurability

  Changing the CODA Backend should be possible without recompile.

- Docker deployment

  Sparked has to run in docker containers on a linux system.

Some common characteristics of web applications are not relevant in this project:

- Useraccounts

  All Users will operate on the same data. There will not be any useraccounts. Any data uploaded to Sparked is visible to all other users.

- Login

  The UI will be open and not contain any login features or any other form of access controll.

Coda will run on a seperate machine, connected via a bus system (Kafka). Kafka access is not part of the Sparked project. An encapsulation library (Java) will be provided.

Sparked contains several workflows:

- Order creation

  An order can be created. This includes the selection of all values needed to create an order. classifier, metric, test dataset and validation method with their respective parameters.

  After an order is created, it will be split in tasks and put into a queue for processing. This includes persisting them to have a keep them in data on restart.

3

- Order overview

  View all orders, with their tasks and allows them to be paused or continued if not finished. A Sparked instance will connect to a single backend.

- Order evaluation

  Open and display order and task results.

It is not possible to access several CODA backends at the same time.

3 Work packages

The project is roughly seperated in 3 parts:

- Architecture
- Development
- Evaluation

3.1 Architecture

- UX Design
- UI Design
- Technolology evaluations
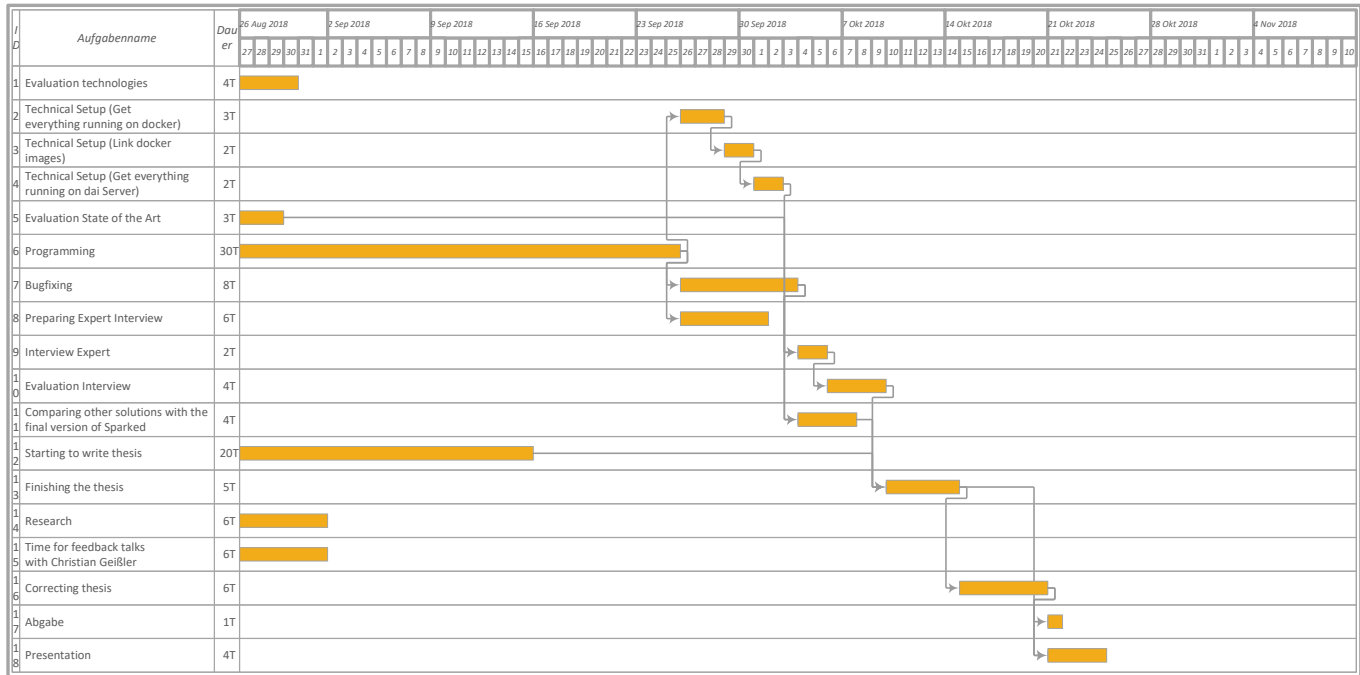- System architecture

3.2 Development

- Let the user create an orders and save them
- Create the tasks needed to evaluate an order
- Display all orders, show their progress and stop, pause and unpause them
- Receive and display the results of an order
- Configuration page
- Bugfixing

3.3 Evaluation

- Find people to interview
- Create the interview questionair
- Hold the interview

- Evaluate the given statements

Sparked time plan

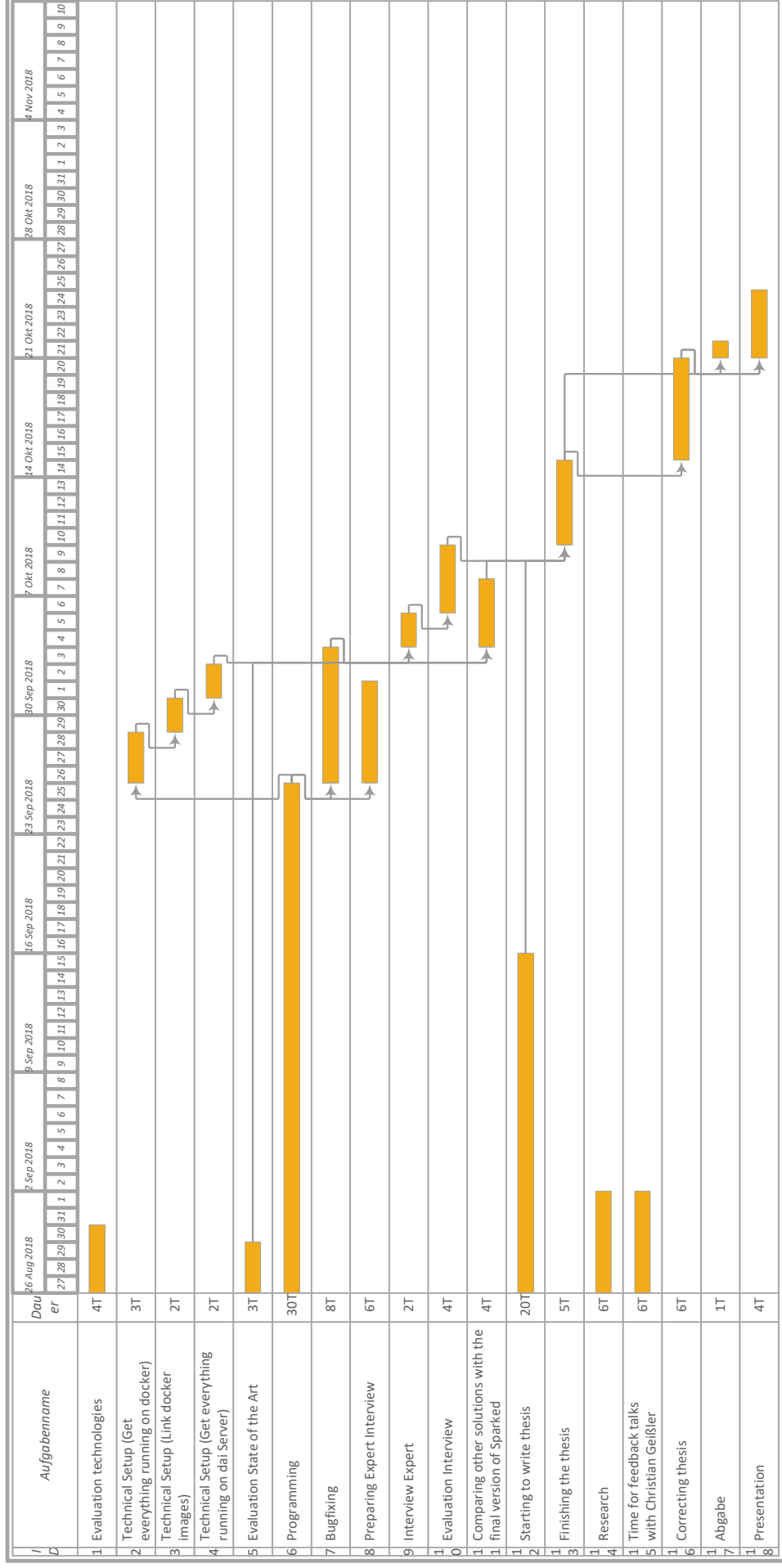| ID	Aufgabenname	Dauer
1	Evaluation technologies	4T
2	Technical Setup (Get everything running on docker)	3T
3	Technical Setup (Link docker images)	2T
4	Technical Setup (Get everything running on dai Server)	2T
5	Evaluation State of the Art	3T
6	Programming	30T
7	Bugfixing	8T
8	Preparing Expert Interview	6T
9	Interview Expert	2T
10	Evaluation Interview	4T
11	Comparing other solutions with the final version of Sparked	4T
12	Starting to write thesis	20T
13	Finishing the thesis	5T
14	Research	6T
15	Time for feedback talks with Christian Geißler	6T
16	Correcting thesis	6T
17	Abgabe	1T
18	Presentation	4T

4 Organizational

- Language of this Bachelorthesis is english.

- The thesis will be written with pdflatex.

- Choosing programming languages and technologies are not defined and part of the development process.

- Supervisors is Christian Geißler

- Evaluators are Prof. Dr. Albayrak and Prof. Kao **inproceedings**

5 Appendix

Sparked time plan

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Timeline headers: 26 Aug 2018 · 2 Sep 2018 · 9 Sep 2018 · 16 Sep 2018 · 23 Sep 2018 · 30 Sep 2018 · 7 Okt 2018 · 14 Okt 2018 · 21 Okt 2018 · 28 Okt 2018 · 4 Nov 2018

Literatur

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