Weekly Diary

Master thesis course in Computing Science

Pina Kolling

Week 3	Introduction and first work on project plan
Week 4	Finish project plan, start setting up code on my computer
Week 5	First research on the topic, including finding literature, set up Git and LaTeX for master thesis (on work laptop, my laptop and stationary pc), document execution of code
Week 6	Set up code on my computer and first familiarizing with codebase, finding literature, document execution of code
Week 7	Researching options of melt framework (implementing, documenting the process and literature research)
Week 8	Implementing, documenting the process and literature research and vacation with my grandmother (she turns 90 ♡) so probably reduced work capacity
Week 9	Implementing, documenting the process and literature research, evaluating if it is possible to obtain colour-corrected video results using JIT and then specify or readjust the focus
Week 10	Implementing, documenting the process and literature research and creating slides for the midterm seminar
Week 11	Implementing, documenting the process and literature research, midterm seminar
Week 12	Implementing, documenting the process and literature research, search or implement offline colour correction software and other suitable solutions for comparison (if needed)
Week 13	Implementing, documenting the process and literature research
Week 14	Implementing, documenting the process and literature research
Week 15	Writing
Week 16	Writing
Week 17	Writing
Week 18	Writing
Week 19	Finalizing, reworking and applying feedback
Week 20	Hand in final version of the thesis
Week 21	Create Slides for the thesis seminar
Week 22	Thesis seminar (defence and opposition)
Week 23	Opponent thesis report

Week 3

16.01.24, Tuesday

- First meeting at university

17.01.24, Wednesday

- Setting up file and git for weekly diary
- Writing first mail with topic specification to Vicenç Torra
- Keeping my supervisor at Codemill (Urban Söderberg) in the loop
- Begin with project plan (setting up the file, etc.)

18.01.24, Thursday

- Getting a supervisor from university assigned (Cem Okulmus)
- Continue work on project plan:
  - Introduction
- First research on:
  - Just-In-Time (JIT), WebRTC, h.264, Melt framework
  - Infrastructure model of the system

19.01.24, Friday

- Continue work on project plan:
  - Problem formulation
  - Method
  - Infrastructure model

20.01.24, Saturday

- Continue work on project plan:
  - Evaluation methods
  - Self assessment
- Looking into previous master thesis that was written at Codemill

Week 4

Info: The Codemill logo marks the days at which I have been at the company's office.

22.01.24, Monday

- Set up git on other computer
- Continue work on project plan:
  - Resources
  - Read again and correct
  - Deciding on a title
- Send projectplan to supervisor at Codemill (Urban Söderberg)
- Send projectplan to supervisor at university (Cem Okulmus)

23.01.24, Tuesday

- First meeting with supervisor at university (Cem Okulmus)
- Rework and additional info on project plan:
  - Change JIT definition
  - Add timeline
  - Add challenges
- Add timeline weekly diary and adapt setup of weekly diary (counting in calendar weeks)

24.01.24, Wednesday

- Prepare laptop to set up code on it

25.01.24, Thursday CODEMILL

- Setting up the code on my laptop at Codemill

  (generating ssh key, cloning git repositories, installing node.js and docker, etc)
  - Problem: My RAM was not sufficient and the code could not be executed
  - Solution: Looking for a company laptop to execute the code

26.01.24, Friday CODEMILL

- Setting up the code on the new laptop at Codemill
  - Problem: Space in user name on the device which makes some paths not working
  - Solution: Setting up windows with a new user (to do)
  - Info: The code has not been run on a windows system before

Week 5

29.01.24, Monday

- Being sick ☹

30.01.24, Tuesday

- Being sick ☹

31.01.24, Wednesday

- Being sick ☹
- Setting up new windows user
- Setting up code on new laptop (frontend running but problems with backend/docker container)
- Document execution of code:

Setting up the code

- Generate ssh key (`ssh-keygen`) and add to GitLab
- Clone git repositories (jit-webrtc and accurate-player-3-core)
- Install node.js and set path variables for npm (and yarn)
- Install and run docker
- Execute jit-webrtc code with command from README with `docker/main/main.sh --threads 16 --port 8080 $VIDEOFILE` (not working!)
- Execute accurate player code (run `npm install --force`, `npm install yarn` and then npm start, resolve errors, fix dependenciy problems with `npm audit fix --force` (potentially twice))

01.02.24, Thursday

- Being sick ☹
- Installing slack
- Looking into the backend/docker problem
- Setting up WeeklyDiary git and tex file on Codemill-laptop

02.02.24, Friday

- Being sick ☹
- Trying to solve the docker/backend problem (still unsolved)
- Setting up git and tex file for master thesis on stationary PC
- Creating title page
- Structure for thesis
- First research and adding of references
- First writing in introduction

03.02.24, Saturday

- Being sick ☹
- Trying to solve the docker/backend problem (still unsolved):
  - Inspecting `main.sh` script file
  - Inspecting docker problems regarding windows
  - `docker-run.sh` not found or opened... Changing the path does not seem to help and the file does exist (feedback: no such file or directory)
  - Setting up python

Week 6

05.02.24, Monday CODEMILL

- Run backend/docker (finally!):
  - Make changes in `main.sh` (last line): remove `--device /dev/fuse` and change path to `//opt/jit-webrtc/jit/docker-run.sh`
- Problem: Connectivity issues between browser and docker
- Solution: Installing Linux and not running it under Windows

06.02.24, Tuesday

- Installing Linux Ubuntu 22.04 (not booting after updates)
- Installing Linux Ubuntu 23.10 (does not work at all)
- Researching and writing an introduction about Codemill
- Installing Linux Ubuntu 22.04
  - The problem originated from the NVIDIA graphics card. Before updating, the drivers had to be installed with `sudo ubuntu-drivers autoinstall`.
- Installing docker, node.js, git, miktex, texstudio and cloning repositories
- Adding to weekly diary: Codemill logo for each day I was at the company's location
- Executing frontend
- Executing backend in docker container

07.02.24, Wednesday CODEMILL

- Connecting backend and frontend
- Running the code
- Setting docker timeout from 15s to 150s in `main.py`
- Create private git repositories to store work progress
- Research on WebRTC and transcoding and looking into code of JIT-WebRTC
- Adding labels and references to structure of master thesis tex file
- Adding README files of code base to master thesis tex file

Running the code

- Frontend:
  - Open folder `accurate-player-3-core/packages/demo` in terminal
  - Execute `JIT_BACKEND=http://localhost:8080 yarn start` or `./start.sh`
- Backend:
  - Open folder `jit-webrtc` in terminal
  - Execute `docker/main/main.sh --threads 16 --port 8080 https://s3.eu-central-1.amazonaws.com/accurate-player-demo-assets/timecode/sintel-2048-timecode-stereo.mp4`
- Open `http://localhost:5000/controls/jit/index.html` in browser

08.02.24, Thursday

- Looking into the backend code, README and the system's components, summarizing and taking notes in the thesis file:
  - Audio Video Interleave (AVI)
  - Named pipe
  - Create diagram of system
  - Python documentation
  - Web services and REST API
- Structure of the thesis

09.02.24, Friday

- Looking into the backend code and the system's components, summarizing and taking notes in the thesis file:
  - Docker container
- Looking into the frontend code and README, summarizing and taking notes in the thesis file:
  - Node.js, yarn and npm

Week 7

12.02.24, Monday CODEMILL

- Write to do list for the next steps and update time schedule
- Look into MLT FX and integration of OpenGL and GLSL?
- Looking into suitable filters (aka plugins) in melt
  - Maybe suitable: `avfilter.colorbalance`, `avfilter.colorchannelmixer`, `avfilter.colorcontrast`, `avfilter.colorlevels`, `avfilter.colortemperature`, `frei0r.coloradj_RGB`, `frei0r.colorize`
  - Probably not suitable: `avfilter.colorcorrect`, `avfilter.colorhold`, `avfilter.colorize`, `avfilter.colorkey`, `avfilter.colormatrix`, `avfilter.colorspace`, `frei0r.colordistance`, `frei0r.colorhalftone`, `frei0r.colortap`, `frei0r.three_point_balance`, `frei0r.contrast0r`, `tcolor`

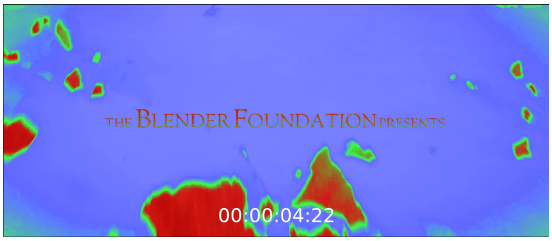
To Do

- Figure out, where the colour grading should be implemented
  1. Does melt already have an option for this?
  2. Can it maybe only be done when the video is paused?
  3. Is there a different place in the system, where the colour grading can be done?

13.02.24, Tuesday CODEMILL

- Looking briefly into `melt.c`, `JitControl.proto`, `JitStatus.proto` and other melt files to find out, where to attach a filter/plugin to a video and where the quality setting is changed
- Getting first overview over structure of melt
- Execute melt with filter without JIT to test the filters: `melt https://s3.eu-central-1.amazonaws.com/accurate-player-demo-assets/timecode/sintel-2048-timecode-stereo.mp4 -filter avfilter.colorbalance av.rs=1 av.gm=1 av.bh=1` for intense colours

Original colours



Colours with `av.rs=1 av.gm=1 av.bh=1`

→ This can be used for the offline comparison

- Starting to look into `local_melt.py`