

Week 2 Progress 28/06

29 JULY 2019 / 2:30 PM / EIE Seminar Room

ATTENDEES

Group 05: Tyson Cross (Chair), Jason Smit (Minutes)

Group 09: Graeme Young, Marco Zahra

Group 39: Esanathan Naidoo

Group 44: Ndivhuwo Maswoba

Prof. Ken Nixon, Prof. Alan Clark, Prof. Van Collier, Dr. Hugh Hunt

APOLOGIES

Tashveer Soorju, Jerome-Berthier Kabwayi

MINUTES

Resolutions:

1. Motion to swap the meeting times between Group 1 and 2 was carried.
2. All future meetings from Monday 5th Meeting on, for Group 1 to be at an earlier time (10:30am), in the EM lab. Meet as a group at EIE Reception.
3. The schedule for the chair to be as follows:
 - a. **Chairing for Monday 5th August 10:30am meeting:** Group 09
 - b. **Chairing for Monday 12th August 10:30am meeting:** Group 39
 - c. **Chairing for Monday 19th August 10:30am meeting:** Group 44
 - d. **Chairing for Monday 26th August 10:30am meeting:** Group 05
4. List of supervisors to be provided by all groups for emailing each week's Agenda before the next meeting
5. **Reminder to submit progress reports** by Saturday 3rd August midday

Completed from Last Week:

1. Group 09:

- a. Finalised horn design
- b. Constructed horns
- c. Rudimentary testing of horns
- d. Constructed mounting brackets
- e. Worked on noise sources

2. Group 39:

- a. Partial design of induction motor for internal fault simulations were established by using a sample model of a synchronous machine and adjusting its d-q parameters.
- b. AC supply now powers the motor protection relay using twin flexes.
- c. Thermal model was studied and it was found that the power losses in the stator and rotor will need to be modelled with thermal resistances and capacitors. The important components required to develop the thermal model were found.

3. Group 44:

- a. Interfacing RTDS to external hardware achieved when redoing the ELEN4018 Lab. The idmt relay connections were done successfully. The relay trip signal was successful sent to the I/O of the RTDS.
- b. The power amplifier was successfully connected to the IDMT relay
- c. Familiarizing with settings of the SEL-321 distance relay
- d. Simulation of the transmission line with series compensation
- e. Simple RS-CAD model with simple fault model successfully implemented.

4. Group 05:

- a. Export cine to per video/per event image sequences: 40%
- b. Create per sequence image masks (Nuke) 6%
- c. Built initial training script and begun first training with VGG16(8S) and AlexNe (transfer learning)
- d. Initial image segmentation results promising: ~90% accurate
- e. Conversion script for RGB pixel based labels to categorical labels.
- f. Resizing scripts
- g. Overall MatLab script super-structure for image segmentation
- h. Training time seems reasonable for now, with reduced training set
- i. Presentation with machine learning consultancy: Q&A, speculation on ideas

Current Group Challenges:

5. Group 09:

- a. Designing the noise sources and comb generators for the S-band frequency range
- b. Designing a clock oscillator capable of producing a squarewave at a frequency in the S-band (2-4 GHz) from a closed unit device (without the aid of a function generator)
- c. Understanding the VNA
- d. Standard mounts for the devices
- e. Construction of the horn
- f. Serial communication issues.
- g. Minimal linux version (SUZE 10) not allowing for easy debugging
- h. Limited documentation impeding progress
- i. Incorrectly assumed 3Ghz instead of 6Ghz, which impacted the design

Proposed solutions:

- a. Use a virtual machine
- b. Using c++ to give the low level access required
- c. Attempt to use different paths to resolve permission problems

Group 39:

- j. Estimating key parameters for a high voltage induction motor equivalent circuit are troublesome: lab experiments have only been carried out with low powered motors in Genmin.
- k. The SEL-710 motor protection relay configuration requires ports that are not available for connection to the OMICRON amplifier.
- l. In addition, a software called SEL-5030 ACSELERATOR QuickSet is required for setting trip times and voltage and current limits for the relay to respond to.

Proposed solutions:

Problems were discussed with supervisor.

6. Group 44:

- a. Problems encountered when connecting the SEL-321 relay that lead to some relay components damaged. This has led to change in project scope

Proposed solutions:

Discussed problems with supervisor. Project has changed to a software based one, to simulate the work as the damage cannot be repaired. RS-CAD and RTDS may present problems going forward (Access to learning resources and training time)

7. Group 05:

- a. Data labelling very slow process
- b. Memory issues with large datasets (20k images will not start training)
- c. Difference in sequence length for up/down lighting: a problem for quality of classification
- d. Net does not understand exclusivity of labels
- e. Initial temporal network structure: Requires more research.

PLAN FOR NEXT WEEK

1. Group 09:

- a. Finish construction of Noise sources and Comb generator
- b. Build all devices
- c. Automatic control of rotator
- d. Remote readings using VNA
- e. Rudimentary testing of constructed devices
- f. Confirmation of design of horn antenna
- g. Revival of the rotator software

2. Group 39:

- a. Download ACCELERATOR QuickSet software
- b. Complete equivalent circuit model and hence thermal model on paper
- c. Investigate and model in RSCAD, alternatively model in block diagram format in MATLAB, and then use the CONVERT component in RSCAD to convert it into RSCAD format so it can be run through the RTDS.

3. Group 44:

- a. The project will be done on RSCAD only
- b. Simulation of a DPR on RSCAD
- c. Line-to-Ground and Phase-Phase fault simulations

4. Group 05:

- a. Work with reduced sample from datasets
- b. Try with simpler labelling/ hierarchical labelling
- c. Require more variety in data:
 - i. Continue export cine to per video/per event image sequences
 - ii. Continue with per sequence image masks (Nuke)
- d. Experiment with different networks and options:
 - i. Modify output layers of googleNet & InceptionResv2
 - ii. Metrics and hyperparameters for networks
- e. Setup environment variable to define project root paths
- f. Interleaving training/validation/test technique (random shuffling data not optimal)