

# 4th Year EIE Lab Project Meeting Minutes For Software Development Groups

Attendance: Dr. S. Levitt, Prof. S. Hazelhurst, J. Zeegers,  
J. Gage, J. Allingham, P. Cresswell, T. Amoretti,  
M. Bezuidenhout, S. Friedman, F. Nieuwoudt  
Minutes noted by: J. Allingham

18 September 2016  
12:30 - 13:30

## 1 Dynamic firewalls for virtual private clouds (M. Bezuidenhout, T. Amoretti)

- Focused on using CUD in the last week.
- Having trouble recovering syntactic rules from the BDD.
  - Prof. Hazelhurst responded, saying that it is not possible to recover syntactically similar rules. Only semantically similar rules can be recovered but this is all that is required.
- Should ADDs be looked at in addition to BDDs?
  - Prof. Hazelhurst responded, saying that for this project the scope should be limited to BDDs only.
- Demoed current work with the “Larry” VM:
  - Showed a TCP rule set.
  - Shut down the VM.
  - Changed TCP rules.
  - Booted up VM.
  - New rules were in place.
- BDDs were not demoed due to time constraints.
- Work for the next week will involve expanding rule types and adding functionality to delete rules.

## 2 Pipeline creation and visualisation for scientific workflows (J. Zeegers, J. Gage)

- No longer using `strace` - replaced with `auditd`, which is easier to use.
- Demoed current progress:
  - Parse an audit file and storing information in JSON format.
  - Store JSON information in MySQL DB.
  - Generate a graph from the DB information.
  - The graph is currently simple and will be expanded to show additional details.
  - Examples of writing, reading, as well as reading and writing to a file were shown.
- Prof. Hazelhurst suggested that shell commands should also be stored in the DB so that the logical structure of the graph can be tied to events that happened. The graph vertices should be shell commands.
- Dr. Levitt suggested that data and commands need to be represented differently on the graph - a new notation should be investigated, potentially via a questionnaire.

## 3 Detecting epistasis using deep learning (P. Cresswell, J. Allingham)

- Demoed a comparison of various network architectures and their results:
  - The demonstration included visualisations of both learning and the network structures using the `tensorboard` utility.
  - It was shown that accuracies of around 73 % were achieved for a 100 SNP, 2 loci epistatic dataset.
  - It was shown that this performance was better than the industry standard tool, MDR, by about 3 %.
  - It was shown that for a more complex 200 SNP, 2 loci epistatic data set, the network will require more training time but could reach the same accuracy levels.
- The last week has been spent cleaning up code, creating a utilities script to make creating NN models easier, writing unit tests, and experimenting with NN architectures.
  - Dr. Levitt commented that unit tests for TensorFlow code do not need to be written.
  - It was clarified that the unit tests were for TensorFlow wrapper functions written by James and Paul.
- Is it reasonable to assume a model of  $x$  interacting loci?

- Prof. Hazelhurst responded, saying that this was a reasonable assumption because researchers doing GWASs will usually do preliminary investigation and have a model they wish to test using the epistasis detection tool.

## 4 Gamifying DevOps (S. Friedman, F. Nieuwoudt)

- The last week was spent building adaptors for getting information from Jenkins. For example whether or not the current build is broken.
- An admin view for the points system was also created. This includes information about whether points have been given or removed, who initiated the build, and how many tests passed or failed. No scoring has been added yet.
- A demo showing points being deducted for failing tests/builds was conducted.
  - The demo showed all the stages of the data flow, from Jenkins through to the DB and then the admin page.
  - The DB showed all of the information about broken builds, test passes and fails, as well as the person who made the commit.
  - Automatic polling of Jenkins still needs to be added.
- Further effort needs to be put into making the game and adding more game rules.
- Dr. Levitt commented on the UI, saying that a large amount of work needs to be concentrated on the user experience, for example adding badges.

## 5 General Comments

- The next meeting will be conducted at 12:45 on the 26th of September.
- Demo again in 2 weeks time, on the 3rd of October.
- Dr. Levitt needs to be notified of project title changes by the 23rd of September.