

Initial Plan: Network Design

Adam Whitter-Jones

Coordinator: Frank Langbein

Supervisor: Steve Hurley

CM0343 - 20 credits

Project Description

The overall aim of this project is to successfully extract and utilise existing Mobile User (MU) and base station data stored in binary format. The data is stored in five different files:

1. RTP – coordinates of the whole grid (x,y).
2. STP – coordinates of the whole grid (x,y, threshold [-90dBm]).
3. TTP – coordinates of the whole grid (x,y, traffic).
4. NET – base station information.
5. PLM – contains information on siteID, RTP and pathloss.

Through using this data I am looking to be able to apply and plot it to a model. To be able to do this, I will need to create an algorithm, such as simulated annealing, to allow the data to be calculated in a way which ensures that Base Station Transceivers (BSTs) are placed in an optimum position to permit for sufficiently strong and more widespread 2G coverage.

To enable this to happen, a Network Performance Measure (NPM) must be obtained which compasses the number of users covered, the number of users served and any interference or overlap. Further, geographical information may be beneficial so we can use it to calculate any expected losses or gains using the Hata Model. Once this is complete, a method of displaying this data in a Graphical User Interface (GUI) will need to be developed. This model is expected to allow the user to click and interact with the model to determine the best place to place transceivers after the algorithm is complete; this will allow us to generate further results and test the data thoroughly.

Project Aims and Objectives

- Obtain a program from Steve Hurley and a collection of binary data that will assist me in my project.
 - Extract data and format it if necessary.
- Plan an algorithm to enable me to use and analyse the binary data relating to MU's and BST's.
 - Calculate a NPM to allow a successful calculation given for user interaction.
- Design an environment and GUI that can be used to allow interaction with the data.
- Create an environment through which this data can be applied/plotted.
 - Plot said data.
- Create a GUI that can interact with the environment created for the data.
 - Allow the user to select parts of the 'map' and plot BST's/MU's and obtain calculated results based on existing data relating to location, service required, traffic required and maximum possible users.
- Plan and create a testing schedule to display the results of the algorithm created and its accuracy.
- Finalise the project showing that the algorithm is successful in its purpose.

For interim:

1. Extract data and design algorithm (include NPM) for applying the data.
2. Design the environment and how I expect to use the data.
3. Design and create a testing schedule.

For final:

1. Create algorithm and use it to manipulate the data.
2. Plot the data.
3. Create the GUI and apply the testing schedule to obtain data and permit further analysis of the data.
4. Specify the most suitable location of x amount of masts.

Work Plan

Week 1 03/10/11

1. Obtain information relating to how to proceed with the module.
2. Arrange to and meet with supervisor. Begin initial plan.

Week 2 10/10/11

1. Submit initial plan to supervisor for proofing.
 2. Arrange to meet with supervisor.
 3. Meet with supervisor
 4. Amend plan.
 5. Submit plan.
- **16/10/2011: Submit initial plan for project 87: "Network design".**

Week 3 17/10/11

1. Arrange to meet with supervisor.
2. Meet with supervisor.
3. Discuss how to utilise data provided.
4. Discuss how to design/moderate an algorithm and deduce the best NPM.

Week 4 24/10/11

1. Manipulate data.
2. Begin designing algorithm and working out NPM.

Week 5 31/10/11

1. Finish designing algorithm and working out NPM.
2. Arrange to meet with supervisor.
3. Meet with supervisor.
4. Discuss the best way to display this data and any proposed or previously successful environments used.
5. Begin designing environments.

Week 6 7/11/11

1. Finish designing environments.
2. Create a testing schedule.
3. Submit draft copy.
4. Arrange to meet with supervisor.

Week 7 14/11/11

1. Meet with supervisor.
 2. Discuss any changes that need to be made.
 3. Discuss algorithm designed and the best course of action to create it.
 4. Submit report.
- **16/12/2011: Submit interim report for project 87: "Network design"**

Week 8 21/11/11

1. Begin creating and testing algorithm.
2. Create environment from plan.

Week 9 29/11/11

1. Finish algorithm.
2. Finish environment.
3. Begin plotting data.

Week 10 5/12/12

1. Arrange to meet with supervisor.
2. Meet with supervisor.
3. Discuss workload for Christmas break.

Week 11 12/12/12

-

Week 12 19/12/12

-

Week 13 26/12/12

-

Week 14 02/01/12

Exams

Week 15 09/01/12

Exams

Week 16 16/01/12

Exams

Week 17 23/01/12

1. Begin creating GUI.
2. Arrange to meet with supervisor.
3. Meet with supervisor.

Week 18 30/01/12

1. Work on GUI.

Week 19 06/02/12

1. Work on GUI.

Week 20 13/02/12

1. Work on GUI.
2. Arrange to meet with supervisor.
3. Meet with supervisor.
4. Test data

Week 21 20/02/12

1. Test data

Week 22 27/02/12

1. Test data
2. Arrange to meet with supervisor.
3. Meet with supervisor.

Week 23 5/03/12

1. Begin writing final report.

Week 24 12/03/12

1. Write report.

Week 25 19/03/12

1. Write report.

Week 26 26/03/12

1. Write report.

Week 27 2/04/12

1. Submit draft copy of report.
2. Arrange to meet with supervisor.
3. Meet with supervisor.

Week 28 9/04/12

1. Amend report
2. Resubmit report.

Week 29 16/04/12

1. Arrange to meet with supervisor.
2. Meet with supervisor.
3. Make report changes.

Week 30 22/04/12

1. Finalise report and additional documents.

Week 31 30/04/12

1. Submit report.
 - **4/5/2012: Submit final report for project 87: "Network design"**