Module 1 - Introduction to Engineering FYRP

Project Approval form

Swinburne University of Technology
Faculty of Science, Engineering & Technology

Final Year Research Project-1 (FYRP-1)

EEE40011 (BEET) and RME40005 (R&M)

Semester 1, 2017

PROJECT CONFIRMATION FORM
(Group Submission)

I, the following student, agree to carry out our Final Year Research Project-1 (FYRP-1) entitled: Artificial Neural network based prediction of stock prices (Code: JP7) under the supervision of Dr. Jagdish Patra.

Group Members:

Student ID	Given Name	Family Name	Signature	Unit Code	Double Degree
4957059	Ngoc Khanh	Nguyen		EEE40011	No

I agree to supervise the above students.

Name of Supervisor: Jagdish Patra.

Signature: ..... Date: 09/03/2017

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09/03/2017

09 ~~MAR~~ 2017

Student and Supervisor Expectation Survey

FYRP Activity 2.1: Student and supervisor expectation survey

Topic/area of study

It is the supervisor's responsibility to select a promising topic.	1 2 3 4 **5**	It is the student's responsibility to select a promising topic.
In the end, it is up to the supervisor to decide which approach is most appropriate.	1 2 3 **4** 5	The student has the right to choose an approach even if it conflicts with that of the supervisor.
The supervisor should direct the student in the planning and scheduling of the research.	1 2 3 **4** 5	The student should be able to work out their own research plan and schedule.
The supervisor is responsible for filling in any skill or knowledge gaps in students.	1 2 **3** 4 5	Students are responsible for filling in any skill or knowledge gaps.
The supervisor should ensure that the student has access to all necessary facilities, materials and support.	1 **2** 3 4 5	Ultimately, the student must find the necessary facilities, materials and support to complete their research.

Contact/involvement

Supervisor-student relationships are purely professional and personal relationships should not develop.	**1** 2 3 4 5	Close personal relationships are essential for successful supervision.
The supervisor should initiate meetings with the student.	1 2 3 4 **5**	The student should initiate meetings with their supervisor.
The supervisor should check constantly that the student is on track and working consistently.	1 2 **3** 4 5	Students should have the opportunity to find their own way without having to account for how they spend their time.
The supervisor should only take on and support students who are certain to succeed.	1 2 3 4 **5**	It's the supervisor's responsibility to support students at whatever level of ability they are at.
It's the supervisor's responsibility to insist upon the minimum standards for each and every milestone of a project.	1 2 **3** 4 5	It's the supervisor's responsibility to mentor and guide the student through the maze of project work.

The project

The supervisor should ensure that agreed milestones are reached within the allocated time.	1 2 **3** 4 5	As long as the student works steadily they should be able to take as long as they need to reach agreed milestones.
The supervisor has direct responsibility for the methodology and content of the project.	1 2 **3** 4 5	The student has total responsibility for ensuring that the methodology and content of the project are appropriate to the discipline.
The supervisor should assist in the actual writing of the project if the student has difficulties, and should ensure that the presentation is flawless.	1 2 **3** 4 5	The student must take full responsibility for presentation of the project, including grammar and spelling.
The supervisor should insist on seeing drafts of every piece of assessment in order to give students feedback on their work.	1 2 **3** 4 5	It is up to the student to ask for feedback from their supervisors.
Students should complete all their project work before beginning to write their final report.	**1** 2 3 4 5	Students should start working on their final report early in the semester.

Module 2: Planned research activities with 6 facets

Project name: Artificial Neural network based prediction of stock prices

1. Embark & Clarify: Asking question and brainstorming ideas
   - How does stock price data look like?
   - Which factors can impact the stock price movement?
   - Which business sectors and companies will be studied?
   - What neural network architecture to use to predict stock price?
   - How to evaluate the performance of the neural network?
2. Find & Generate
   - Study other researches available on science and engineering databases such as IEEE, Science Direct, ACM, …
   - Specify toolboxes, software and libraries to carry out the project such as Matlab, PyTorch and Tensorflow.
   - Specify sources to collect data for the project such as Yahoo Finance, Google Finance and DatAnalysis.
3. Evaluate & Reflect
   - Reflect from existing researches:
     - What techniques and method were applied?
     - How well their approaches and solutions work?
     - Are there any room for improvements?
   - Evaluate current approaches:
     - Ensure the collected data is original and correct
     - Compare the intended approaches with existing approach from other researches
     - Different input features and data preprocessing scheme must be considered
     - Different neural network architectures must be studied.
4. Organize & Manage
   - Divide and break down the whole project into smaller tasks.
   - Each task must be planned and allocated to an appropriate time slot in order to complete research objectives.
   - Create a Gantt chart to keep track of the research progress.
   - Recording the content of the meetings with supervisors.
   - Use a workbook to record the progress and have an overview about both ongoing and completed task in order to improve the quality of research continuously.
5. Analyze & Synthesis
   - Analyze stocks and companies' data
     - History and development of companies
     - Impact of different factors on stock price
   - Analyze network architecture:
     - Number of input units in the input layer of the neural network
     - Number of hidden layers and hidden units
     - Activation function at each layer
     - Learning rate
6. Communicate & Apply
   - Weekly meeting with supervisor for advices and feedbacks.

Module 3 - Engaging with Literature

5 peer-reviewed journal articles

- N. L. D. Khoa, K. Sakakibara, and I. Nishikawa, "Stock Price Forecasting using Back Propagation Neural Networks with Time and Profit Based Adjusted Weight Factors," in *2006 SICE-ICASE International Joint Conference*, 2006, pp. 5484-5488.
- G. Tingwei, L. Xiu, C. Yueting, and T. Youhua, "Deep learning with stock indicators and two-dimensional principal component analysis for closing price prediction system," in *2016 7th IEEE International Conference on Software Engineering and Service Science (ICSESS)*, 2016, pp. 166-169.
- J. C. Patra, N. C. Thanh, and P. K. Meher, "Computationally efficient FLANN-based intelligent stock price prediction system," in *2009 International Joint Conference on Neural Networks*, 2009, pp. 2431-2438.
- F. A. d. Oliveira, L. E. Zárate, M. d. A. Reis, and C. N. Nobre, "The use of artificial neural networks in the analysis and prediction of stock prices," in *2011 IEEE International Conference on Systems, Man, and Cybernetics*, 2011, pp. 2151-2155.
- M. Qiu, Y. Song, and F. Akagi, "Application of artificial neural network for the prediction of stock market returns: The case of the Japanese stock market," *Chaos, Solitons & Fractals,* vol. 85, pp. 1-7, 4// 2016.

Module 4 - Applying Literature Findings to Research Design

Techniques to investigate research problem

- Generate the research questions
    - Why is this research important?
    - What is the scope of the research topics?
    - What is the expected the outcome of the project?
- Study the background knowledge required for the project
    - Study the target of interest of the research
    - Review recent researches and studies of the similar problems
    - Review potential techniques which may help to form solutions for the research
- Observe and analyze results as the research progress
    - Justify outcomes resulted from the research process
    - Adapt to new methodologies and techniques to fit the development of the research

Justification of techniques:

These techniques help solve research problem because of two reasons. Firstly, understanding the problem and the background knowledge behind it provides a guideline to what need to be carried out in order find the solution. Lastly, as the research develops, validating the results along the way help keep the research on correct track.

Module 5 - Communicating Research Findings

Cross-referencing between assessment criteria/requirements in the rubric and workbook content

Criteria	Description	Workbook content
ULO 1	Undertake a research project within constraints using previous knowledge	Information about the target stocks and description of its potential driven forces Artificial neural network architectures notes
ULO 3	Professional communication	Planning a clear structure for the research plan.
ULO 4	Apply problem solving methodologies to generate, evaluate and justify solutions	Literature reviews Advices and feedback of supervisor
ULO 6	Reflect on professional engineering practice Reflect on professional issues within the project	Observation and analyzes of research progress
ULO 7	Reflect on personal professionalism, integrity, ethical conduct and professional accountability in project work Demonstrate professionalism to supervisor and other stakeholders	Record of meeting with supervisor