School of Computing 

COMP5200M Scoping and Planning Document

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| **Student Name:**  Wenjie Zhang | |
| **Programme of Study:**  Msc Advanced Computer Scienc**e** | |
| **Provisional Title of Project:**  Machine learning classification of aneurysms using imaging and simulation data | |
| **Name of External Company** (if any)**:**  None | |
| **Supervisor Name:**  Toni Lassie | |
| **Type of Project:**  Empirical Investigation | |
| ***NOTE to student****: ensure you have discussed the content with the supervisor before submitting this document to Minerva. Submit an* ***electronic version*** *of this report in pdf via the appropriate link in Minerva; with filename of the format <surname><year>-SP ( e.g. SMITH15-SP.pdf).* | |
| **Signature of Student:** | **Date:** |

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## 1. Background Research for the project

*The structure used in this template is only a suggestion. DO seek your Supervisor’s guidance to tailor this template for your project.*

This section provides an overview for the reader to appreciate the level of challenge posed by the project and its relevance to your degree programme. This also demonstrates that you have explored the problem space for the project and have acquired an understanding of the initial requirements. For a strong start, the following subsections should reflect a systematic and scholarly approach to **research or literature review** you have undertaken to date.

### 1.1 Context

For example, motivation, background drivers, social and/or technical context, stakeholders involved.

### 1.2 Problem statement

Clarification of the problem – for example, refinement of the problem that was given as a project idea, or emerged research hypothesis from some background study.

### 1.3 Possible solution

Initial thoughts on possible solution(s) to be tackled in the project - what may or may not be pursued depending on speed of progress, challenges and how to approach the development of a potential solution, which modules or computing topics will be the building blocks for the solution.

Should cite background reading or systematic research conducted so far to provide justification of your initial thoughts.

Collect the relative data from different website, and preporocess these data and input them in to RNN, CNN, Random Tree and Logistic regression model to form a model that will give a prediction on the IA cure possibility.

### 1.4 How to demonstrate the quality of the solution

In essence, how to judge the success of your solution in solving the problem. This will help shaping manageable deliverables.

Calculate the p-value and accuracy for each model, present the ROC curve and AUC, compare them and conclude the result. Then compare my result with the models develop by others previously, conclude the adventsge and improvement of my models compare to theirs

## 2. Scope for this project

This section specifies what the project will deliver. It should be written in a concise manner, to be used as a basis for assessment.

### 2.1 Aim

The aim of the project is the overall top-level goal. It might be helpful to consider this in conjunction with the project title.

* Design and create Machine learning and Deep learning classifier model that classify cerebral aneurysms, base on the input data (morphological features of different cerebral aneurysms and simulation-derived features), give out a predicted succeed probability of the treatment by endovascular flow diversion.
* Compare these model, and improve the model that gives the best accuracy, then train the model again, try to improve the trained model to give a better prediction accuracy.

### 2.2 Objectiv**e**s

List up to five objectives. When you phrase an objective, think about how you can demonstrate its achievement.

To summarise, characteristics of suitable objectives are:

* Deliverable -- you will hand them in!
* Measurable -- examiners are able to judge/quantify if you have done a good job.
* Appropriate -- they should solve a sufficiently difficult problem.
* Agreed – by your supervisor, assessor, other members of the School (where appropriate).
* Background research on previous similar projects to generate a basic idea
* Understanding the data by give research on the data
* Choose and collect suitable data for model training from a different website
* Background research on different Deep learning and machine learning model, aim to choose suitable classifiers and neural network structures
* Design input data types and preprocessing methods for the data
* Design prototypes of different Deep learning and machine learning model
* Use Python to create the preprocessor for the original data, so that data can be input to the model
* Use the Python libraries torch and sklearning to create the models
* Train and test the models with the preprocessed data, and give labels to different cerebral aneurysms.
* Conclude the result by observing the prediction accuracy to evaluate different models
* Change the structure of models and see if there will be some improvement in the prediction accuracy
* Evaluate the models again, repeat the processes a couple of times
* Write the final report that compares the different models and concludes the findings

### 2.3 Deliverables

These are items for assessment under ‘delivery’. These could be written up as sections in the final project report (e.g. comparison of algorithms, or feasibility assessment, or design documentation, etc.) or be handed in separately (e.g. code, user manual or installation guide etc.). It is important to have the agreement from the supervisor at this stage that these deliverables are suitable as delivery for the type of project.

To ensure that these deliverables are within the scope of the project, cross-referencing to the objectives may be a helpful check.

Some examples of deliverables: an analysis of current infrastructure, a comparative study of techniques or tools, a recommendation to the client, requirements specification, design documentation, algorithms, software functionality, a qualitative or quantitative evaluation study, and so on, as appropriate for the type of project.

* Final report
* Python Code
* Machine Learning Model prototype
* trained deep learning or machine learning model
* Excutebale software that visualize the algorith

## 3. Project schedule

The schedule for completion of the project should relate the activities (or tasks) to objectives or deliverables. A few milestones should be identified for self monitoring of progress.

### 3.1 Methodology

Outline the underpinning project approach that is appropriate for the chosen type of project. This should help to plan for the order of the activities /tasks.

### 3.2 Tasks, milestones and timeline

Any appropriate method of presentation is acceptable. A common method is the use of Gantt chart.

### 3.3 Risk assessment (if appropriate)

If there is any risk identified at this stage (e.g. availability of stakeholders, technical issues or suitable test data etc.), mitigating strategy should be discussed.

## References

Further guidance from Skills@Library: [**http://library.leeds.ac.uk/skills-referencing**](http://library.leeds.ac.uk/skills-referencing)**.**

Also see Resources on ‘Writing Tips' for other guidance.

## Appendix A. How ethical issues are addressed

This is a University requirement. See Resources on 'Ethics relevant to computing projects' for guidance and discuss it with your supervisor. If no ethical issue is involved, a sentence to that effect will suffice.