Informatics Institute of Technology

In Collaboration With

University of Westminster, UK



*University of Westminster, Coat of Arms*

GenSum

Conclusion

Mr. Nazhim Kalam

w1761265 / 2019281

Supervised by

Mr. Torin Wirasingha

September 2022

This Project Proposal is submitted in partial fulfilment of the requirements for

the BSc (Hons) Computer Science degree at

the University of Westminster.

Table of Contents

[List of Figures ii](#_Toc125462559)

[List of Tables ii](#_Toc125462560)

[1. Chapter Overview I](#_Toc125462561)

[2. Technology Selection I](#_Toc125462562)

[2.1 Technology Stack I](#_Toc125462563)

[2.2 Data Selection I](#_Toc125462564)

[2.3 Selection of development framework I](#_Toc125462565)

[2.4 Programming Language I](#_Toc125462566)

[2.5 Libraries Utilized I](#_Toc125462567)

[2.6 IDE’s Utilized I](#_Toc125462568)

[2.7 Summary of Technology selection I](#_Toc125462569)

[3. Implementation of Core Functionalities I](#_Toc125462570)

[4. Testing & Evaluation Code of Models II](#_Toc125462571)

[5. User Interface II](#_Toc125462572)

[6. Chapter Summary II](#_Toc125462573)

[References II](#_Toc125462574)

# List of Figures

[Figure 12.1 - Prototype Feature Diagram (Self-composed) 13](#_Toc117550682)

[Figure 13.1 - Gantt Chart 16](#_Toc117550683)

[Figure 13.2 - Model development flow (Self-composed) 21](#_Toc117550684)

# List of Tables

[Table 5.1 - Related work in abstractive text summarization 3](#_Toc117584436)

[Table 11.1 - Research Objectives 9](#_Toc117584437)

[Table 13.1 - Research Methodology 13](#_Toc117584438)

[Table 13.2 - Deliverables and Dates 17](#_Toc117584439)

[Table 13.3 - Risk Mitigation Plan 19](#_Toc117584440)

**Acronyms**

|  |  |
| --- | --- |
| AI | Artificial Intelligence. |
| DL | Deep Learning |
| GUI | Graphical User Interface |
| ML | Machine Learning |
| NLP | Natural Language Processing |
| ROUGE | Recall-Oriented Understudy for Gisting Evaluation. |
| BLEU | BiLingual Evaluation Understudy. |
| T5 | Text to Transfer Transformer. |
| BART | Bidirectional Auto-Regressive Transformers. |
| BERT | Bidirectional Encoder Representations from Transformers. |
| PEGASUS | Pre-training with Extracted Gap-sentences for Abstractive Summarization Sequence-to-sequence |
| ILP | Inductive logic programming. |
| LSTM | Long Short-Term Memory. |
| RNN | Recurrent Neural Network. |
| CNN  SEQ2SEQ | Convolutional Neural Network.  Sequence to Sequence |
| RoBERTa | Robustly Optimized BERT Pre-training Approach |
| GPT-3  REST  GPU | Third Generation Generative Pre-Trained Transformer  Representational State Transfer  Graphical Processing Unit |

# Chapter Overview

This chapter covers the preliminary conclusion of the research project, including the core functionality of its implementation for the MVP. The chapter will also review the achievements of the project's goals and objectives and the obstacles encountered. Additionally, an outline of the author's prior knowledge and modules of the program which helped to support the project will be documented along with any new knowledge and skills acquired.

# 10.2 Achievement of Research Aim & Objectives

## **10.2.1 Achievement of Aims**

**“***The aim of this research is to design, develop and evaluate an optimal generalized transformer architecture from a range of popularly used architectures by fine-tuning via hyperparameter optimization, therefore obtaining the recommended architecture's optimum performance.***”**

The initial core components related to the aim of the research is successfully completed by designing, developing & evaluating a performance adaptive generalized transformer. The core functionality was researched in a way to be automated in order to meet the project requirements. The evaluations for the respective work done is attached in the implementation chapter.

## **10.2.2 Achievement of Objectives**

Appendix G – contains the achievement status related to the research objectives which were mentioned in the Chapter 01. "Completed" is the mark next to tasks that were successfully completed, while "Incomplete" is the mark next to those that weren't.

# 10.3 Utilization of Knowledge from the Course

Table 10.1: Utilization of Knowledge gained from the course

|  |  |
| --- | --- |
| **Module(s)** | **Utilized Knowledge** |
| Machine Learning | Understanding the concept underlying data collection and preprocessing, as well as how to train machine learning models, was extremely helpful in developing the models for this research project. |
| Applied AI | The in-depth understanding of how algorithms interact while building ML models provided an understanding of the theoretical principles. |
| Software Development Group Project | This module served as more of a trial run for the Final Year Project; it provided a basic understanding of how to plan, conduct, and assess the research project, providing students the confidence and knowledge necessary to carry out research in their final year. |
| Object Oriented Programming | The knowledge about creating classes and how objects are important helped to enhance the development side area of knowledge for the project. |
| Python Programming (PP1) | This project has the usage of Flask (Python Programming Language Web Framework), PP1 module helped to get introduced to working with Python. |
| Database Systems | The knowledge and the idea of how queries are used to communicate with the database from the webserver system, helped a lot in order to perform read & write operations. |
| Web Design & Development | The concepts thought from this module was used to build the UI for the prototype and the foundation idea of using HTML, CSS and JS supported a lot to move into working with advanced frameworks like React. |

# 10.4 Use of Existing Skills

* **Full-Stack Web Development** – Throughout his internship, the author worked on a number of R&D projects at 99x, where he was able to use cutting-edge technologies for a full stack web development project.
* **Machine Learning / Deep Learning** – During the internship, the author worked on many data science-related R&D projects and also used a variety of online learning resources for self-learning and developing machine learning projects.
* **Documentation Writing** – During the internship and while working on the SDGP module report, the author gained expertise in creating project documentation.

# 10.5 Use of New Skills

# 10.6 Achievement of Learning Outcomes (LOs)

# 10.7 Problems and Challenges Faced

Table 10.2: Mitigations to Problems and Challenges Faced

# 10.8 Deviations

# 10.9 Limitations of the Research

# 10.10 Future Enhancements

# 10.11 Achievement of the Contribution to Body of Knowledge

# 10.12 Concluding Remarks