BIRMINGHAM CITY University

CMP6200
Individual Undergraduate Project
2024 - 2025

A2 - Literature Review and Methods

University Artifically Intelligent Assistant

Course: Computer & Data Science
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Contents

Report Introduction

Draft notice

This is a very early draft of this literature review and will be subject to major change over the next month. I've marked sections that I've taken from the proposal, or ones that I'm currently uncertain of, with boxes similar to this one.

1.1 Aims and Objectives

Copied from proposal

These are still subject to change pending the feedback from my proposal.

This project aims to aid new and existing students alike while they are attending university with helpful information about the university itself, such as university societies, locations/campuses, and policies through the medium of a digital chatbot companion to converse with. Its objectives are to:

- Develop a chatbot capable of accurately answering user queries related to university buildings, policies, and societies with a minimum 95% accuracy rate.
- Conduct a thorough literature review on the surrounding topics, namely AI, LLMs and NLP.
- Create effective documentation for all stages of development, highlighting challenges faced during the process.
- Manage time effectively to ensure all project milestones are met on a consistent and regular timeframe.
- Evaluate the effectiveness of an AI assistant on university student acclimatization.

1.2 Literature Search Methodology

My literature search will be performed using multiple reputable databases for academic papers, including:

- IEEE Xplore
- Scopus / Elsevier
- Google Scholar
- BCU Online Library

By using multiple different databases to source my information from, I can ensure that any potentially relevant literature will be found. Figure 1.1 depicts how in a search for 1685 articles about employee retention strategies and turnover, only 582 (25.7%) appeared in multiple databases (Wanyama, McQuaid and Kittler, 2022), meaning that the remaining 74.3% of articles were exclusive to the single database in which they were found, emphasising the importance of searching multiple databases.

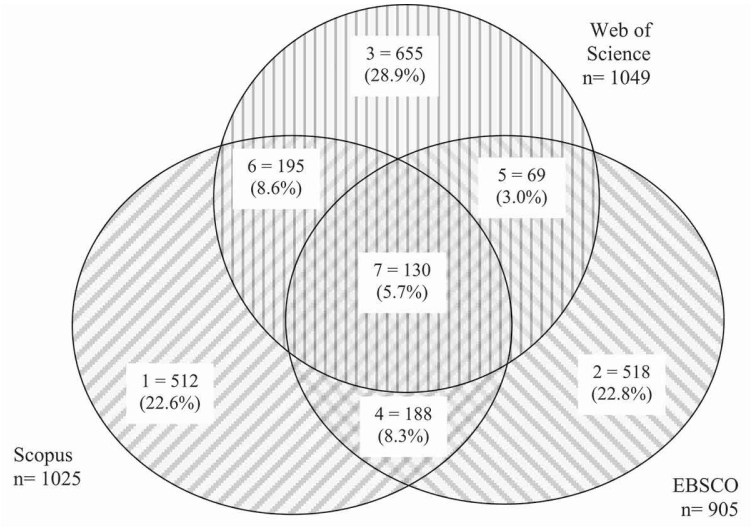

Figure 1.1: Distribution of searched articles across databases. (Wanyama, McQuaid and Kittler, 2022)

All searches performed will be on papers published during or after 2020, due to the constantly evolving fields my project is based on. The search terms I will use to retrieve the data I will be studying are:

- Artifical Intelligence / AI
- Chatbots / Digital Assistants
- Generative AI
- Large Language Models / LLMs

- User Experience / UX

By using these specific terms that are directly relevant to the core themes of my project, I will be ensuring that I only retrieve literature that will be of crucial use in its development.

Literature Review

2.1 Themes

To develop the artefact and conduct thorough background research on relevant literature to further my knowledge of the subject areas, key general themes of the project were identified. From these themes, further keywords to be used in the literature search were derived to ensure that retrieved literature is directly relevant to my research and development of the final artefact. Due to the constantly evolving fields the project focuses on, it will be necessary to limit the results to only those written in recent years (2020 earliest) as there are frequent new developments in the subject areas.

Significant uncertainty

I had a large amount of difficulty identifying my project's key themes, as many of them overlap and I was unsure which would simply be keywords of others, which is most evident with "AI" and "Generative AI" seen below. From what I can gather so far, I'm not sure if just making a chatbot that just accesses another LLM's API is worthy of being a dissertation project at all, and if it would be better to try with my own fine-tuned model of something like LLaMA. I'd have much more to write about that way.

Theme	Description	Keywords
AI	A field of computing dedicated to allowing computers to simulate human learning by training them on large amounts of data so that they can recognise patterns to classify or predict unknown data. AI can only be as good as the data it is trained upon, and can develop biases if it is fed too much data of a certain type.	Generative AI, AI Ethics, AI Bias
Generative AI	AI dedicated to the generation of content rather than prediction or classification. It is possible for generative AI to produce text, images and more recently, even video and sound.	LLMs, Tokens, Embedding
Chatbot Digital Assistant	Software that simulates a natural conversation between the computer and end user. Many chatbots, including the one I intend to develop, utilise recent developments such as Generative AI and natural language processing (NLP) to interpret and respond to user queries. (IBM, 2024b)	NLP, Microsoft Bot Framework, Watson Assistant, ChatGPT
LLM	Large Language Models are a type of AI dedicated to the recognition and generation of text. As suggested by their name, they are trained on enormous amounts of text data, which allows them to have active conversations with users. There are many different LLMs, and as their size and complexity increases, so too does the necessary processing power.	Fine-tuning, GPT4o, LLaMA, Gemini, Claude
User Experience (UX)	The end user's overall experience of using a system, such as its ease of use and whether it is enjoyable to use (Cambridge Dictionary, 2024). In the context of my project, it will refer to the user's ability to smoothly converse with the chatbot and how human-like it is.	Conversational design, usability, market research

2.2 Review of Literature

2.2.1 Review

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2.2.2 Theory

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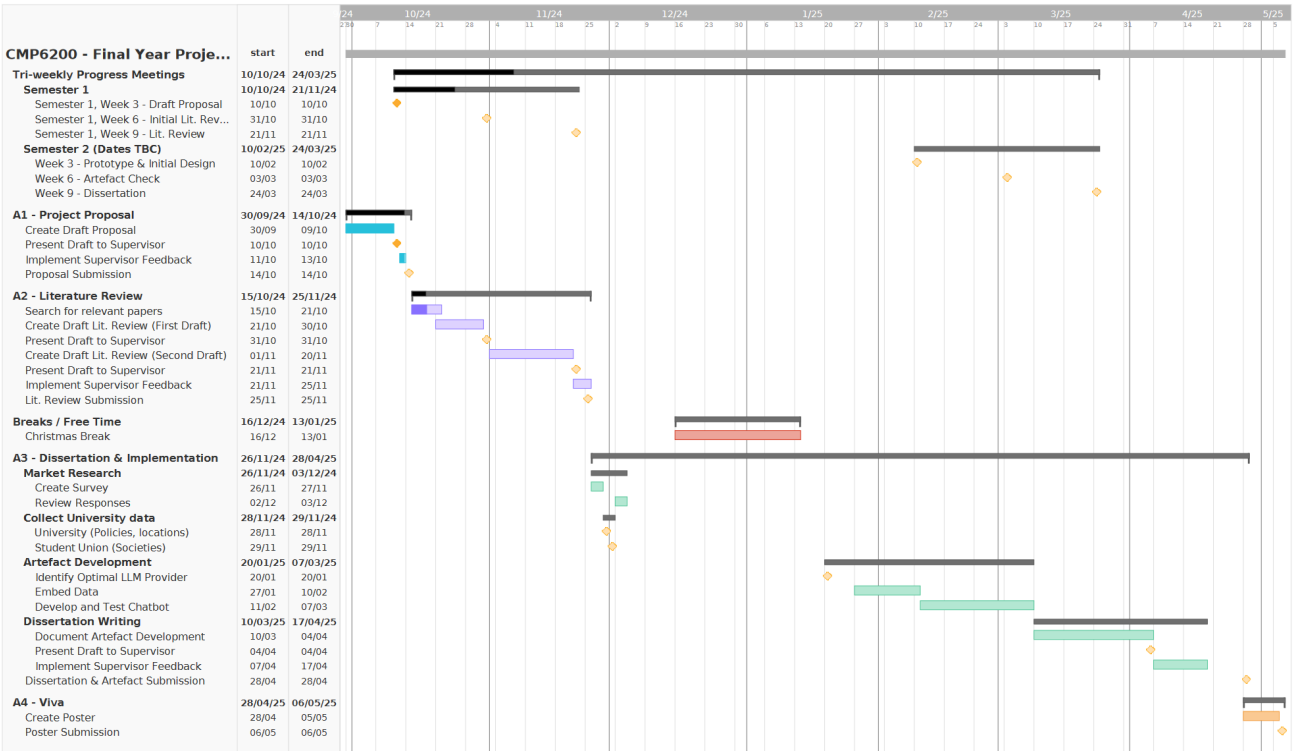
2.3 Summary

Appendix

Copied from proposal

This is still subject to change pending the feedback from my proposal.

3.1 Gantt Chart



CMP6200 - Final Year Proje...	start	end
Tri-weekly Progress Meetings	**10/10/24**	**24/03/25**
Semester 1	**10/10/24**	**21/11/24**
Semester 1, Week 3 - Draft Proposal	10/10	10/10
Semester 1, Week 6 - Initial Lit. Rev...	31/10	31/10
Semester 1, Week 9 - Lit. Review	21/11	21/11
Semester 2 (Dates TBC)	**10/02/25**	**24/03/25**
Week 3 - Prototype & Initial Design	10/02	10/02
Week 6 - Artefact Check	03/03	03/03
Week 9 - Dissertation	24/03	24/03
A1 - Project Proposal	**30/09/24**	**14/10/24**
Create Draft Proposal	30/09	09/10
Present Draft to Supervisor	10/10	10/10
Implement Supervisor Feedback	11/10	13/10
Proposal Submission	14/10	14/10
A2 - Literature Review	**15/10/24**	**25/11/24**
Search for relevant papers	15/10	21/10
Create Draft Lit. Review (First Draft)	21/10	30/10
Present Draft to Supervisor	31/10	31/10
Create Draft Lit. Review (Second Draft)	01/11	20/11
Present Draft to Supervisor	21/11	21/11
Implement Supervisor Feedback	21/11	25/11
Lit. Review Submission	25/11	25/11
Breaks / Free Time	**16/12/24**	**13/01/25**
Christmas Break	16/12	13/01
A3 - Dissertation & Implementation	**26/11/24**	**28/04/25**
Market Research	**26/11/24**	**03/12/24**
Create Survey	26/11	27/11
Review Responses	02/12	03/12
Collect University data	**28/11/24**	**29/11/24**
University (Policies, locations)	28/11	28/11
Student Union (Societies)	29/11	29/11
Artefact Development	**20/01/25**	**07/03/25**
Identify Optimal LLM Provider	20/01	20/01
Embed Data	27/01	10/02
Develop and Test Chatbot	11/02	07/03
Dissertation Writing	**10/03/25**	**17/04/25**
Document Artefact Development	10/03	04/04
Present Draft to Supervisor	04/04	04/04
Implement Supervisor Feedback	07/04	17/04
Dissertation & Artefact Submission	28/04	28/04
A4 - Viva	**28/04/25**	**06/05/25**
Create Poster	28/04	05/05
Poster Submission	06/05	06/05

Figure 3.1: A conceptual Gantt chart of a development timeline.

References

Wanyama, Seperia B., Ronald W. McQuaid and Markus Kittler (2022). "Where you search determines what you find: the effects of bibliographic databases on systematic reviews". In: *International Journal of Social Research Methodology* 25 (3), pp. 409–422. DOI: 10.1080/13645579.2021.1892378.

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