ESCORT - University Students guidance system based on NLP

2022-179

Project Proposal Report

Parathan T

B.Sc. (Hons) Degree in Information Technology
(Specialization in Software Engineering)

Department of Information Technology
Sri Lanka Institute of Information Technology Sri Lanka

February 2022

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Declaration

I declare that this is my own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Name	Student ID	Signature
Parathan T.	IT19125176	

The supervisor/s should certify the proposal report with the following declaration.

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

…… ……...

Signature of the supervisor Date

Abstract

Most of the students who are following a bachelor's degree in IT (Information Technology) don't have much idea about what role they are going to do for an internship or for a permanent job in the IT sector. Due to that, many of the students get bored in their daily work. Students' interest and their passion towards a particular role should be identified by him/her during the university days and they should be able to enhance to suit them towards that job role. To enable this, an automated system will help the students to create a student profile and input their field of interest and their most available time to get the mentorship. Based on students preference, system will recommend students with suitable mentors, courses that could help the students. This system will help to build a communication between student and mentors.

Keywords: NLP, Text Analysis, Recommendation

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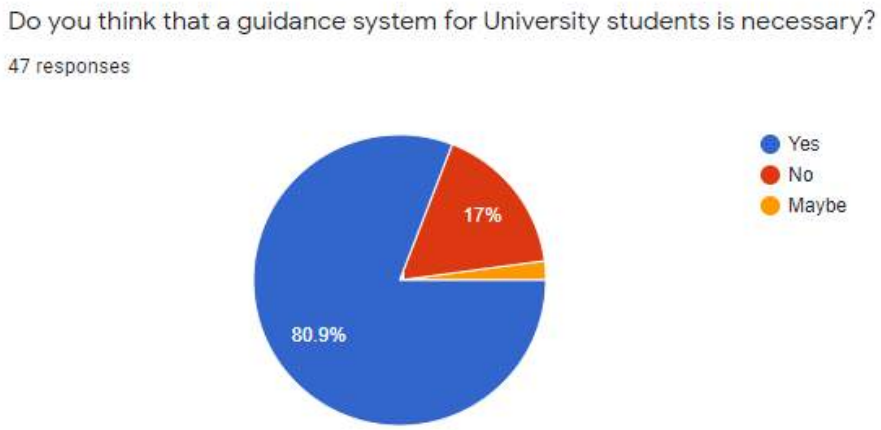
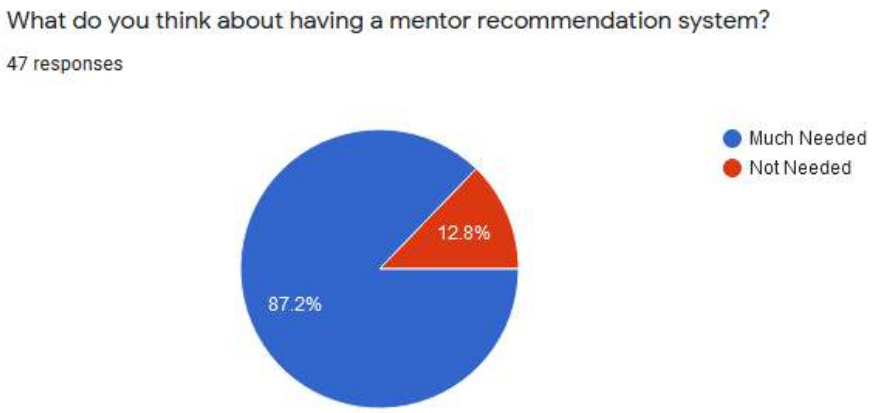
1. Introduction

1.1. Background

In Sri Lanka, students are able to follow an IT degree from a state university or a non-state university. During the internship period or after graduation most of the students were not able to find the suited role of their interest. In the IT industry, different types of fields are available for job opportunities. E.g.: Software Engineer/Developer, Database Administrator, DevOps, Business Analyst, Quality assurance, Data Science and Robotics, etc. Students might be interested in developing software solutions and programming, but they might get into quality assurance. This kind of role which is not suited to their interest will bring up a slowness, and get bored after doing it for a longer period of time. So, to shape up students future, the system will recommend mentors who can guide them for a certain period of time and give feedback to students and also the system will able to recommend courses and certifications to students as well. The system like this should be found in all the universities to help student's to get connected with mentors, and industry experts who can guide students to achieve success in their life.





1.2. Literature Survey

For the university students, career guidance is the most important aspects during their academic life. They should be aware of the IT industry code of conduct and what skills they should enhance to land a great opportunity in their field of interest. For that, it's a good practice to ask for a mentorship from industry people or those who can provide guidance for students. However finding a mentor by student themselves is a big challenging. They don't know how exactly they can find the suitable mentors to themselves. So, this part of the system is a much needed area for students. Probably, many recommendations are found in different areas.
For example: Job recommendation, movie recommendation & product recommendation etc.

In most of the research areas, the recommendations plays the major role in different areas like mentor and course recommendation. Even though, the research papers are available publicly, the systems were not available publicly. The systems are not available for public use. The datasets that were used to build the systems also not available.8
In the *[1] Amer Al-Badarenah, Jamal Alsakran "An Automated Recommender System for Course Selection"* research paper they have used the collaborative recommendation system for course selection where the courses are recommended to students based on what other similar students have chosen before. This system itself automatically finds the similar student details and then recommends courses that similar student has chosen. This system has clustering technique from machine learning which group similar students from the dataset using machine lerning clustering algorithm k-means clustering.

Features	Research 1 Mentor Recommendation System [6]	Research 2 Intelligent Recommendation System for Course Selection in Smart Education [5]	Research 3 Building a Course Recommender System for The College of Wooster [4]	Escort
Designed for university students	✓	✓	✗	✓
Course, certifications recommendation	✗	✓	✓	✓
Mentors recommendation system	✓	✗	✗	✓
Will be released for real users	✗	✗	✗	✓

1.3. Research Gap and Research Problem

1.3.1. Research Gap

The students are getting more chances to get into the field of IT through academic studies. But cannot be able to say that all the students who joined the industry are interested in what they are really doing. To shape up them for their favorite field in IT, the university itself should organize and encourage students to take part in the events in different fields. Unfortunately, not all the students are getting that chance and perform well in those events. So, a system where it will recommend students to pursue their career interests will help a lot in a student's life. The most important thing would be recommending a mentor from academic alma Mater or, lectures from the university personally mentor the students through a system.
In this way, this mentor recommendation system will do the same functionality as like most of the recommenders but that are suitable for Sri Lankan university students.

1.3.2. Research Problem

The students at the universities do not get much exposure before they get into an internship to an IT company. So that, this is one of the major issue found among the students who need to get a mentorship from the fields they like before they get into a membership. These kind of connecting systems are very rare as most of the social media connects people. But, the effectiveness of social medias in university students' guidance perspective is not that much encouraged. Therefore, connecting university lectures, alumni & other industry experts through a recommending system in the domain of Sri Lanka is not found. This system will be able to solve this major problem in university student's life. Recommending

mentors to students will be a very helpful idea. The recommendation determining variables may vary based upon students and mentors, the way mentors doing the mentorship. But still, cannot able to filter the retrieved data from database much closer using the NLP techniques by implementing powerful algorithm to find the mentors and students similarities and important other common features. The data collection for the mentors will be a bit challenging when it comes to real-world mentors names, skills and their details. I need to personally need to have a conversation or invite people to give their support for this implementation. Later the graph database connections needs to be connected to each other, and the NLP techniques need dataset to create model to predict the best suited recommendations for the students. This problem is similar for the courses and certification recommendation as well. Moreover the frontend implementation for this system needs programming language development as well. The request making and accept/reject part of mentors is a needed use case for this project to be fulfilled. So, the frontend and backend implementations also should be a challenging part.

2. Objectives

2.1. Main Objective

The main objective is to recommend suitable courses, certification, and mentors to help students to pursue their career

2.2. Sub Objectives

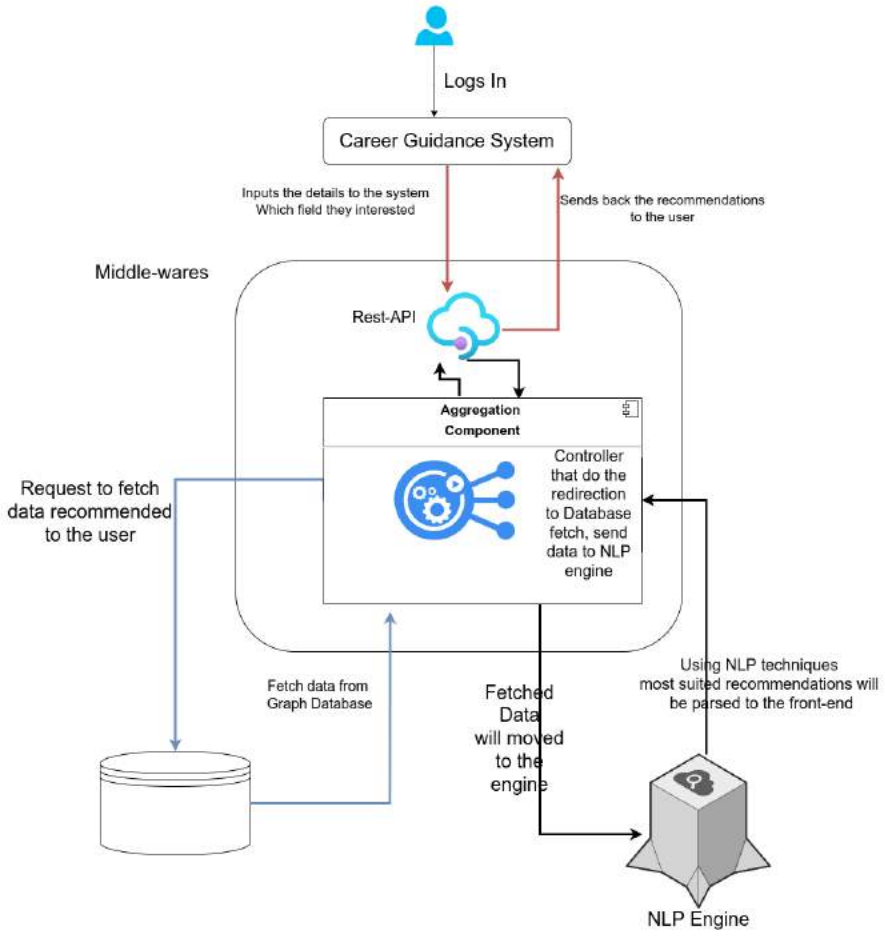
- → Building an interactive web application for frontend
- → Collect data for mentors, courses & certifications
- → Create graph database and input data
- → Writing queries to get connected data
- → NLP implementations to filter the data that graph data provides

3. Methodology

Process: The students can create a profile on the system. While creating the profile users need to input the interested fields, their available time for a one-to-one mentorship. At the same time, profiles for mentors (can include lectures, alumni of SLIIT) can also be created. The mentors can input their field of expertise and availability for their mentorship. So, based on the student profile details, students will get recommendations of the mentors, courses and certifications when they log into the system. Afterwards, the students can view the mentor's profile and can request a mentorship from the mentors. Then mentors will get the requests and they can approve or reject. The recommendations are fetched from graph database for students based on their profile, afterwards using the NLP techniques the fetched data from the database will further get filtered out and sent to the students.

Graph-based recommender: Graph database will help in recommending suitable mentors, courses, and certifications to improve for students based on their interest and the available time to get the mentorship.

NLP Techniques: Such as Text Classification, Topic Modelling, Cosine Similarity will help to filter the best out of the recommendation from the graph database.
Text classification and topic modelling are the NLP techniques that help to classify the text, organize, structure and categorize to different contexts. The cosine similarity helps to get the most similar contents in each data. By using these techniques, the data provided by graph database will be further filtered and given to the user.



4. Project Requirements

4.1. Hardware requirements

Windows 10

Intel® Core™ i5-8250U Processor
8 GB RAM
Smart Phone

4.2 Software Requirements

Python
Graph Database (Neo4j/DGraph)
Visual Studio Code
PyTorch
JavaScript

5. Description of Personal and Facilities

Member	Component	Task
Parathan .T	Student Career Guidance recommendation System	Function Implementation ● Graph database implementation and feed data ● Queries to get recommendations ● Implementing NLP techniques to get filtered data ● Frontend design and workflow

6. Budget and Budget Justification

The estimated cost of the proposed system in order to develop and test the accuracy of the research project can be categorized as follows.

➢ Web Server Rs. 15,000.00
➢ Other Costs Rs. 7,000.00
➢ Documentation Rs. 3,000.00
Total Rs. 25,0000.00

7. References

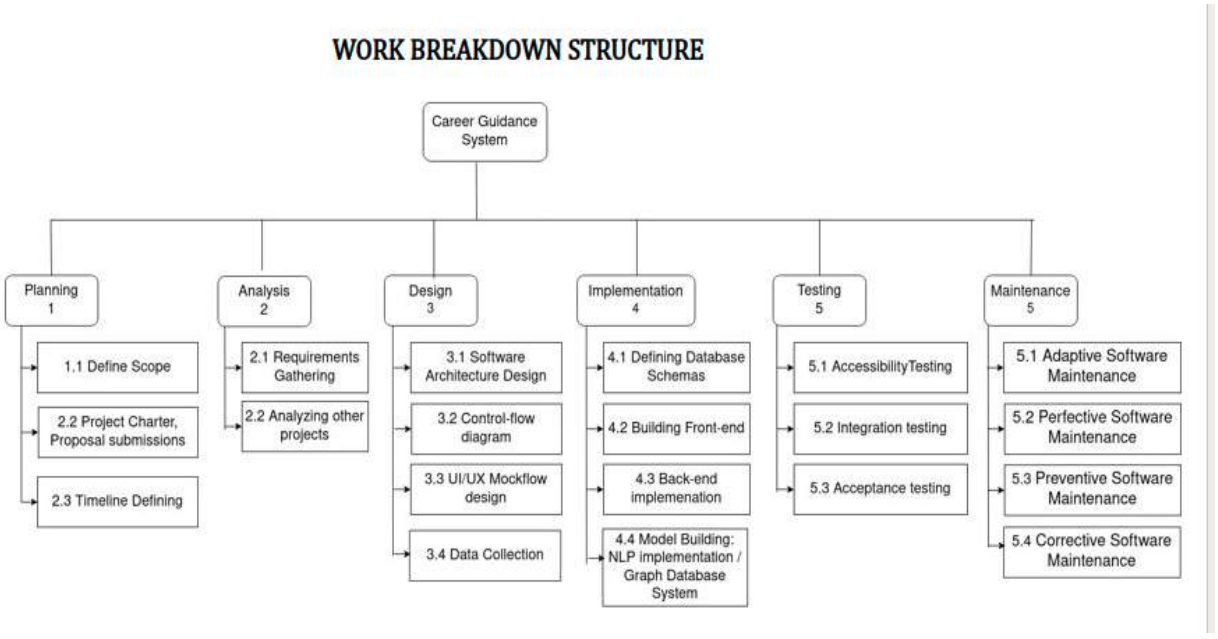
[1] Amer Al-Badarenah, Jamal Alsakran “An Automated Recommender System for Course Selection” - (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 7, No. 3, 2016

[2] Grewal DS1 * and Kaur K2 “Developing an Intelligent Recommendation System for Course Selection by Students for Graduate Courses” - Business and Economics Journal

[3] Nan Jiang “Building a Course Recommender System for The College of Wooster” - The College of Wooster Libraries, The Open Works

[4] JinjiaoLin, HaitaoPu, YibinLib, Jianlian “Intelligent Recommendation System for Course Selection in Smart Education” - 2017 International Conference on Identification, Information, and Knowledge in the Internet of Things

8. Appendices



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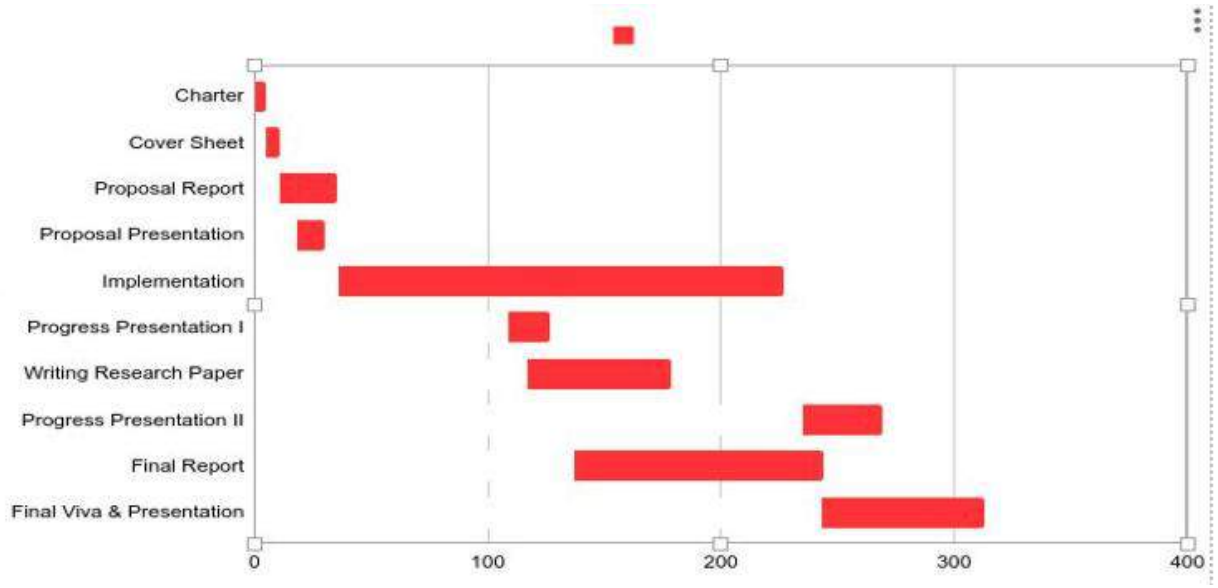
Charter
Cover Sheet
Proposal Report
Proposal Presentation
Implementation
Progress Presentation I
Writing Research Paper
Progress Presentation II
Final Report
Final Viva & Presentation
0
100
200
300
400