

INFORMATICS INSTITUTE OF TECHNOLOGY

In Collaboration with

UNIVERSITY OF WESTMINSTER

**Recourse Recommendations System**

A Project Proposal by

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**List of Abbreviations**

# Introduction

This document defines the background of the problem, the existing works that are related to my research topic, the solution that I am planning to implement, and how I am supposed to address the currently facing issues. The past research interests are also explored with their limitations and the research gaps are also identified with relevant reasons. Moreover, this paper further includes the solution methodology, the software and data requirements needed to implement it, the time plan, and the risk mitigation plan for the next few months of research work.

# Problem Domain

Nowadays, most students learn using online resources. Even though students gained knowledge in universities, schools, and other institutes, they always tend to explore more to ability in their fields with the help of online sources. There are several types of online resources for different learning styles (visual, read and write, auditory). For example, some students may be interested in watching tutorial videos. It will help them to extract the content more than reading documentation. But some students are more interested in reading and gaining knowledge than watching a video. Sometimes we cannot find the most suitable learning type that suits us. When someone must be ready for an exam within two to three days, he/she must face difficulties in finding the best learning material for a specific subject that matches their learning style. In such cases, it would be a great solution to have an online resources recommendation system by identifying our learning styles.

# Problem Definition

Every student has a different learning style. Some students are visual learners, while some students prefer to learn through audio. The online learning system, with its range of options and resources, can be personalized in many ways. It is hard to find the perfect online material for our subject and learning style. It takes more time to try out various sources and find the relevant ones. The main issue with most online resources is reliability. Even though we found the perfect match for our choice, the information it contains may not reliable.

## Problem Statement

Students are facing difficulties in finding the best online resources that match their learning styles.

# Research Motivation

As a university student, I faced problems when choosing the right online sources when studying. It took me a period to find myself the best learning style that suits me. I found it by trying and following videos, reading materials, and making notes. It takes some time. In some situations, I had to watch so many tutorial videos from different sites to find the best one that meet my requirement. During the exam days, I encountered complications finding the suitable reference.

# Existing work

|  |  |  |  |
| --- | --- | --- | --- |
| Citation | Brief Description | Limitations | Contribution |
| (Shao, n.d.) | Using the symbolic dataset from AI-Ismail, Gedeon, and Yamin's study, this paper offers a deep neural network (DNN) classification model to predict four preferences of mobile learners, including audio, PowerPoint, video, and e-books. | This study provides a way to create a learning material adaptation model that links a user profile to a content group using the Naive Bayes classifier and K-Means clustering method. | This research explores how to train a classification model with pre-encoded data to predict mobile learner preferences based on VARK scores. The popularity of mobile learning was a factor in the decision to use this dataset. |
| (“Intelligent Recommendations for e-Learning Personalization Based on Learner’s Learning Activities and Performances ,” 2018)‌ | This recommendation system is an application that enables a user to propose an item based on their past choices and the preferences of a group of people who share their interests and worldviews. Therefore, recommendation systems both provide tailored access to material for a particular topic and aid learners in reducing the information overload they now experience. | This study suggests intelligent suggestions for an e-learning customization system that utilizes content-based filtering, collaborative filtering, and educational data mining techniques for recommendations and forecasts while also taking into consideration the learners' preferred learning styles. Here, we introduce a basic skill level test to identify the startup profile in an effort to solve the cold-start issue.  a new student. | The system encouraged learners to engage in various activities, such as completing numerous quizzes, throughout the e-learning process. Discuss, rank, evaluate, and bookmark subjects. to accumulate points The graphic displays the grades each student received. As a result, this point indication encouraged students to engage with the system more. |
| (Krishnamoorthy and Lokesh, 2020)‌ | Learning style preferences provide us insight on how to make better use of the educational materials at our disposal, especially with the growth of online and personalized learning platforms. On the idea that pupils like knowledge, Fleming and Bonwell created the VARK learning styles. | The study investigated the connection between education and demographic elements including learning preferences and place of upbringing. The outcomes contradicted their theories, it turned out. They come to the conclusion that the development of big data learning style classification allows for the employment of a combination of stacking algorithms, such as voting classifiers or modeling algorithms, to adapt to user applications. | This study illustrates how machine learning algorithms may create correlations between different types of data. Students' learning styles have a significant role in how they assimilate knowledge while in school. |
| (de Medio et al., 2020)‌ | The web presents special potential in this article. Technologies and educational materials may make enormous sums of money. Simple options are available: For instructors, the internet is a vast resource where they may obtain helpful instructional materials for adding to or establishing courses. | The instructor can choose a specific LO from those on the rated list based on this analysis of prior uses of intriguing LOs. On the basis of their utilization, which was not included in the inquiry response, she/he may be encouraged to utilize additional LOs in addition to the pertinent LO in other courses. | In this paper, they focused on teaching activities. The presentation is an addition to the LMS that aids in helping the teacher create a course based on suggested LOs. The suggestions were made in response to features that LOs had requested as well as from the use of LOs by other teachers in various courses. |
| (Ezaldeen et al., 2019) | The major goal of online learning is to give people from all over the world access anywhere, at any time, and the ability to quickly and easily discover the right courses. | This study provides a way to create a learning material adaption model that links a user profile to a content group using the Naive Bayes classifier and K-Means clustering method. | Incorporating intelligent support systems, this article proposes an AI-based e-learning system. Learning resources may be chosen depending on a student's ability and needs, assisting instructors and students in improving overall learning results. |

# Research Gap

The suggested solution is recommending learning resources for people with the same learning preferences using an algorithm to identify their learning styles. The accuracy can be improved using that algorithm. The users can also suggest learning materials they followed using the feedback form.

The existing recommendation systems only use normal algorithms and don't specify domains. When we are doing a system for an education category, we have enough ability to create a better output using specific knowledge. But that area hasn't been fully researched yet. I am planning to create a domain-specific improved personalized recommendation system by using the knowledge of the education domain and identifying the learning styles of students minimizing time waste.

# Contribution to the Body of Knowledge

By addressing the above gap what is the contribution you are going to make

## Technological contribution

## Domain contribution

The main drawback of e-learning and education systems is not being domain personalized. As a solution for that issue, a domain-specific recommendation system is designed using the learning style to save time and increase efficiency.

# Research Challenge

Evidence for complexity and challenge to achieve, you need to write such that it gives reason it could lead to a publication.

Publishable does not mean it is publishable in a conference but publishable in a <https://mjl.clarivate.com/search-results> journal

Further evidence to show that this can be further extended to PhD research

# Research question/s

RQ1: How to design and develop a maintainable resource recommendation system according to the learning style of the students?

# Research Aim

The aim of this project is to design and develop a web-based solution that recommends accurate learning resources according to the learning preference of the students.

# Research Objectives

Elaborate the steps of atomic activities that you need to carryout to achieve the aim

|  |  |  |
| --- | --- | --- |
| Research Objectives | Explanation | Learning Outcome |
| Problem Identification |  | LO1 |
| Literature Review | RO1  RO2  RO3 | LO1 |
| Data Gathering and Analysis |  | LO2, LO3 |
| Research Design |  |  |
| Implementation |  |  |
| Testing and Evaluation |  |  |
|  |  |  |
|  |  |  |

# Project Scope

## In-scope

* Classify students according to their learning style using questionary
* Provide a feedback form with recommendations
* Recommended learning resources according to similar learner’s feedback
* Admin panel to insert learning resources.

## Out-scope

## Diagram showing prototype feature

# Methodology

## Research methodology

|  |  |
| --- | --- |
| Research Philosophy | The author of the research has selected the positivism as the research philosophy |
| Research Approach | Deductive or inductive why? |
| Research Strategy | Experiment, survey => questionnaire (can be quantitative or qualitative) or interview (can be quantitative or qualitative), |
| Research Choice | Mono method => only one method can quantitative (Positivist) or qualitative (interpretivist), Multi method (More than one method but all belong to same paradigm (positivist or interpretivist)) or Mixed method (only pragmatist can mix the method => mixing the method from positivism and interpretivism) |
| Time zone | Cross-sectional or longitudinal |
|  |  |
|  |  |
|  |  |

## Development methodology

### Life cycle model

### Design Methodology

### Evaluation Methodology

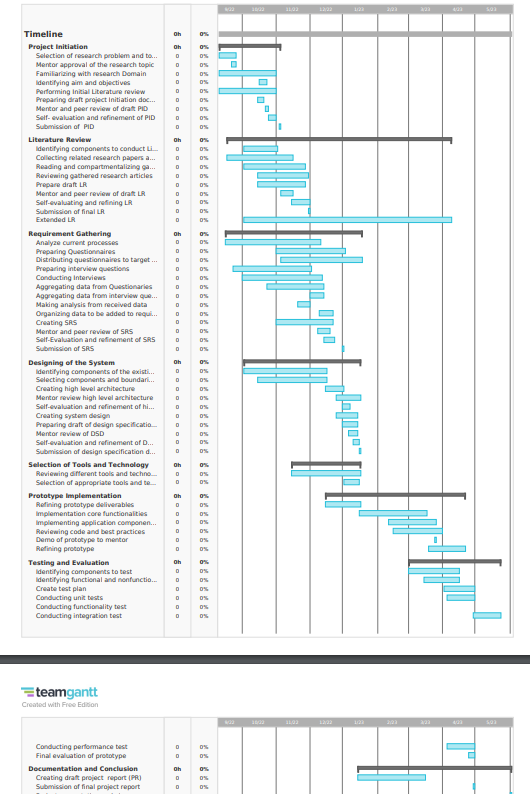
### Benchmarking

* 1. **What is the life cycle model and why?**
  2. **Design methodology => SSADM or OOAD or Anything else?**
  3. **Evaluation methodology => Evaluation metrics and/or benchmarking**

## Project management methodology

### Schedule

### Gantt Chart



### Deliverables

|  |  |
| --- | --- |
| Deliverable | Date |
| Project Proposal Document | 3rd November 2022 |
| Literature Review Document | 15th November 2022 |
| Software Requirement Specification | 24th November 2022 |
| System Design Document | 23rd January 2023 |
| Prototype | 2nd February 2023 |
| Thesis | 30th March 2023 |
| Review Paper | 3rd February 2023 |
| Manuscript Paper | 17th February 2023 |
| Final Research Paper | 27th April 2023 |
| Public project library | 3rd July 2023 |

### Resource Requirements

### Software Requirements

|  |  |
| --- | --- |
| Software Requirements | Solutions |
| Operation System | Windows, Linux |
| Programming Language | Java, Python, JavaScript |
| Frameworks | Flask, Angular, Node js, |
| Diagram Design Tools | Drow.io |
| Project Management Tools | Mendeley, Zotero |
| Documentation Tool | Microsoft word, Google sheet, Microsoft excel |
| IDE | Jupiter notebook, IDEA, Anaconda, PyCharm |
| Libraries | TensorFlow/ Scikit learn Python packages |

### Hardware Requirements

|  |  |
| --- | --- |
| * 16 GB Memory or above. * 15 GB Storage or above * Core i7 processor | To be able to develop the Resource Recommendation System and to store the data and code. As well as To manage the dataset and training process. |

### Data Requirements

* **Student learning preference** - Kaggle open datasets. Use as ML dataset

### Skill Requirements

* Creations of required Resource Recommendation Systems.
* Ability to train and optimized Machine learning and Deep learning Models.
* Creative writing and Research writing skills

### Risk Management

* 1. **Schedule using the Gantt Chart after doing a WBS (Do not have to provide the WBS)**
  2. **Deliverables,** **milestones, and dates of deliverables**
  3. **Resource requirements** 
     1. **Hardware requirements**
     2. **Software requirements**
     3. **Skills requirements**
     4. **Data Requirements**
  4. **Risk Management**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk Item** | **Severity** | **Frequency** | **Mitigation Plan** |
|  | **5** | **5** |  |
|  | **5** | **4** |  |
|  | **5** | **1** |  |
|  |  |  |  |

# References

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