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Research Proposal

Machine Learning and its usage within Curriculum and Revision planning in Secondary Education

Significance / Contribution to the field

The education sector is facing unprecedented demands, with teachers having limited time to plan schemes of work.

There is scope for Machine Learning algorithms to assist with this problem.

The research project can help further develop the disciplines of Computer Science and Education.

Research Question

Is it possible to increase the experience of both students and teachers within secondary education through the utilisation of Machine Learning?

This can be broken down into further questions relating to teachers and students independently.

Aims and Objectives

Aims

- Identify whether Machine Learning can provide a benefit to the education sector.

Objectives

- Develop an application that meets the needs of the research question.
- Analyse the results to identify if there is a real world benefit.

Key Literature

Yousafzai, B. K. et al. (2020) Application of machine learning and data mining in predicting the performance of intermediate and secondary education level student. *Education and information technologies*. [Online] 25 (6), 4677–4697.

Joshi, M. & Kumar, S. (2020) Prediction and Analysis of Student Performance in Secondary Education Based on Data Mining and Machine Learning Techniques. International Journal of Scientific Research in Computer Science, Engineering and Information Technology. [Online] 294–301.

Forero-Corba, W. & Bennasar, F. N. (2024) Techniques and applications of Machine Learning and Artificial Intelligence in education: a systematic review. Revista iberoamericana de educación a distancia. [Online] 27 (1), 209–253.

Ahajjam, T., Moutaib, M., Aissa, H., Azrour, M., Farhaoui, Y., & Fattah, M. (2022). Predicting Students' Final Performance Using Artificial Neural Networks. Big Data Mining and Analytics, 5(4), 294-301. https://doi.org/10.26599/BDMA.2021.9020 030

Methodology and Development Strategy

RESEARCH DEVELOPMENT – IDENTIFY SECTOR NEEDS, UNDERSTAND CURRENT WORKLOADS AND UTILISE REAL WORLD DATA.

APPLICATION DEVELOPMENT – UTILISE SDLC, IDENTIFY APPLICABLE MACHINE LEARNING MODEL, RIGOROUS TESTING.

Ethical Consideration and Risk Assessment

Ethical Consideration

- Concerns regarding real world users and data, especially with regards to children.

Risk Assessment

- Although the application will be local to reduce risk of data compromise, there will be user data held that could be disclosed.
- Risk of the model being inaccurate.

Artefact

An application that will allow users to unput data (test scores, progress reports) that will help provide information to both teachers and students about the areas of improvement needed.

Machine Learning algorithms will analyse the data and will create a schema of work that will allow students to focus on what is needed and teachers to develop a curicculum that meets the needs of the class.

Model will continue to learn with new data.

Proposed Timeline

Mar. 2025

Artefact design completed by March 2025.

May 2025

Artefact development completed by May 2025.

June 2025

Research 1st draft completed by June 2025.

July 2025

Testing completed by July 2025.

July 2025

Research fully finalised by late July 2025.

Conclusion