Artificial Intelligence COS5028-B
Coursework1
AI applications: Use case review and basic implementation
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Background

Since a few years, AI has been more and more used in several domains, such as industry, agriculture, finance, education, healthcare, entertainment and social media, …etc, and nowadays, more and more customer services are being automated thanks to AI. However, several challenges are still unresolved, including service quality optimisation and user's protection, in terms of safety and privacy.

Aim

This coursework aims to review the AI technology, making the link between the techniques used and the applications provided. Therefore, for each reviewed technique, the set of AI techniques used need to be investigated, in order to understand how AI can be used in multiple ways, each using a different set of techniques. The review do not have to cover all the possible applications of AI, but have to explain the techniques used in the selected AI applications. Examples of AI applications are: Healthcare, online teaching, language translation, financial services, decision making, engineering and industrial production, social media development, etc.

Note! The list mentioned above of AI applications is not exhaustive. Any other relevant AI applications can also be presented and reviewed.

Design Problem

Problem statement

In this coursework, the AI application(s) need to be reviewed according the following actions:

- Present the selected AI application framework and users
- Analyse the selected AI application workflow and techniques, e.g. machine learning, expert systems, association rules, etc.
- For each technique used, present a summary of its background
- Show how AI has been able to improve the selected application, giving an example from the literature
- Search a public dataset/repository related to the selected AI technique and have basic understanding of their significance and meaning.
- Develop basic data processing tools to read and process samples of data, using some machine learning tools, e.g. linear regression, classification, clustering, etc. (Optional)
- Demonstrate the feasibility of your design by implementing some of its basic features using python (Optional)
- Discuss your findings making recommendations for further investigation and improved implementation.
- Write a 1500 words report to present your work and findings.

Effort required

You are expected to demonstrate good effort in exploring the background of this problem, understanding the datasets, processing the data, developing meaningful AI system and implementing some basic aspects, and writing up your report. The coursework is worth 50% of the marks for this 20-credit module. A 20-credit module is nominally 200 hours of your time, some of which is spent in lectures, labs and private study. You should expect to be spending around 70 hours on this coursework.

Deadline for submission of report

The report must be submitted through Canvas before **3.00 pm Friday 29th Nov 2024**
Late submissions (without acceptable extenuating circumstances) will receive a mark of *zero*.

Number of students per submission
A maximum of 2 students will be allowed to present the same report. Each report must contain the names of both students. **However, each student must submit individually on Canvas.**

Report structure
You report (about 1500 words) should contain the information listed below.

- **Cover Page**: Title, author(s), affiliation of the author, date, and abstract
- **Introduction**: A rough overview of the studied AI application and its impact.
- **Background**: Here you are required to have an overview about the selected AI application. Then, you can describe relevant approaches and systems, or you can introduce basic concepts that are necessary for understanding the later material.
- **Methodology and Data**: This section contains an explanation, demonstration, description of the system architecture, or some interesting implementation techniques. Discussion of some targeted methods for solving this challenge/problem will be mostly encouraged. Description of the knowledge representation (datasets used and data processing issues) are discussed in this part. The development of the AI application is discussed in this part as well
- **Analysis and Discussions**: You need to present your findings and discuss, analyse, evaluate and/or criticise what you implemented and described in the previous part.
- **Conclusions and suggestions for future work:** the major findings from doing this coursework will presented in this section. You can comment on the lessons learnt from doing this coursework, advantages/limitations of your AI, resources needed to implement the full system, what would you differently if you had more time, etc
- **Bibliography and Citations**: It is imperative that whenever you make reference to a fact of some sort, you cite an authoritative source for that fact; most frequently, these sources will be scientific articles.

Specific Learning outcomes
This coursework will enable you to apply basic principles of AI in solutions that require problem solving, inference, planning, and learning. It will enable you to demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

Marking Scheme:

Criteria	>80%	70-80%	60-70%	50-60%	40-50%	39-25%	<25%
Presentation of the report (25%)	Fully adheres to student guidelines. Complete lack of spelling and grammatical errors. Excellent use of appropriate and scientific language. Excellent structure and organisation. Excellent readability.	Good degree of adherence to student guidelines. Lack of spelling and grammatical errors. Good use of appropriate language. Excellent structure and organisation. Good readability	Mainly adheres to student guidelines. Minor spelling and grammatical errors. Good use of appropriate language. Well-structured with logical organisation.	Some adherence to student guidelines. Some spelling and grammatical errors. Inconsistent use of appropriate language. Organisation and progression evident.	Little adherence to student guidelines. Many spelling and grammatical errors. Minimal use of appropriate language. Inadequate attention to structure and organisation	Does not adhere to student guidelines. Major deficiencies in spelling and grammar. Lack of appropriate language. A disorganised report with lack of evident structure.	No report submitted. Paperwork submitted does not constitute a meaningful report.
Description and achievement (25%)	Novel or innovative solution to AI-based application. Exceptional amount of high quality work, which could include comprehensive testing, or critical reviews, or results incorporated into prototype.	The AI system presented is meaningful, innovative challenging and possibly complex. Problem explicitly stated with precise explanation of all research objectives. Excellent analysis and recommendations.	A relevant and original topic which is effectively translated into project aims and objectives which are clearly stated. Good analysis and recommendations.	Appropriate problem area chosen. Objectives outlines with the main areas of investigation identified. Some analysis and recommendations.	Limited topic choice with the problem area poorly defined. Objectives vague or insufficient. Very limited analysis and recommendations. .	Simple or unoriginal problem showing lack of imagination. No analysis and recommendations	No software/project completed. No working software/project (does not apply to theoretical submission).
The demonstration of development capability (25%)	Signs of professionally developed AI concepts, excellent understanding of user requirements, excellent specifications and system requirements.	Fully developed AI concepts, fully-developed user requirement , fully developed specification and System requirement. Evidence of excellent	Evidence of developed AI concepts, developed user requirements, developed specifications and System requirements. Good understanding of	Partial in-depth development of AI concepts, Partial in-depth developed user requirements, Partial in-depth developed specifications and System requirements.	Limited development of AI concepts, limited developed user requirements, limited developed specifications and System requirements. Evidence of a	No or very limited development of AI concepts, no or very limited developed user requirements, no or very limited developed specifications and System	No demonstration given. System failed to work. Student could not explain working of software or technical aspects of project (does not apply to theoretical submission).

	Specification effectively interpreted with signs of original thinking and/or research.	understanding of AI-development process and applications.	the AI-development process and applications.	Evidence of a fair understanding of the AI-development process and applications.	limited understanding of the AI-development process and applications.	requirements. No evidence of understanding of the AI-development process and applications.	
Quality of work and understanding (25%)	Wide range of material investigated. Excellent evidence of critical evaluation and original thinking. Substantial number of appropriate references. Evaluation and recommendations fully and appropriately reviewed and presented. Excellent link to implementation. Research findings fully consider broader issues.	Good range of material. Good evidence of critical evaluation. Good number of appropriate references. Recommendations fully and appropriately reviewed and presented. Good discussion of implementation. Research findings discusses broader issues.	Focus on key areas using relevant sources. Good range of references with a varied bibliography. Clear recommendations identifying key issues. Research findings apparent with some consideration of broader issues.	Adequate information survey with some evidence of investigation of a key area. Appropriate range of references. Good bibliography. Recommendations identify some key issues. Research findings lack consideration of broader issues.	Limited sources of information used. Limited range of references. Limited bibliography. Limited recommendations. Lacking clarification of research findings.	Review of existing literature not evident. No references provided with limited or omitted bibliography. No recommendations. Conclusions do not link to research findings.	No understanding demonstrated. No conclusions. No future work suggested.