Artificial Intelligence Concepts

Assignment Brief

Contents

Module Details

Module code:	COM7032M	**Level of Study:**	7
Module Leader(s):	Dr. Sahar Ahmadzadeh (Director) Dr. Shamsuddeen Muhammad (Seminar lead)	**Credits: 15**	
Assessment format:	Portfolio (Anonymous) An artificial Intelligence portfolio of various instruments	**Method of submission:**	Turnitin within Moodle
Deadline or Assessment Period:	19th Dec 2024, 12Noon	**Feedback date and place:**	22nd Jan 2025, Turnitin within Moodle submission
Assessment limits: length, load, word count, etc.	N/A	**Component number:**	1
Is this exempt from anonymous marking under the policy?	No	**Component weighting:**	100%

Assignment Description

You are required to complete the below task:

Individual Assignment: 100 Marks

This coursework will assess your artificial intelligence-related skills in real life scenarios/problems.

You must work on your coursework, for example building **Intelligent Tutoring System for Math**. The topics provided in the assignment (Math, Chemistry, etc.) are very broad, so you must narrow down the topic to a small part that can be solved. For instance, teaching students how to calculate the area of different shapes, e.g., triangle, square, etc. Please make assumptions whenever needed to clarify and justify your point of view.

Deliverables:

Each student is required to produce and submit through Moodle the following requirements.

A report in word format. This report is expected to contain the following sections:

1. **Introduction**: to set the scene for the problem
2. **Project plan**: to explain who is doing what, milestones and other project planning aspects.
3. **Literature review:** to describe the state-of-the-art Intelligent Tutoring Systems. Hence, you are expected to list the main ITSs in your domain and criticise their structure, mechanisms, knowledge representation, interaction with users, etc.
4. **Development of your Intelligent Tutoring System**: to describe the domain you are working in, the steps you used to develop your ITS, any limitations, to mention but a few. A prototype of ITS in a specific domain (Math, Chemistry, etc.) based on your topic. This prototype should be developed using: (i) Protégé ontology development editor which will produce a web ontology language file (OWL) and (ii) any programming language (Java, Python, etc.) to create user interfaces.
5. **Conclusion**: to summarise the solution, lessons learnt and reflections.
6. **References**: to list all references used in creating your report. You should use Harvard referencing style.
   Here are some useful resources on how to do that, other resources can be found online: https://www.yorksj.ac.uk/students/referencing/referencing-guides/

The main purpose of your report is to describe your ITS and the steps carried out to develop it. However, you can discuss many issues, for example you can summarise

Assignment Description

the current development in ITS in your selected domain and present the software process you have used to produce your ITS. The process should highlight the key requirements, design and development phase, tools used, lessons learnt and future developments for your work. It will be extremely useful to conclude with Analysis and Reflection, where you as a knowledgeable researcher in AI domain, can present your analytical reflection on how to maintain the system, manage its evolution, and so on.

Learning Outcomes

You must successfully achieve the following Learning Outcomes to pass this assessment:

This coursework is designed to achieve the following PLOs:

7.2 Apply the findings of advanced scholarship and/or contemporary research and practice to the solution of computer science problems

7.3 Critically evaluate computer science problems, including those at the forefront of field.

7.4 Demonstrate operation within applicable professional, legal, social and ethical frameworks.

7.5 Demonstrate originality and creativity in the solution of computer science problems.

7.7 Apply standards, quality processes and engineering principles to the solution of computer science problems

Advice and Guidance

- The first and the second tasks **MUST Be** identical.
- Each assessment task will have its submission link and deadline.
- You are expected to submit original and reflective text. Please use proper referencing techniques to avoid plagiarism.
- There should be a full reference list at the end of the report.
- A high level of understanding of the subject must be demonstrated.

    It is important that the content is underpinned with the inclusion of relevant academic theory, concepts, and models where appropriate, as well as contemporary industrial insights. These should be accurately cited and referenced according to **York St John Harvard Referencing** throughout.

How is this assessment marked?

Your work will be marked according to the assessment instructions provided within this document and the selected Learning Outcomes' (LOs) (see above).

Furthermore, this assessment is marked using the assessment marking criteria or a similar rubric that aligns with the University's Generic Assessment Descriptors (see below).[1] This is to ensure all assessment decisions are comparable regardless of the discipline or mode of assessment.

Please note that you **must** meet the required baseline standards (50 – 59%) which will include the LOs and minimum expectations of the assessment. Further still, you must ensure you meet the requirements of each grade boundary to progress to the next, i.e., you should demonstrate your learning through the standards of the Pass, Merit and Distinction to reach a Distinction (70 – 84%). These standards are designed to scaffold and build your learning to achieve your fullest potential in each criterion being assessed.

Additional Information

If you require support with your study skills, please visit https://www.yorksj.ac.uk/students/study-skills/

Assessment Regulations

Please refer to the York St John University Code of Practice for Assessment and Academic Related Matters 2022-23.

We ask that you pay particular attention to the academic misconduct policy. Penalties will be applied where a student is found guilty of academic and/or ethical misconduct, including termination of programme (**Policy Link**).

You are required to keep to the word limit set for an assessment and to note that you may be subject to penalty if you exceed that limit. You are required to provide an accurate word count on the cover sheet for each piece of work you submit (**Policy Link**).

For late or non-submission of work by the published deadline or an approved extended deadline, a mark of 0NS will be recorded. Where a re-assessment opportunity exists, a student will normally be permitted only one attempt to be re-assessed for a capped mark (**Policy Link**).

An extension to the published deadline may be granted to an individual student if they meet the eligibility criteria of the (**Policy Link**).

Please see the assessment criteria below.

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[1] A rubric is a type of scoring guide that markers use to set out specific components and expectations for an assignment for their students. It is then used to guide the marking they undertake.

Deliverable	Skills Criteria	Description	Marks (%)
1. Introduction	**Thinking Skills**	Introduce the project, explaining the relevance of your ITS and the problem it addresses. Learner should demonstrate good knowledge of AI algorithms Techniques. Learners should provide a rationale for the choices they have made.	10
2. Project Plan	**Professional Conventions**	Provide a project plan, detailing roles, responsibilities, milestones, and project management approaches.	10
3. Literature Review	**Research Skills**	Review existing ITSs, critique their structure, mechanisms, and knowledge representation in your chosen domain.	10
4. Your Intelligent Tutoring System (ITS) Description & Development	**Thinking Skills** **And** **Practical and Professional Learning Skills**	**Description** Learner should identify the requirements for The Intelligent Tutoring System (Ontology & Application). Describe the steps in developing your ITS, including ontology creation, interface development, and limitations.	15
		Development Create a domain-specific ontology using Protégé, covering key concepts and relationships in your subject area.	20
		User Interface Development Develop a functional user interface using Java, Python, etc., which interacts with the ontology to guide the user.	10
		Integration and Functionality Ensure that the interface properly communicates with the ontology and provides a seamless learning experience.	5
5. Conclusion	**Thinking Skills**	Summarize the project outcome, lessons learned, and potential future improvements.	10
6. References	**Professional Conventions**	Provide a complete and correctly formatted list of references using the Harvard referencing style.	10

Marking Criteria

Pass Grade Bands (100 – 50) (Learning Outcomes must be met)
Fail Grade Bands (49 – 0) (Learning Outcomes are not met)

Assessors, please insert your own assessment marking criteria relevant this module which provides further detail and disciplinary specificity, etc. For more information on how to use the GAD to guide your assessment marking criteria visit Marking Criteria.

Criteria	Pass (50 – 59)	Merit (60 – 69)	Distinction (70 – 84)	Distinction (85 – 100)	Borderline Fail (45 - 49)	Fail (30 - 44)	Fail (0 - 29)	Marks
Introduction (Thinking Skills)	Basic understanding of AI techniques with a simple rationale for choices.	Good understanding of AI techniques with a clear and logical rationale.	Comprehensive understanding of AI techniques with well-reasoned rationale for all choices.	Outstanding insight into AI techniques with strong, insightful rationale.	Limited understanding of AI techniques with weak rationale.	Poor understanding of AI techniques with flawed rationale.	No understanding of AI techniques or rationale provided.	10 Marks
Project Plan (Professional Conventions)	The project plan includes basic roles, responsibilities, and milestones but lacks detail or clarity in some areas. Project management approaches are present but may be underdeveloped or inconsistently applied. Timelines are provided but may be somewhat vague or unrealistic, with milestones that are either too broadly defined or not well connected to the overall project objectives.	The project plan covers most roles and responsibilities, with key milestones identified. The use of project management tools and techniques is sound but may lack depth in certain areas, such as risk management or adaptation strategies. Timelines are mostly realistic, but some milestones may not be well-defined. Overall, the plan is functional but could benefit from more clarity or detail.	The project plan is thorough and clearly structured, covering most roles, responsibilities, and milestones in great detail. Appropriate project management techniques are used, and timelines are realistic. There may be minor gaps in detailing risk management or contingency plans, but overall, the project plan is well-considered and actionable. The plan demonstrates strong time management and task delegation skills.	The project plan is highly detailed and well-organized, covering all roles, responsibilities, and milestones with exceptional clarity. Includes comprehensive project management approaches (e.g., Agile, Waterfall, or Gantt charts), timelines, risk management strategies, and contingency plans. There is evidence of strong forward planning and adaptability, with clear assignment of tasks to individuals. Every milestone is clearly defined, achievable, and logically sequenced.	The project plan includes only minimal roles and responsibilities, with few milestones identified. Project management techniques are either not present or are poorly developed, and the plan lacks clear timelines or risk management strategies. Milestones may be overly broad or unclear, making it difficult to track project progress effectively.	The project plan is incomplete, with little to no mention of roles, responsibilities, or milestones. There is little evidence of project management approaches, and timelines are vague or absent. The plan does not offer a coherent structure for tracking progress, and key project phases are missing.	The project plan is either missing or extremely underdeveloped, with no mention of roles, responsibilities, or milestones. There is no evidence of any project management strategies or timelines, and the plan shows no meaningful attempt at forward planning.	10 Marks

Criteria							Marks
Literature Review (Research Skills)	Able to create a functional AI algorithm with basic sample data	Good technical ability: AI with relevant data; effective use of software	Strong technical skills; well-populated AI algorithm; and effectively retrieve complex information.	Exceptional technical skills: AI algorithm is well-optimized with advanced software; system thoroughly tested and secure.	Limited technical ability: AI algorithm is incomplete or lacks sample data.	Poor technical ability: AI algorithm is non-functional or lacks necessary data.	No technical ability demonstrated; no AI algorithm or analysis created.	10 Marks
Your Intelligent Tutoring System (ITS) Description & Development (Thinking Skills And Practical and Professional Learning Skills)	Basic identification of requirements; schema design with minimal Intelligent Tutoring System (Ontology & Application. The ontology covers basic concepts and relationships relevant to the subject domain but lacks depth and completeness. Certain key relationships may be missing, or the structure may be unclear. The interface is functional but may be rudimentary or less user-friendly. Basic interactions with the ontology are possible, but the overall design lacks polish or sophistication.	Good identification of requirements; schema design with focus on Deployment of the system to the production environment to compliance with security standards and best practices. The ontology includes most key concepts and relationships relevant to the subject domain. While the structure is generally clear, some relationships may be missing or underdeveloped. The user interface is functional but may lack some advanced features or be less intuitive. It interacts with the ontology, but the design could be improved in terms of usability or visual appeal. The interface communicates	Thorough requirements identification for Deployment of the system to the production environment to compliance with security standards and best practices. The ontology is comprehensive, covering most key concepts and relationships with a high degree of accuracy. The structure is logical and supports effective interaction with the ITS. The user interface is functional and easy to navigate. It integrates well with the ontology and provides a good user experience. All key features are present, though there may be minor room for	Exceptional identification of requirements; schema fully deployment of the system to the production environment to compliance with security standards and best practices with advanced optimization. The ontology is highly comprehensive, covering all relevant concepts and relationships with exceptional clarity. Demonstrates deep understanding of the subject domain, and the ontology is structured effectively for use in an ITS. Includes advanced features such as constraints, properties, and custom classes. Exceptional UI: Highly intuitive, visually appealing, and fully functional. Demonstrates a user-centered design that allows seamless navigation, interactive feedback, and clear interaction with the ontology. All required functionalities are present, and additional advanced features may be implemented. Flawless integration: The interface	Incomplete identification of requirements; schema lacks proper deployment of the system to the production environment to compliance with security standards and best practices. The ontology includes some key concepts, but it lacks coherence, and several important relationships are missing. The structure may be poorly organized. Minimal UI: The interface allows for basic interactions with the ontology but is not intuitive or aesthetically pleasing. Many functionalities may be underdeveloped or missing.	Poor requirements identification; weak schema design and lack of deployment of the system to the production environment to compliance with security standards and best practices. The ontology is incomplete, with many critical concepts and relationships either missing or incorrectly represented. The overall structure is unclear and difficult to follow. The interface is either non-functional or severely lacking in key features. It provides little or no meaningful interaction with the ontology, and the design	No identification of requirements; no schema or deployment of the system to the production environment to compliance with security standards and best practices. The ontology is either non-existent or includes very few concepts and relationships, with no discernible structure. Little to no effort is shown in domain representation. Non-functional UI: The user interface is missing or so incomplete that it does not enable any meaningful interaction with the ontology.	50 Marks

	The interface communicates with the ontology but may suffer from occasional inefficiencies, errors, or lags. The overall user experience may feel somewhat disjointed.	adequately with the ontology, though some interactions may feel slightly sluggish or inefficient. Some minor technical problems may arise, but they don't severely impact usability.	improvement in aesthetics or usability. Strong integration: The interface communicates effectively with the ontology, though minor inefficiencies may exist. Overall, the user interaction is smooth, with only occasional delays or small technical issues.	communicates seamlessly with the ontology. Interactions between the UI and ontology are smooth, with no noticeable delays or issues. The system operates efficiently with high responsiveness and appropriate feedback mechanisms.	Substandard integration: The interface struggles to communicate effectively with the ontology, resulting in frequent lags or technical issues that significantly affect user interaction.	is confusing or unresponsive. Major integration issues: The interface fails to communicate properly with the ontology. Errors, lags, or crashes are common, and the system is largely unusable.	No integration: The interface does not communicate with the ontology at all, or it is so broken that the system cannot be used.	
Conclusion (Thinking Skills)	The project outcome is summarized adequately, but some key aspects may be missing or not fully explained. The lessons learned are present but lack significant depth or critical reflection. Future improvements are mentioned but may be vague, lacking specific suggestions or clear rationale for how they would enhance the project.	The project outcome is summarized well, covering the major aspects of the project. The lessons learned show adequate reflection on both technical and project management aspects, though the depth of insight may be limited. Future improvements are identified, but they may be somewhat general or lack detailed justification. Overall, the summary provides a solid overview of the project with room for further elaboration.	The project outcome is summarized thoroughly, with a clear explanation of key achievements and challenges faced during the project. The lessons learned demonstrate a strong level of reflection, highlighting both strengths and areas for improvement. Future improvements are well thought out and feasible, showing a good understanding of potential next steps and areas that could be enhanced.	The project outcome is summarized in a highly insightful and comprehensive manner. Key achievements, challenges, and solutions are clearly identified and critically evaluated. The lessons learned are deeply reflective, showing profound understanding and self-awareness of both technical and non-technical aspects. Future improvements are innovative, realistic, and well-justified, showing excellent foresight and planning for potential project extensions or refinements.	The project outcome is summarized in a minimal way, with little detail on key accomplishments or challenges. The lessons learned are either very basic or unclear, showing limited reflection on the project experience. Future improvements are mentioned in passing but lack any meaningful detail or justification. The summary lacks cohesion and depth.	The project outcome is poorly summarized, with critical aspects either missing or inaccurately described. There is little to no reflection on the lessons learned, and any mention of future improvements is superficial or irrelevant. The summary demonstrates minimal engagement with the project's successes or challenges.	The project outcome is either not summarized or is so incomplete that it lacks any meaningful information. There is no mention of lessons learned, and future improvements are either non-existent or irrelevant. The summary shows no understanding or engagement with the project.	10 marks

References (Professional Conventions)	Basic report with some structure; Harvard citations are used but with errors.	Well-structured report; Harvard citations mostly accurate; some visual appeal in presentation.	Professionally structured report; accurate Harvard citations; results presented clearly and attractively.	Exceptionally well-organized and clear report; perfect Harvard citations; highly informative and visually appealing presentation.	Report lacks clear structure; Harvard citations poorly applied.	Report is poorly organized; citations are incorrect or missing.	No report or citations provided; presentation is confusing or absent.	10 marks