Algorithmic foundations and ethics in AI: from theory to practice course

Toolkit for synchronous sessions

CU3 | Algorithms and their limitations

Open answer formative assessment

Project number | 2022-1-ES01-KA220-HED-000085257

Open answer formative assessment*

* Instructors will find 2 potential formative assessment activities for this CU and can chose using any of them or both

Open answer formative assessment 1

	Description	Comments
Task description	This formative assessment aims to deepen students' understanding of the inherent limitations in machine learning algorithms. Students will engage in activities that highlight the challenges associated with data quality, model complexity, and the ongoing need for model updates. The exercise is designed to be thought-provoking and informative, suitable for students from various academic backgrounds.	
Description of how to do the task	**Scenario Analysis:** Students will read several brief scenarios that describe common problems faced when deploying machine learning models, such as overfitting, underfitting, and issues with data quality. **Reflective Responses:** Following the scenarios, students will answer diverse open questions that challenges them to identify potential solutions and consider the implications of these limitations in real-world applications.	
Estimated time to do the task	**Scenario Reading**: 5 minutes **Reflective responses:** 25 minutes	
Suggestion of sources for doing the task	Course booklet (CU3) and any other source that students might use.	
Detailed description of how to deliver the task	**Scenario Analysis:** Read the provided scenarios. Each scenario will present a problem and ask for the identification of the limitation demonstrated. **Reflective Quiz:** Respond to the short-answer questions based on the scenarios. Responses will automatically be recorded on the platform. Access the following slide to read the scenarios and the questions. This activity can be implemented either in a face-to-face scenario or in an online training setting (for instance using a forum, form, etc.).	The teacher should explain on where to return the assignment (e.g. by email, in a certain folder previously shared with the student, in an area created in the course structure on the e-learning platform...).
Information on the deadline for the task delivery	The teacher should set a deadline for the submission of this assignment (please note the structure of the course in terms of asynchronous work and synchronous sessions).	Give the date in the introduction session.
Contact information or how to clarify doubts	The teacher must provide a form of contact.	It could be an email address, a telephone number...

Open answer formative assessment 1

Scenario Analysis
Read the provided scenarios. Each scenario will present a problem and ask for the identification of the limitation demonstrated.

Reflective Quiz
Respond to the short-answer questions based on the scenarios (please use a maximum of 200 words per answer).

Scenarios for Reflection

Scenario 1: Data Quality Issues
A health tech company develops a model to predict patient drug responses but only uses data from a limited demographic. This results in poor model performance when applied to a broader population.

Scenario 2: Overfitting in Financial Modeling
A financial institution uses a complex neural network to predict stock prices. The model performs exceptionally well on historical data but fails to accurately predict future prices.

Scenario 3: Underutilized Computational Resources
A startup tries to implement a sophisticated image recognition system with limited hardware, which leads to excessive processing times and a delayed product launch.

Questions

1. What potential biases could arise from the data used in **Scenario 1,** and how might they affect the predictions?
2. In **Scenario 2,** what signs indicate that the model might be overfitting?
3. What solutions could address the computational challenges faced in **Scenario 3**?

Open answer formative assessment 2

	Description	Comments
Task description	**Quick AI impact reflection:** participants will briefly reflect on the impact of artificial intelligence (AI) in a specific sector. They must choose one of the sectors discussed in the course content (such as Finance, Healthcare, E-commerce, etc.), and briefly outline key AI applications and their implications.	
Description of how to do the task	• **Choose a sector:** pick one sector from the provided list in the course materials. • **Identify key AI applications**: note one or two prominent AI applications in this sector based on the course content. • **Reflect on implications:** write a short paragraph discussing the potential benefits and challenges of these AI applications in the chosen sector.	
Estimated time to do the task	30 minutes	
Suggestion of sources for doing the task	• Course materials provided for each sector. • Personal notes from class discussions and lectures. • Internet and academic databases.	
Detailed description of how to deliver the task	**Format:** write a 400-500 word reflection. **Submission:** post your reflection directly in the designated discussion board/forum on the course's learning management system (LMS) or submit through a form or email as specified by the instructor. **Evaluation:** the reflection will be assessed for understanding of AI applications and ability to succinctly discuss their implications.	The teacher should explain on where to return the assignment (e.g. by email, in a certain folder previously shared with the student, in an area created in the course structure on the e-learning platform...).
Information on the deadline for the task delivery	The teacher should set a deadline for the submission of this assignment (please note the structure of the course in terms of asynchronous work and synchronous sessions).	Give the date in the introduction session.
Contact information or how to clarify doubts	The teacher must provide a form of contact.	It could be an email address, a telephone number...

THANK YOU

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