

Design Challenge Project: How AI Can Be Used in Education

Objective:

The objective of this project is for each team to research, design, and present a solution on how artificial intelligence (AI) can be used to enhance learning experiences, streamline administrative tasks, and personalize educators and learners, identifying practical and innovative ways to integrate AI into the education system.

Problem Statement:

In this challenge, each team will investigate and propose a solution on using AI to address a specific educational need or challenge. The project can cover various aspects, such as personalized learning, smart tutoring systems, predictive analytics for student performance, or automating administrative tasks like grading and attendance tracking.

The project will evaluate the team's ability to:

1. **Identify a Relevant Problem:** Teams must choose a specific educational problem that AI can help solve, such as improving engagement, assisting teachers, or addressing learning gaps.
2. **Develop an AI-Driven Solutions:** Using AI concepts, teams will design a solution to address their chosen problem, detailing how it would work, its potential impact, and the resources required.
3. **Present and Justify the Solution:** Teams should explain the reasoning behind their chosen solution, discussing its advantages, limitations, and feasibility.

This challenge emphasizes creativity in problem identification, understanding of AI's capabilities, and practical application in educational settings.

Key Milestones:

1. **Initial Selection:**
 - a. A team of judges will review all submissions and select the top 3-5 teams from this category during the week of Feb. 10th, 2025
 - b. Teams will present their projects and conduct demos in the Design Studio
2. **Finals:**
 - a. The Demo Fest will take place in the ERC Atrium the week after Reading Week.
 - b. Finalists will showcase their projects to a broader audience, including judges, peers, and faculty.

Resources and Materials:

- **Access to AI software and Tools:**
 - **Description:** Teams will have access to AI software and platforms, such as Google Cloud AI, Microsoft Azure Cognitive Services, for open-source tools like TensorFlow and PyTorch.
 - **Importance:** These tools will enable teams to experiment with AI algorithms, build models, and demonstrate basic functionality, even without extensive programming.
 - **Provision:** Each team will receive a list of recommended tools and tutorials to help them get started with AI for their project.
 - **Access to hardware:** Raspberry Pi, Arduino
 - **Additional Resources:**
 - **Workspaces and Testing Areas:** Each team will have access to workspace areas equipped with computers, internet access, and any necessary software for development and research.
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Rules and Guidelines:

- **Power Source**
 - Not applicable, as this project is a design and research challenge rather than a physical build.
- **Participants Constraints**
 - Capstone projects are not allowed.
 - Priority is given to students in years 1-3.
 - Only Engineering students, including international students in Engineering, are eligible.
- **Construction/Design Requirements**
 - **Team Composition:** Teams must consist of 1 to 4 members, with a recommended distribution of roles.
 - **Scope Limitation:** Solutions should focus on practical applications of AI within the education system and avoid overly complex models or tools beyond the project's timeframe and resources.
 - **Ethical Considerations:** Teams must consider ethical implications, including privacy concerns, bias in AI algorithms, and accessibility.
- **Judging Criteria**
 - **Problem Relevance and Understanding (20%)**
 - **Description:** Clear identification of a critical problem, supported by thorough research
 - **Creativity and Innovation (25%)**
 - **Description:** Original and feasible solution, demonstrating innovative approaches in design or application
 - **Solution Design and Functionality (30%)**

- **Description:** Well-structured and functional design, with a clear workflow and practical implementation.
 - **Presentation and Documentation (15%)**
 - **Description:** Effective and well-organized presentation, supported by comprehensive and clear documentation.
 - **Practical Feasibility and Considerations (10%)**
 - **Description:** Demonstration of practical feasibility and consideration of key challenges, such as ethical concerns, usability, or scalability.
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Expected Timeline:

- **Preparation Phase:**

- **Phase 1: Problem Identification and Research**

- **Objective:** Teams will explore various AI applications in education and identify a relevant problem to address.
- **Activities:** Research current AI use cases, discuss problem areas, and select a specific focus for the project.

- **Phase 2: Initial Solution Planning**

- **Objective:** Develop a high-level solution concept and outline the workflow of the proposed AI application
- **Activities:** Define solution objectives, map out components, and begin exploring available AI tools.

- **Phase 3: Solution Development and Testing**

- **Objective:** Create a prototype or detailed design document of the AI solution.
- **Activities:** Build or simulate the proposed solution, test its functions, and make refinements.

- **Phase 4: Documentation and Final Adjustments**

- **Objective:** Compile all documentation, finalize designs, and prepare presentation materials.
- **Activities:** Finalize design elements, polish the documentation, and rehearse presentations.

- **Competition Phase:**

- **Demo: Final Presentations and Judging**

- **Date and Venue:** The presentations will be held on Thursday Feb. 27th 2025, with details on timing and location provided in advance.
 - **Setup:** Teams will have time to set up their presentations and test any digital components
 - **Presentation and Judging:** Each team will present their solution, followed by a Q&A session. Judging will evaluate the project based on the outlined criteria, with awards for top-performing teams.
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Group Sizes and Roles:

- **Team Size**
 - **Recommended Number of Participants:** Each team should consist of **1 to 4 members**. Smaller teams (1-2 members) are suitable for participants who are comfortable with multiple responsibilities, while larger teams (3-4 members) allow for a more focused division of tasks.
 - **Suggested Roles**
 - **Project Manager / Team Leader**
 - **Responsibilities:** Oversees the entire project timeline, organizes team meetings, and ensures tasks are progressing on schedule. The team leader also communicates with mentors or competition organizers for guidance or clarifications.
 - **AI Researcher**
 - **Responsibilities:** Conducts research on existing AI applications in education, identifies potential data sources, and ensures that the solution is aligned with real-world needs.
 - **Solution Designer**
 - **Responsibilities:** Designs the AI solution, maps the workflow, and creates the architecture or prototype of the AI model.
 - **Presentation and Documentation Specialist**
 - **Responsibilities:** Manages the project's documentation, prepares the presentation, and ensures all materials are clear and well-organized
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Prizes:

- \$1,000 for the winner in each category.
- \$500 for the runner-up in each category.
- Total prize pool: \$4,500.