College of the Sciences and Mathematics Undergraduate Student Research Award

1. Budget:
   1. Expenses
   2. Justification:

The purpose of this research is to outline the use of Unreal Engine 5 to test AI and Machine Learning algorithms, including r\* and other popular algorithms. The project will aim to test the AI and Machine Learning algorithms under different conditions within Unreal Engine 5 environment to see how they will perform and adapt to different scenarios.

Unreal Engine is a very powerful game engine that needs a computer with powerful capabilities such as a GPU. We will use this engine to model realistic environments for testing different AI and Machine Leaning algorithms. This engine will allow us to build and deploy applications on different platforms, including PC, consoles, and mobile devices. The engine’s ability to create a realistic environment is an excellent tool to test AI algorithms' performance.

We will achieve this by testing different AI and Machine Learning algorithms in the Unreal Engine 5 environment, including R\* and other popular algorithms. Implementing different scenarios that will challenge the AI and Machine Learning algorithms, including navigation, obstacle avoidance, and decision-making. Measuring the algorithms' performance under different conditions and analyzing the results to identify areas for improvement. Optimizing the algorithms' efficiency and effectiveness based on the results analysis.

The research will be conducted following a review of the existing literature on AI and Machine Learning algorithms and their applications in gaming environments will be conducted to identify the most popular algorithms and their performance. Then creating A realistic environment will be created using Unreal Engine 5, including different terrains, obstacles, and assets that will challenge the AI and Machine Learning algorithms. Following this we will implement different AI and Machine Learning algorithms in the environment and test it under various conditions, including navigation, obstacle avoidance, and decision-making. Then the algorithms will be optimized based on the results analysis to improve their efficiency and effectiveness.

There will be multiple deliverables that will be produced during the research which will include a literature review on the used of AI and Machine Learning algorithms in multiple gaming environments. A report on the implementation of different AI and Machine Learning algorithms in Unreal Engine 5 and their performance analysis. An optimized version of the AI and Machine Learning algorithms that perform better in the Unreal Engine 5 environment.

Recommendations for improving the efficiency and effectiveness of the algorithms in gaming environments.

The research proposes the use of Unreal Engine 5 to test AI and Machine Learning algorithms' performance under different conditions. The research will contribute to the field of AI and Machine Learning by identifying areas for improvement and optimizing algorithms' efficiency and effectiveness in gaming environments. The results of the research can be applied to various gaming applications, including game development and artificial intelligence.