American International University-Bangladesh (AIUB)

Department of Computer Science
Faculty of Science & Technology (FST)

Generative Immersive Education with AR

A Software Engineering Project Submitted
By

Semester: Summer_21_22		Section:	Group Number:	
SN	Student Name	Student ID	Contribution (CO1+CO2)	Individual Marks
1	Ammar Bin Mahmud	22-46524-1		
2	Muhtadi Mansib	22-47083-1		
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5	MD. Tahsin Hasib	22-46026-1		

The project will be Evaluated for the following Course Outcomes

	Total Marks	
CO1: *Analyze* the impact of software engineering models over various context of software development to assess societal, health, safety, legal and cultural issues.	Total Marks	
Project Background Analysis and feasibility (needs, goal, benefits, etc.)	[5 Marks]	
Analysis the impact of societal, health, safety, legal and cultural issues	[5Marks]	
Review of existing Studies and Relevant Example	[5Marks]	
CO2: *Explain* appropriate software engineering model, project management roles and their skills in the context of professional engineering practice and solutions to complex engineering problems in a software development environment.	Total Marks	
Appropriate Process Model Selection and Argumentation with Evidence	[5Marks]	
Evidence of Argumentation regarding process model selection	[5Marks]	
Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report	[5Marks]	

Description of Student's Contribution in the Project work

Student Name:
Student ID:
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2

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Signature of the Student

Student Name:
Student ID:
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2

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Signature of the Student

Student Name:
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Contribution in the Project:
- Contribution Description 1
- Contribution Description 2

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Signature of the Student

1. PROJECT PROPOSAL

1.1 Background to the Problem

When it comes to meaningfully developing knowledge and effectively interacting, the traditional classroom approach frequently falls short. Students often receive knowledge as a passive learning paradigm such as teachers or textbooks. Many educational concepts are taught in an abstract form without meaningful connections to the real world which hinders their ability to apply it in real-world situations and limits their ability to remember it. Moreover, many students feel struggling and frustrated with the educational process because the one-size-fits-all approach to education does not account for a variety of learning styles and preferences.

The root cause of the problem lies in the limitations of conventional education systems, which often struggle to engage and immerse learners effectively. This problem is crucial to address as it impacts the effectiveness of education in various domains, hindering the development of critical skills and knowledge in learners. Numerous STEM (Science, Technology, Engineering, and Mathematics) concepts continue to be taught in analog ways within traditional classrooms. Despite the rapid advancements in technology, many educational institutions still rely on conventional methods, such as textbooks and static visual aids, to convey complex STEM concepts. This persistence of analog teaching methods poses a significant challenge as it limits the dynamic and interactive nature of STEM education.

1.2 Solution to the Problem

Our solution is to develop an immersive learning system using Augmented Reality (AR) with assisted hardware. This system will help students and teachers alike to visualize, interact and simulate specific scenarios and procedures implemented by 3D projection technology.

At the very basic, the system can help visualize complex mathematical problems with graphs and appropriate visuals. One can easily select any equation and see it in 3D space to analyze the shapes and equations in real life. Teachers can create engaging spatial content for their students. As this device will be used for education it is necessary that the control remains to the teachers. So our device will have a portal where the teacher can manage every students devices. What

apps they can use, how long they can interact with it. They can even take exams in a controlled environment where every app and resource will be either blocked off or unavailable made by the teacher. The device can use it's GPS to automatically geo-fencing the virtual environment. Students can set a different set of apps for school and different learning resources for home. Students can use this device to revise their notes or skim through lecture videos when they're stuck in traffic jam. Our target users are teachers and students belonging to educational institutions. The field of AR is not very new but the advancement in this field has only caught up recently because we did not have enough computing power in the past for this kind of projects. But now we can easily run these solutions on ARM mobile SoCs. Many of the mobile processor even comes with Neural and Visual engine to support the computation that our device needs. This project is feasible more than ever before and in future with the advancement of CPUs this will only go lower. Some existing solutions include Zappar, Quiver or Google Expeditions AR (Currently merged with Google Arts & Culture), which range from interactive textbooks, 3D learning experiences to virtual explorations. Our system extends the existing solutions by adding a language interface, immersive reading experience, a 3D model view for pre-specified structures to improve understanding the design and simulation of related procedures.

Rubric for Project Assessment (CO1)

Marking Criteria	Marks Distribution (Maximum 3X5=15)				Acquired Marks
	Inadequate (1-2)	Satisfactory (3)	Good (4)	Excellent (5)	
Background Analysis	No background information regarding the project is given; project goals and benefits are missing.	Insufficient background information is given; project goals and benefits are poorly stated	Sufficient background information is given; the purpose and goals of the project are explained.	Thorough and relevant background information is given; project goals are clear and easy to identify.	
Analysis the impact of societal, health, safety, legal and cultural issues	Student vaguely discuss the impact of societal, health, safety, legal and cultural issues in their project	Student provided with partial relevance to the impact of societal, health, safety, legal and cultural issues in their project	Student fairly provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project	Student comprehensively provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project	
Existing Studies and Relevant Example	Ambiguous representative example.	Partially identify / indicate towards real-life example.	Real-life example is fairly connected towards the definition.	Comprehensively defend with real life example.	
				Acquired Marks:	
				CO Pass / Fail:	

Rubric for Project Assessment (CO2)

Criteria	Marks distribution (Max 3X5= 15)				Acquired Marks
	Inadequate (1-2)	**Satisfactory (3)**	**Good (4)**	**Excellent (5)**	
Argumentation of Model selection with Evidence of Argumentation	Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model	Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice	Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model	Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient amount of evidence to support argument for the model selection	
Role identification and Responsibility Allocation	The project has poor project management plans for identifying roles and assigning the responsibilities	Identify few roles in the project management where some of the roles are left alone with any project responsibilities	Identify most of the roles in the project management and assign their responsibilities	Well planned project with proper role identification and responsibility allocation in the project management activities	
Submission, Completeness, Spelling, grammar and Organization of the Project report	Project report is not complete and Several errors in spelling and grammar. Present a Confusing organization of concepts, supporting arguments, and real-life example. Sentences rambling, and details are repeated.	Some errors in spelling and grammar. Some problems of organizing the answer in a logical order of defining, elaborating, and providing real-life examples.	Few errors in spelling and grammar. Presents most of the details in a logical flow of organization in definition, details, and example.	Project report is complete and No errors in spelling and grammar. Consistently presents a logical and effective organization of definition, details, and real-life example of the topic.	
				Acquired marks:	
				CO Pass / Fail:	