IT4010 – Research Project - 2024

Topic Assessment Form

Project ID : R25-056

1. Topic (12 words max)

Prehistoric VR simulations as educational content

2. Research group the project belongs to

MR - Mixed Reality

3. Specialization of the project belongs to

Interactive Media (IM)

4. If a continuation of a previous project:

Project ID	
Year	

5. Brief description of the research problem including references (200 – 500 words max) – references not included in word count.

When it comes to learning prehistoric life, traditional teaching mediums like museum displays, Infographics, and books frequently fall short of providing an interesting or hands-on experience. The public's understanding of Prehistoric Animals, Plants, and environments is limited by static displays and one-way learning methods, especially for contexts that no longer exist in the present world. This lack of immersion reduces curiosity and hinders deeper learning in students.

The use of virtual reality in prehistoric studies is still relatively unexplored, given its growing popularity in education. The majority of VR apps now concentrate on simple visualizations rather than building dynamic, interactive environments that highlight prehistoric animal movement, Extinction events and the Ecological evolution. Furthermore, the use of smart AI to replicate realistic animal behavior and environmental changes has not been fully realized in these kinds of situations.

By creating a virtual reality simulation that lets people explore and engage with AI-driven ecosystems, the proposed study aims to close these gaps. This system will provide a unique and engaging learning environment by simulating animal behaviors, Ecological evolution milestones and major extinction events happen in Mesozoic era. The project aims to change prehistoric education by using technological innovation, making it interesting for learners of all ages.

6. Brief description of the nature of the solution including a conceptual diagram (250 words max)

Virtual reality prehistoric simulations that take viewers to the early ages (Mesozoic Era) for educational reasons is the answer. It has four main components

Component 1 – Virtual Guide enhanced by Spatial awareness

- When User roam around a Virtual prehistoric environment, User can communicate with a Virtual guide and receive verbal responses enhanced by spatial awareness

Component 2 – Prehistoric Animal Behavior Simulation

- User can simulate animal behaviors in the simulation to observe and understand prehistoric animal behaviors better.
  ex: Hunting patterns of a particular animal

Component 3 – Prehistoric Extinction Event Simulation

- Simulating Prehistoric Extinction events, that user can trigger and experience and understand the changes happen before and after the extinction
  ex: User can trigger the massive asteroid impact happen on earth

Component 4 – Prehistoric VR Timeline

- Let users experience, interact, learn about the prehistoric ecological evolution focusing the most important ecological evolutionary milestones happen in a specific Era (Mesozoic) using memory retentive, focus improving learning methods

7. Brief description of specialized domain expertise, knowledge, and data requirements (300 words max)

ML / AI Implementations and Virtual Reality Development

- Expertise in creating AI components for realistic and interactive behaviors.
- Skill in developing immersive virtual reality experience.

Scientific knowledge

- Knowledge of Prehistoric eras to ensure animal behaviors and occurrences are accurate.

3D Modeling and Animation

- Skills in creating prehistoric environments and animating prehistoric elements.
- Ability to Modify 3D models if necessary

Game Engines

- Proficiency in using game engines (Unity) to make interactions and implement, deploy the VR application
- Use of Unity ML agent for Machine learning

VR Testing and Technology

- Access to VR testing setups.
- Familiarity with VR hardware and software for testing and deployment.

8. Objectives and Novelty

Main Objective

To design, create, and test VR simulations and a virtual guide that enhance learning for students and the general public by improving immersion, engagement, range of content and memory retention.

Member Name	Sub Objective	Tasks	Novelty
Ilangamveera M M	• Deliver concise and engaging content on Mesozoic ecosystems in a short time • Enhance knowledge retention using VAK learning modes (kinesthetic, auditory, visual) and pre-questions & gamifications	• Environment creation • Animate animal activities • UI creation • Implement gamifications • Implement proper pre-questions to enhance user focus. Curiosity • VR implementation • Test the success of the component with user testing	Existing Solutions are • Do not incorporate methods that improve memory or attention. • Rely on one-way learning, offering little to no participation or interaction for learners.

Kodithuwakku A K	• Create AI animals with different behaviors – using fuzzy logic to decide whether they flee or fight based on health, type, and confidence. • Show how AI makes virtual worlds more engaging – proving that intelligent, interactive animals improve user experience. • Test the AI in real-time – measuring how well the animals interact and whether the simulation runs smoothly.	• Create 3d models • Animate them for different behaviors • Animations should adapt to different parameters	The integration of machine learning–based adaptive animal behaviors into immersive VR simulations of prehistoric ecosystems, going beyond visual reconstruction to create believable, autonomous, and interactive experiences that are currently absent in museum and educational VR contexts.
Dissanayake J S	• To create an immersive VR simulation of the KPG extinction event. • To enable users to visualize the environment before	• Create environments • Animate KPG extinction event and users should be able to trigger it to experience it	There are no detailed interactive simulations that show how extinction events happen in early ages, and show the difference of before and after a particular event

	and after the asteroid impact. • To allow interactive exploration of prehistoric life and its changes during the extinction.	• Ability to compare the before and after the extinction event	
Waynath S P K	• Enable the ability to communicate verbally with the virtual guide • Enable spatial awareness capabilities • Use a 3D model to humanize the experience	• Train a chat bot to ask questions verbally and get answers / have a conversation about prehistorical species • Enable spatial awareness capabilities.	There are no educational virtual guides that help users with special awareness

9. Supervisor details

	Title	First Name	Last Name	Signature
Supervisor	Mr.	Ishara	Gamage	
Co-Supervisor	Mr.	Nushkan	Nizmi	
External Supervisor				
Summary of external supervisor's (if any) experience and expertise				

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Topic Assessment Form

<u>This part is to be filled by the Topic Screening Staff members.</u>

a) Does the chosen research topic possess a comprehensive scope suitable for a final-year project?

Yes		No	

b) Does the proposed topic exhibit novelty?

Yes		No	

c) Do you believe they have the capability to successfully execute the proposed project?

Yes		No	

d) Do the proposed sub-objectives reflect the students' areas of specialization?

Yes		No	

e) Supervisor's Evaluation and Recommendation for the Research topic:

IT4010 – Research Project - 2024

Topic Assessment Form

Acceptable: Mark/Select as necessary

Topic Assessment Accepted	
Topic Assessment Accepted with minor changes*	
Topic Assessment to be Resubmitted with major changes*	
Topic Assessment Rejected. Topic must be changed	

* Detailed comments given below

Comments

Staff Member's Name	Signature

*__Important__:

1. According to the comments given by the evaluator, make the necessary modifications and get the approval by the **Evaluator**.
2. If the project topic is rejected, identify a new topic, and request the RP Team for a new topic assessment.