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Title: Immersive Learning through Augmented Reality for Children’s Quality Education

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**Abstract**

This thesis is about an Augmented Reality (AR) application with simulated 3D models where children can study in 360°degree immersive and interactive learning experience. This application offers opportunities to revolutionize educational methodologies and improve learning outcomes, particularly for children. It is designed as a teaching aid for shaping and enhancing the quality of education. This thesis will introduce the concept of Metaverse technology (Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR) and Extended Reality (XR)) and their applications in educational sector, especially my focus here, Augmented Reality (AR). This AR application will be built with Unity Software Development and Vuforia Engine which will detect and track image target by comparing natural features from the camera image against a known target resource database. This application offers a captivating learning environment where children can study English vocabularies with interactive and entertaining 3D models, improving kid’s vocabulary skills.

**Objectives:**

The objectives of this thesis are:

* To support “Quality Education” for all children with the integration of AR technology
* To develop an AR 360°degree application, enhancing vocabulary skills for children
* To provide as a teaching aid, addressing the challenge of limited teaching resources in Myanmar
* To be an inspiration for future Metaverse projects

**Problem Statement**

Every child has the fundamental right to quality education. In Myanmar, ensuring access to quality education for children remains a biggest challenge, caused by factors such as limited number of teaching aid resources, insufficient infrastructure, and teacher shortages. Quality education is not only essential for individual citizen empowerment but also plays a crucial role in the development of a country. However, traditional teaching methods is not enough in meeting the diverse learning needs of children, particularly in resource-constrained environments. In response to these challenges, the emergence of the Metaverse technology, comprising Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR) and Extended Reality (XR), represents a unique opportunity to solve educational challenges, shaping the future of learning for children. This thesis proposes a solution by using Augmented Reality (AR) technology as a teaching aid to revolutionize traditional teaching methods and upgrade the quality of education for Myanmar children. By using Unity software development and Vuforia Engine, this study aims to develop an AR 360°degree app specifically designed to improve children's English vocabulary skills, engaging with simulated 3D models in a 360°-degree immersive and interactive learning experience.

**Datasets**

This thesis titled “Immersive Learning through Augmented Reality for Children’s Quality Education” includes vocabulary dataset in which a collection of English vocabularies flashcard images and 3D Model dataset where their associated 3D models will be pop up in the surface of these image target. There will also be audio dataset about pronunciation, virtual 360°degree viewing angle feature, and the control of these 3D models. Image targets will be created with the Vuforia Target Manager using JPG or PNG images in RGB or grayscale. The size of the input images must be 2.25 MB or less and a minimum width of 320 pixels.

**Background Theory**

**Augmented Reality (AR) Technology:**

Developing AR application includes concepts such as image detection and tracking, spatial mapping, and rendering virtual content in real-world environments.

**Image Target (Image Tracking, Feature Extraction):**

Image Target feature will be used with the Vuforia target Manager for image recognizing and tracking. Feature extracted from these images are stored in a cloud or device database, of which the latter can be downloaded and packaged together with the application.

**3D Modeling:**

Blender will be used for 3D modeling, which involves creating a three-dimensional representation of an object or scene. The models simulates and capture the shape and appearance of real-world objects, rendering them in digital form.

**Mobile App Development (Unity Game Engine):**

My app will be built on Unity Engine which allows developers to create apps that run across various platforms, including iOS, Android, Windows, macOS, and more.

**System Flow Diagram**

Vuforia Target Manager

Match A-Z vocab visual’s features

No

Yes

End

360 degree view and pronunciation audio

Augment 3D objects

Detect?

Image

Target

Capture Video frame

Start