AR Zoo Card Project Documentation

1. Project Title

AR Zoo Card An Augmented Reality Based Educational App

2. Project Description

The AR Zoo Card is an interactive Augmented Reality application developed using Unity and Vuforia.

The app brings educational animal flashcards to life by rendering 3D animal models and playing realistic sounds when a card is scanned through the camera. When a specific image target (animal card) is detected, its corresponding 3D model appears on the screen with a relevant sound effect such as a lion roaring or a bird chirping providing a fun and immersive learning experience for children.

3. Tools & Technologies Used

- Unity 3D: Game engine used to build and deploy the AR application
- Vuforia Engine: AR SDK integrated with Unity to detect image targets and display 3D models
- 3D Models (FBX): Free animal models (.fbx format) downloaded from free 3D asset websites
- Audio Clips: Realistic animal sounds associated with each 3D model (roars, chirps, etc.)
- Image Targets: Predefined animal images used as AR markers for model recognition

4. Key Features

- Image Target Detection: Recognizes printed animal cards through the camera.
- 3D Model Display: Renders lifelike animal models on top of image cards.
- Audio Playback: Plays corresponding animal sounds when a model appears.
- Mobile Ready: Optimized for mobile devices using Unity build support.

5. Implementation Overview

A. Setting Up Vuforia in Unity

- Created a Unity 3D project.
- Imported the Vuforia Engine from Unity Package Manager.
- Configured ARCamera and added ImageTarget prefabs in the scene.

B. Preparing Assets

- Downloaded FBX animal models (Lion, Elephant, Bird, etc.) from free 3D model websites.
- Imported sound files matching each animal's real sound.
- Linked each model and sound to its corresponding ImageTarget in Unity.

C. Interaction Logic

- Attached models as children of ImageTarget objects.
- Added AudioSource component to play sound when target is detected.
- Used simple Unity scripting (C#) for managing sound triggers.

6. Resources Used

3D Model Sources

- Free3D (https://free3d.com/)
- TurboSquid (https://www.turbosquid.com/)
- Sketchfab (https://sketchfab.com/)

Audio Clips

- Freesound (https://freesound.org/)
- Zapsplat (https://www.zapsplat.com/)

Image Targets

- Custom animal images used as markers, uploaded to Vuforia Target Manager.

7. Future Enhancements

- Add touch-based interactivity to animate animals (e.g., lion walks).
- Include educational voiceovers with animal facts.
- Expand animal library and support for multiple targets on one screen.

8. Conclusion

The AR Zoo Card project effectively blends education and entertainment using augmented reality. It makes learning about animals more engaging for young learners through visual and auditory experiences. By leveraging tools like Unity and Vuforia, the project demonstrates how AR can transform simple printed materials into dynamic digital content.