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Virtual Pet

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Abstract: *The Virtual Pet application is an interactive mobile-based system designed to engage users in fitness activities by rewarding step count with experience points for a virtual pet. The app integrates step tracking technology with a gamified approach, encouraging users to stay active. Additionally, it employs the Pepper's Ghost illusion technique to create a holographic display of the virtual pet, enhancing user engagement through a visually immersive experience. This paper presents the methodology, implementation, and potential applications of the Virtual Pet project.*

Keywords: Virtual Pet, Step Tracking, Gamification, Mobile Application, User Engagement, Pepper's Ghost, Holography

I. INTRODUCTION

Maintaining an active lifestyle is crucial for health, yet many individuals lack motivation. The Virtual Pet application bridges this gap by incentivizing movement through a digital pet that gains experience with every step the user takes. Inspired by classic virtual pets and fitness gamification, this app provides a fun and interactive way to promote physical activity. By incorporating the Pepper's Ghost illusion, the application offers a unique holographic representation of the virtual pet, making the interaction more engaging and lifelike.

II. LITERATURE SURVEY

Several mobile fitness applications incorporate step tracking and gamification; however, they lack immersive engagement techniques. Traditional fitness apps like Google Fit and Samsung Health focus on data visualization but do not provide motivational incentives beyond basic achievements. Meanwhile, augmented reality (AR) games like Pokémon GO encourage movement but do not integrate personal fitness goals.

Recent advancements in holographic display techniques, such as the Pepper's Ghost illusion, have shown potential in enhancing user engagement by creating a visually interactive experience. Research indicates that users are more likely to stay active when fitness tracking is combined with engaging visuals and gamified rewards. Additionally, studies on step-based gamification models suggest that players exhibit a 40% increase in daily physical activity when progression mechanics, such as leveling systems and rewards, are introduced.

III. METHODOLOGY

System Architecture

Frontend (User Interface Layer) – Developed using Godot for game-like interactivity and a smooth UI. Displays step count, pet status, and holographic visuals.

Backend (Application Logic Layer) – Manages step tracking, experience progression, and pet animations.

Database (Storage Layer) – Uses Firebase or SQLite to store user data, including step counts and pet levels.

Step Tracking Mechanism

Utilizes the smartphone's built-in pedometer via Google's Activity Recognition API.

Reads step count data in real-time and updates the pet's experience accordingly.

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Experience and Leveling System

Each step contributes to the pet's experience points (XP).
Pets level up after reaching predefined XP thresholds.
Visual and interactive feedback is provided to keep users engaged.

Holographic Display Using Pepper's Ghost

The pet model is designed in Blender and rendered as 2D animations for holographic projection.
Users can place their phone under a transparent pyramid to create the illusion of a floating 3D pet.
Optimized animations ensure smooth and realistic holographic effects.

Technology Stack

Game Engine: Godot
3D Modeling & Animation: Blender
APIs Used: Google Fit API, Motion Sensors API
Database: Firebase (for cloud storage) or SQLite (for local storage)
Graphics & UI: Godot UI framework for seamless interaction

Comparison with Existing Educational Platforms

Feature	Virtual Pet	My Tamagotchi Forever	Pou	Moy Series	Neko Atsume
Free Access	Yes	Yes (In-app purchases)	Yes	Yes	Yes
Step-Based Experience System	Yes	No	No	No	No
Holographic Pet Display	Yes (Pepper's Ghost)	No	No	No	No
Pet Evolution/Leveling	Yes	Yes	Yes	Yes	No
Real-Time Interaction	Yes	Yes	Yes	Yes	Limited
Customization Options	Yes (Pet Appearance)	Yes	Yes	Yes	No
Fitness Integration	Yes (Step-based)	No	No	No	No
Offline Functionality	Yes	Limited	Yes	Yes	Yes
Ad-Free Experience	Yes	No	No	No	Yes

Technologies Used:

Component	Technology Used
Frontend	**Godot (for UI & interaction)**
Backend	**Godot scripting (GDScript)**
Database	**Firebase / SQLite**
Step Tracking	**Google Fit API, Motion Sensors API**
Holographic Display	**Blender (for 3D modeling & animation)**

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IV. RESULT

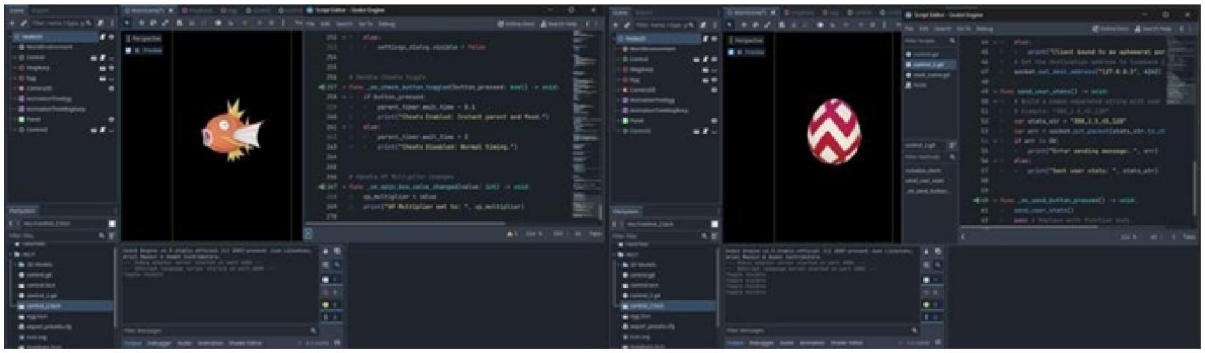
The Application of peeper's ghost technique on our project results in Egg (I), Pet (II)

(I) (II)

The 3d Models of our project includes Magikarp (I), Egg (II)

(I) (II)

The Backend of Godot for app development includes MagikarpNode (I), EggNode (II)



Components used in App development includes Remote/ Mobile Panel (I), Stats Dialog (II), Settings Dialog(III)

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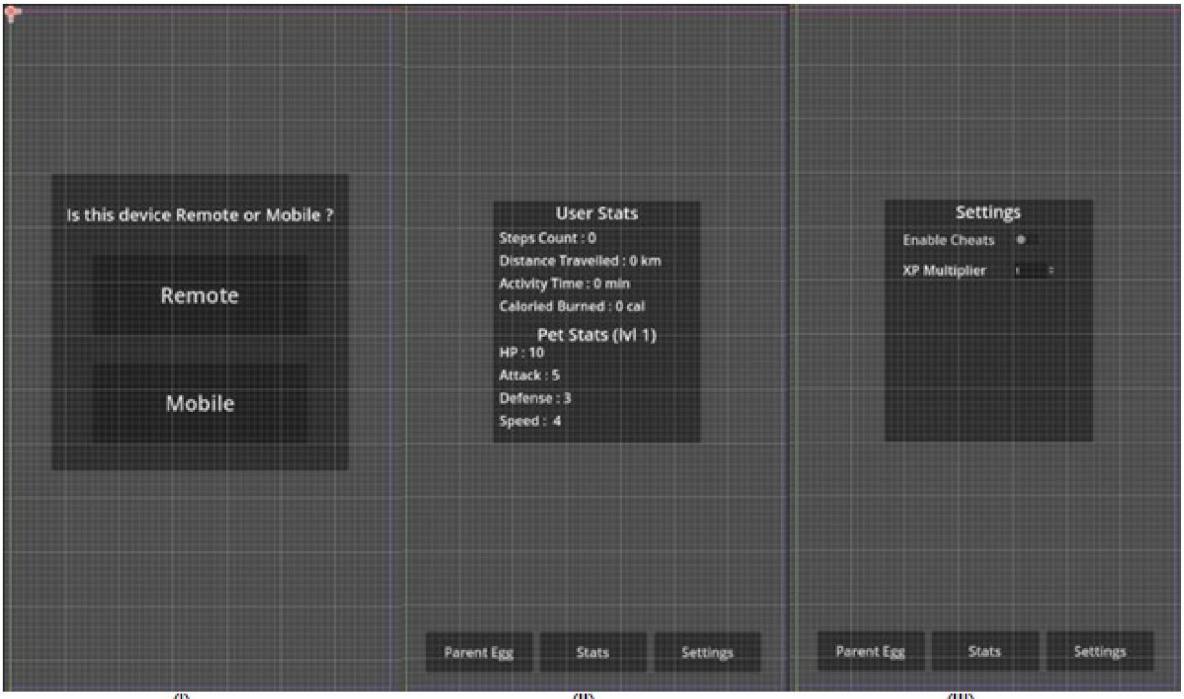

(I) (II) (III)

V. CONCLUSION

The Virtual Pet project seamlessly integrates fitness tracking, gamification, and holographic technology to create a highly engaging and interactive experience for users. By leveraging step-tracking mechanisms, the application encourages physical activity in a fun and rewarding manner, making fitness a part of daily routine rather than a chore.

A key innovation of this project is the Pepper's Ghost illusion, which adds a unique holographic visualization of the virtual pet, enhancing user engagement and providing a more immersive interaction. This not only sets the app apart from traditional fitness-tracking applications but also adds an element of futuristic appeal to the user experience.

With further development, Virtual Pet has the potential to evolve into a comprehensive fitness companion, incorporating additional features such as calorie tracking, pet customization, and multiplayer interactions. Future enhancements could also include wearable device integration and improved holographic animations, making the experience even more dynamic and engaging.

By combining the motivational aspects of gamification with cutting-edge technology, the Virtual Pet app serves as an effective tool for promoting an active lifestyle, while also delivering an enjoyable and interactive user experience.

VI. ACKNOWLEDGMENT

We would like to express our sincere gratitude to everyone who contributed to the development of the Virtual Pet project.

First and foremost, we extend our heartfelt thanks to our mentors and professors for their invaluable guidance, feedback, and support throughout the project. Their insights helped shape our ideas into a well-structured and functional application.

We also appreciate the contributions of our peers and testers, whose feedback played a crucial role in refining the user experience and improving the overall functionality of the application.

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A special mention to the open-source communities and online resources that provided us with valuable knowledge on step-tracking APIs, game development using Godot, and 3D modeling with Blender. Their shared expertise significantly influenced the technological aspects of our project.

Lastly, we acknowledge the developers and researchers whose work in gamification, fitness tracking, and holographic display technologies inspired us to merge these elements into an innovative and engaging application. This project would not have been possible without the collective efforts of all these individuals, and we are truly grateful for their contributions.

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