**Traffic Sign Quiz**: A Mobile Game Application with Image Recognition for TL Mabuhay Driving Lesson Academy Inc.

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6. **Related Works**

According to Nagar (2022), proper knowledge and adherence to traffic signs and regulations are crucial for all individuals, particularly those obtaining a driving license, as it significantly reduces the likelihood of accidents occurring. Furthermore, Hussain and Shi (2019) highlight that the lack of professional driver training in Pakistan, with drivers relying on non-professional instruction, increases the likelihood of road traffic accidents (RTAs), motivating the need for professional training. The study by Purnamasari (2019) reveals that, on average, 77.11% of drivers understood 32 traffic signs correctly, with variations between male and female respondents, but violations were observed despite good understanding. Additionally, an analysis by Hassan et.al (2022) demonstrates that road users exhibit a relatively low level of awareness (43%) of traffic signs, with age, education, and years of driving experience influencing comprehension. Borrego-Jaraba et al. (2020) emphasize the significance of road sign recognition skills and propose a gamified approach, while Tran and Tran (2020) propose a mobile-based system combining deep learning algorithms and game-based learning principles for traffic sign recognition. Barmpounakis et.al (2019) implement a mobile-based serious game utilizing CNN models for real-time traffic sign recognition, enhancing learning and understanding. Similarly, Li et.al (2017) integrate traffic sign recognition technology into a game-based application for interactive and engaging learning. Lastly, Ertan (2020) trains a CNN model with annotated data for real-time traffic sign recognition on a mobile device.

**Gaps**

Existing studies have already delved into and suggested a gamified approach to underscore the importance of traffic signs. However, there remains a pressing need to enhance knowledge and training concerning traffic signs and regulations among individuals. To address this gap, the inclusion of pre-assessments can have a significant impact on improving users' understanding and retention of traffic sign-related knowledge.

**II. Problem of the Study**

Traditional methods of studying traffic signs, such as reading manuals or attending classroom sessions, may not be engaging or effective for everyone. It is important to bridge this knowledge gap and provide an accessible, enjoyable, and interactive learning experience that caters to individuals with varying learning styles.

Traffic signs play a crucial role in ensuring road safety. However, many individuals face challenges in obtaining their driver's license due to a lack of knowledge about various traffic signs. Without proper understanding and recognition of these signs, individuals may fail their exams and be unable to acquire their license, which can limit their mobility and access to opportunities.

**Specific Problem**

The specific problem addressed is the lack of knowledge and understanding of traffic signs among individuals, leading to difficulties in passing the LTO licensing exam and potential risks to road safety. Traditional learning methods are not engaging or effective for everyone, highlighting the need for an interactive tool to help individuals memorize and comprehend traffic signs, improving their exam success and promoting road safety.

**III. Object of the Study**

The main objective of this thesis is to develop an image recognition game, "Traffic Sign Quiz," designed to assist individuals with limited knowledge of traffic signs in improving their understanding and recognition of these signs. By creating an enjoyable and interactive learning experience, the game aims to help users memorize traffic signs and prepare them for the Land Transportation Office (LTO) licensing exam.

**Specific Objective**

1. Create a fun, interactive game called "Traffic Sign Quiz" that tests players' knowledge of traffic signs by using machine learning to correctly recognize and identify different signals in real-world situations.
2. Evaluate the effect of the "Traffic Sign Quiz" game on users' capacity for traffic sign recognition and comprehension, consequently raising users' chances of passing the LTO licensing exam. This will be accomplished by assessing users' knowledge prior to and after playing the game and evaluating their performance.

**IV. Scope and Limitation**

This study focuses on developing and evaluating the effectiveness of the "Traffic Sign Quiz" game as a tool for improving users' recognition and understanding of traffic signs. The scope includes designing an interactive game using image recognition technology to detect and identify traffic signs in real-life scenarios. The study will assess users' performance and gather feedback to evaluate the game's impact on users' knowledge and preparedness for the LTO licensing exam.

**Limitation**

limitation of the "Traffic Sign Quiz" game is its reliance on image recognition technology, which may be affected by variations in lighting conditions, image quality, and occlusions. This can result in challenges and potential inaccuracies in correctly identifying and recognizing traffic signs, leading to misleading learning experiences for users. Additionally, the game requires a constant internet connection due to its dependency on online databases or cloud-based resources for accurate detection. This limitation restricts the usability of the game in areas with limited or no internet access, limiting its availability and effectiveness in such locations or situations.

**V. Tech Stacks**

* Game Development: Unity is essential for creating the "Traffic Sign Quiz" game, providing a robust framework for developing interactive and engaging experiences.
* Cross-Platform Compatibility: Unity enables seamless deployment of the game across various platforms, ensuring wider accessibility and reach for users.
* TensorFlow for Unity: TensorFlow for Unity is a plugin that enables the use of TensorFlow, a machine learning framework, within Unity. It can be utilized for training and deploying custom image recognition models for detecting and classifying traffic signs.

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