ARtEYE: Augmented Reality Text & Eye-Enhancer

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Introduction

Myopia, or nearsightedness, is a rapidly increasing global vision issue, with 3,361 million people suffering from it worldwide. Getting eyewear prescriptions usually requires visiting a doctor, leading to extra costs and inconvenience. Augmented reality (AR) devices, while not traditional solutions, have the potential to significantly complement standard eyewear.

Objectives

- Complement traditional eyewear for myopia patients with an AR device.
- Seamlessly blend AR into daily life for ease of use.
- Link with Google AI and ChatGPT for improved digital interaction.

Solution

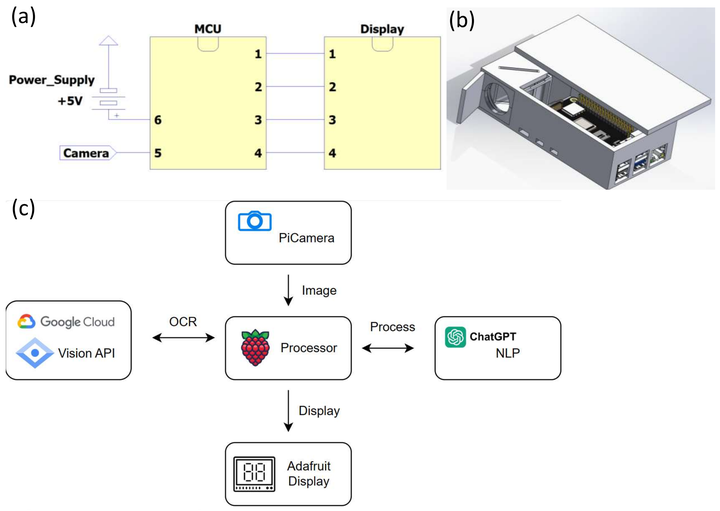


Figure 1: Design

ARtEYE comprises: (a) electronic circuits for image capture, information processing, and text display (b) an optical setup for text magnification and light redirection, along with a housing that holds all physical components (c) integrated software for controlling electronic I/O and AI-powered text recognition.

Results

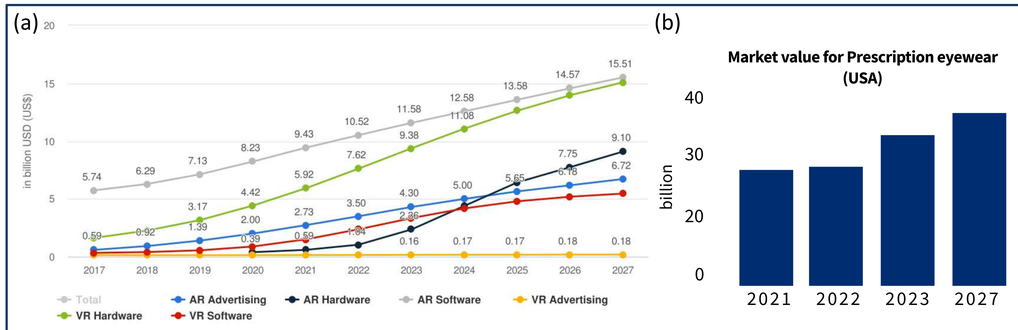


Figure 2: Promising Market.

(a) The prescription eyewear market was **33.83 billion USD** in 2023 in the U.S. alone.

(b) Global AR market will be valued at over **$36 billion** by 2026.

Figure 3: Competitive Analysis

ARtEYE offers a cost-effective solution for those seeking to experience the benefits of hands-free and comfortable technology without making a significant financial commitment.

Features	Hololens	Pokémon Go	Apple Vision Pro	ARtEYE
Portability	✗	✓	✗	✓
Affordablility	✗	✓	✗	✓
Compatible with eyewear	✓	✗	✓	✓
Comfort	✗	✓	✗	✓
Immersion	✓	✗	✓	✓

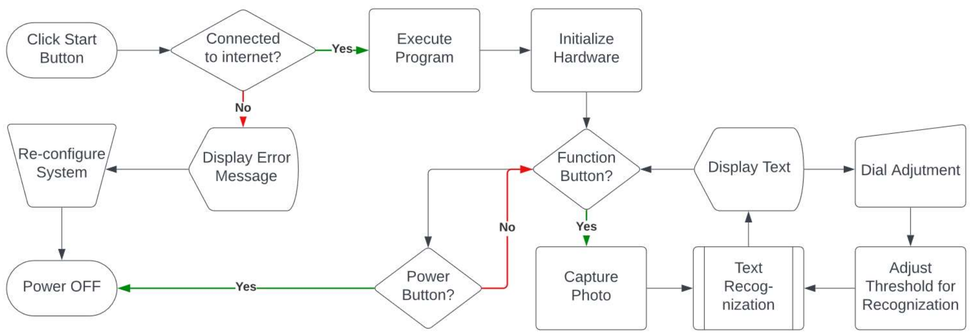


Figure 4: Workflow

Workflow demonstrating the interaction between the electronic circuit and the embedded software.

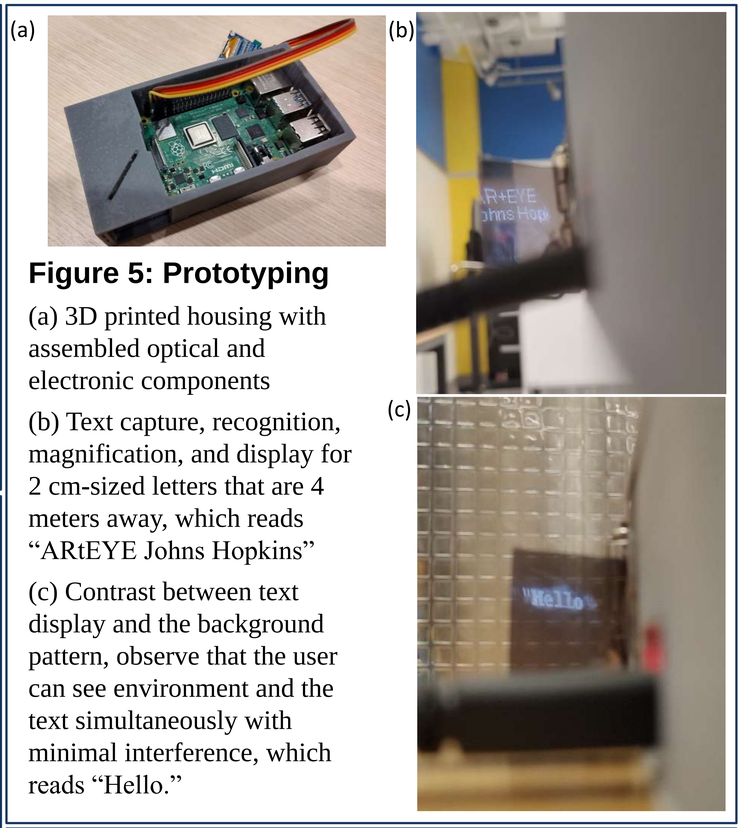


Figure 5: Prototyping

(a) 3D printed housing with assembled optical and electronic components

(b) Text capture, recognition, magnification, and display for 2 cm-sized letters that are 4 meters away, which reads "ARtEYE Johns Hopkins"

(c) Contrast between text display and the background pattern, observe that the user can see environment and the text simultaneously with minimal interference, which reads "Hello."

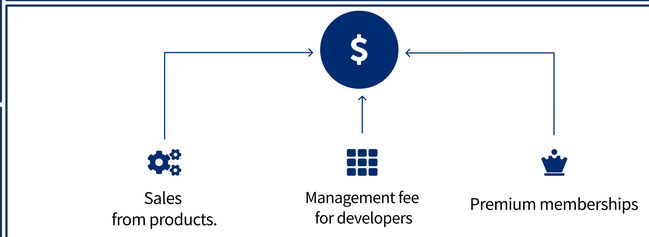


Figure 6: Business Model

Our business model centers around developing and selling high-quality, portable, AI-enhanced augmented reality products tailored to the needs.

Conclusion

ARtEYE simplifies AR technology, seamlessly integrating with text-based platforms like ChatGPT for a user-friendly experience in various settings. The prototype successfully performs text recognition and displays the enlarged text over the objects in real-world, and we will incorporate modular design to meet more needs of a larger group of consumers.