# ClearSight 👁️

AI-Powered Vision Aid for People with Partial Vision Loss

## 🔍 Problem

Over 100 million people suffer from partial vision loss due to conditions like corneal scarring, keratoconus, or glare sensitivity. These users are not fully blind — but still struggle to read signs, navigate safely, or see faces.  
  
Current smart vision aids are:  
- Too expensive (₹3–6L)  
- Bulky and inaccessible  
- Not personalized

## 💡 Our Solution

ClearSight is a smartphone-based vision enhancement app that uses real-time AI filters to help users with partial vision see more clearly — using just their Android phone.  
  
Core Features:  
- Zoom & Magnification  
- Contrast Enhancement  
- Edge Detection  
- OCR (Text Recognition)  
- Text-to-Speech (Audio Feedback)

## ⚙️ How It Works

1. Input: Live video from the phone’s camera  
2. Processing: Filters applied via OpenCV + ML Kit OCR  
3. Output: Enhanced video shown fullscreen on the phone screen with optional voice feedback  
  
Users can:  
- Use the phone like a digital magnifier (handheld)  
- Mount it using a monocle/headband for hands-free use

## 🧰 Tech Stack

|  |  |
| --- | --- |
| Layer | Stack |
| App Platform | Android Studio (Java/Kotlin) |
| Camera Feed | CameraX API |
| Vision Processing | OpenCV |
| Text Recognition | Google ML Kit OCR / Tesseract |
| Audio Feedback | Android TextToSpeech API |
| UI/UX Design | XML Layouts / Material UI / Figma |
| Version Control | Git + GitHub |
| (Optional AI) | MediaPipe / TFLite |

## ✅ Benefits

- Low-Cost: Uses existing smartphones, no smart glasses required  
- Accessible: For people in low-income or rural regions  
- Personalized: Filters can be tuned to user’s visual needs  
- Impactful: Built for real people, real use cases

## 🧪 Use Cases

|  |  |
| --- | --- |
| Scenario | Feature Used |
| Reading bus signs | Zoom + Contrast + OCR |
| Shopping | Edge Detection + TTS |
| Navigating indoors | Edge Highlighting + Fullscreen Mode |
| Elder care support | OCR + Text-to-Speech |

## 🎯 Roadmap

- Add per-user vision mapping  
- Voice-controlled filter switching  
- Testing with clinics or vision NGOs  
- Mount-ready version for monocle glasses

## 📖 Story Example

“Rani, age 54, can’t read signs clearly due to corneal haze. With ClearSight, she can navigate the train station and read menus — independently, using just her phone.”