DynamEye

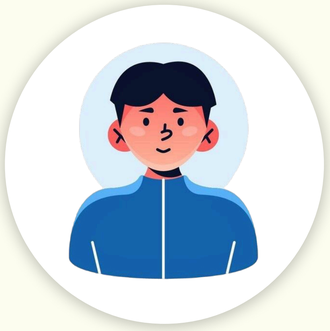
Vision Without Limits

UNIVERSITY of WASHINGTON | GLOBAL INNOVATION EXCHANGE

SECONDARY RESEARCH

- **Prevalence & onset** – RP is the most common inherited retinal disease (1 in 4000; > 1.5 million people). Night-blindness and loss of peripheral vision, progressing to tunnel vision and possible blindness.
- **Diagnosis** – Confirmed with a dilated eye exam, visual-field testing, electroretinography (ERG), optical coherence tomography (OCT), and genetic panels.
- **Current management** – No cure yet; low-vision devices and vision-rehabilitation training help maximize remaining sight.
- **Life impact** – Field loss disrupts mobility, work, social activities, and hobbies, heightening anxiety, depression, and income instability.
- **Economic burden** – High out-of-pocket costs for assistive tech, home modifications, and frequent specialist care compound financial stress.

Primary Persona



The Determined Student

"My goal is to earn my degree on time, stay active on campus at night, and keep my independence even as my sight changes."

Age Group

18 – 25 (university sophomore)

Stage of RP

Early-stage, autosomal-recessive onset — night-blindness and mild peripheral loss; still retains good central vision.

Goals

- Finish computer-science degree on schedule and secure an internship next summer
- Stay socially active on campus after dark (game nights, concerts, late study sessions)
- Keep driving privileges long enough to maintain independence in a suburban college town

Pain Points

- Anxious about navigating dim dorm corridors and poorly lit lecture halls
- Needs extra time to read dense code on bright monitors, causing eye strain and missed deadlines
- Fear of losing driver's license limits off-campus jobs and spontaneous trips with friends

Needs

- A way to see far-off lecture slides or white-boards clearly, without walking closer
- A way to catch obstacles at the edges of vision before bumping into them
- A solution that is affordable on a student budget and easy to pair with his laptop/ phone

Secondary Persona

The Resilient Provider

"I want to keep my stay active in my community and support my family—even as tunnel vision narrows what I can see."

Age Group

40 – 55 (small-business owner and mother of two teens)

Stage of RP

Mid-to-late stage, autosomal-dominant — pronounced tunnel vision, color distinction difficulty; no night driving.

Goals

- Keep her artisanal-bakery business profitable without relying on personal driving
- Maintain an active social life with family and church groups, especially evening events
- Prepare financially and emotionally for eventual central-vision loss

Pain Points

- Crowded farmers' markets and cluttered kitchen surfaces lead to frequent bumps and spills
- High cost of screen-reader software and countertop video magnifier strains budget
- Feelings of isolation when declining night outings; worries about burdening her teens

Needs

- A way to bring distant text, faces, or signs "closer" instantly while working or shopping
- A way to widen what she can see so she doesn't miss people or obstacles at the edges
- A solution that is low-cost, comfortable for all-day wear, and easy to learn

PRODUCT TECHNOLOGY

Core Technologies

- Flutter Framework: Cross-platform UI development
- TensorFlow Lite: On-device machine learning for object detection
- Image Processing Pipeline: Custom conversion and optimization for mobile devices
- Adaptive Threshold System: User-configurable sensitivity for different environments

Neural Network Implementation

Our implementation utilizes SSD MobileNet for efficient on-device detection:

- Input: 300×300 RGB images (uint8 tensor format)
- Processing: Frame skipping optimization (every 3rd frame)
- Output: Detection boxes, class indices, and confidence scores
- Categories: 80+ object classes for comprehensive scene understanding
- Performance: 10 FPS detection rate with battery optimization

System Structure