

Advancements in Low Vision Rehabilitation in more detail

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I Have no financial interest in any product mentioned in this lecture.

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Students often ask me Why do I talk to myself



Sometimes I need expert advice.

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Macular Degeneration

- Primarily a loss of central vision
- Estimate > 20 million in US
 - > Under 5% population age 40-50
 - > 30% population by age 80 -84
- Around 2 million with advanced AMD
- About 50,000 new cases of blindness each year from AMD

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Indoor Navigation and Shopping

- ARIA app - A free (usually) app for iPhone /android / tablets
- Walmart, Target, Gucci, Starbucks
- Professional visual interpreters to find & describe items, help checkout



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Indoor Navigation and Shopping

Walmart | ARIA in Stores & Online | Visual Interpreting On Demand



Paula Margeson
Walmart customer and ARIA user

The more technology allows me to be independent.

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Indoor Navigation and Shopping

- ARIA Access Partners Include
 - > Some airports
 - > Some Universities – Western WA U.
 - > Some museums
 - > Some transportation agencies – C-Tran, Vancouver
 - > Some government agencies
 - > Some entertainment places

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Indoor Navigation and Shopping

- ARIA Cons
 - > Some applications described as user-unfriendly, slow, and difficult to use'
 - > Slow performance at times
 - > Inconsistent support across services
 - > Not in all major big stores

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Navigation

- Lazarillo app
 - > Voice guidance for outdoor and indoor navigation
 - > Interactive digital maps for navigation indoor and outdoor
 - > Free for iPhone / androids



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Navigation



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Navigation

- Lazarillo app pros
 - Free for iPhone / androids
 - User friendly
 - Customizable – text to speech speed, amount of information available
 - Comprehensive guidance – turn by turn directions and announces street names, intersections, points of interest

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Navigation

- Lazarillo app cons
 - Internal voice conflicts making hard to understand in certain situations
 - Inaccurate business data –
 - ↳ some outdated/fictional
 - Limited external voice integration

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Envision

- Envision AI app for smart phones
 - OCR/Text to speech in many languages (>60)
 - Object recognition & identify previously taught faces
 - Scene descriptive – “there’s a table...”



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Envision 

- Envision AI app
 - Describe images
 - Find people in crowds
 - Scan barcodes
 - Answers questions about scene text, etc.



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Envision 

- Envision AI app Cons
 - Not hands free
 - Depending on lighting, camera quality, recognition less reliable
 - Using camera + AI drains battery
 - Some features may require internet
 - Learning curve
 - Costs: \$40/yr or \$200 lifetime, but some basic core features are free

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Envision app + Envision smart glasses

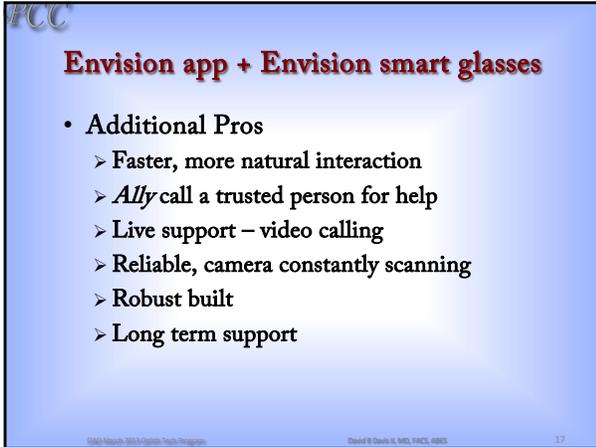
- Many versions: \$1900 - \$3500
 - Built in camera constantly “see” what is in front and describes it
 - Fully hands free
 - OCR Text to speech
 - Scene/object description
 - Face recognition (learned)
 - Light and color detection
 - AI is built on Chat GPT-4 base



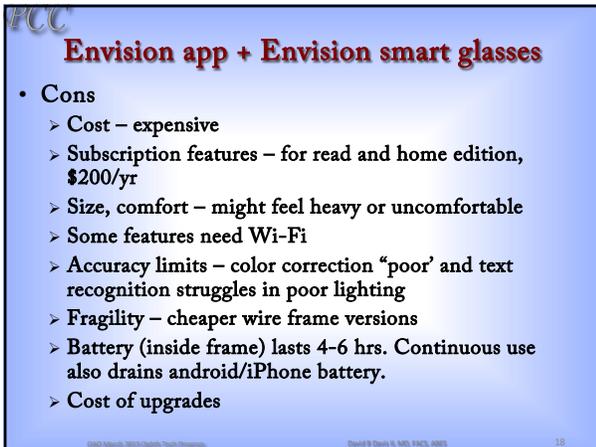
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Ally Solo Smart Glasses

- A cheaper \$700 (\$599) lightweight, simpler smart glasses that is primarily designed for navigation, reads, object recognition.
- Compact, comfortable, wearable
- Long battery life
- AI assistant “Ally” runs via a companion smartphone app
- Can use with envision AI, but not all of envision features work with it



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Ally Solo Smart Glasses



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Ally Solo Smart Glasses Cons

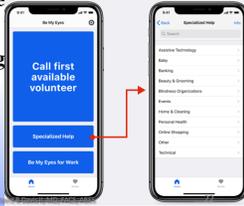
This video was made by professionals under all the special hinges needed, support, Wi-fi, etc. Not that well developed yet.

- Mixed User experience / reliability issues
- Inconsistent AI results and occasional errors
- Dependence on voice/potentially awkward in noisy environment
- Learning curve and usability frictions
- Price
- Not a replacement for true vision – still limited. Not AR glasses that project vision. Don't see the world, get descriptions.
- A promising but still evolving assistive tool

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Be My Eyes App

- **Be My Eyes Volunteers**
 - This app connects users with volunteers or AI agents to describe images, read text, or provide visual support.
 - Totally free
 - Over 2m volunteers world-wide
 - For real time events – camera
 - Send fotos, text, etc. for reading
 - App Icon



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AI Powered Apps – BeMyEyes Virtual Volunteer (Beta)

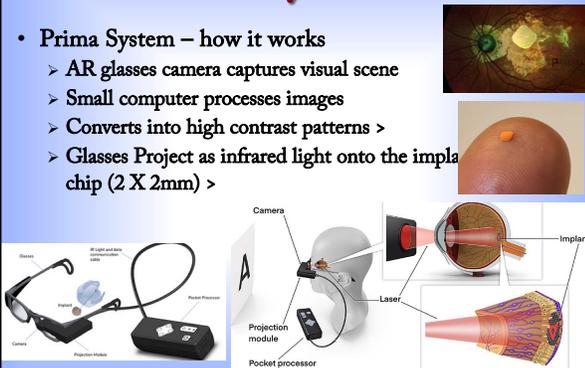


Be My Eyes can be paired with Ray Ban Meta Smart Glasses Barilla cookings. 9.5m live volunteers

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Bionic Vision System – for GA

- **Prima System – how it works**
 - AR glasses camera captures visual scene
 - Small computer processes images
 - Converts into high contrast patterns >
 - Glasses Project as infrared light onto the implan chip (2 X 2mm) >



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Bionic Vision Systems

- Prima System for GA – how it works
 - Convert light into electrical impulses
 - Mimic the natural activity of retinal cells
 - Stimulating the remaining healthy inner retinal neurons (bipolar & ganglion cells) > optic nerve

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Prima System for GA

- 38 patients, VA $\leq 20/320$ in at least one eye
- 84% patients had increase 5 lines vision
- Mean VA remained stable after implantation
- Takes many months for patient to learn to see with this
- The visual field GPT says about 7 degrees ????
- No significant 12 moth complications

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Prima System for GA

- Prima System Update 10/25
 - Limited by only Black and white 100u pixels, 378/chip
- Future in development
 - New chip: 20u, up to 20,000/chip
 - Chip with full grayscale – allow facial recognition
 - Potential to 20/80 and with electronic zoom 20/20?
 - Awaiting FDA approval for next stage

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Other Aids

Time does not permit me to discuss other Low Vision Aids at this time. In your notes, at the end of this presentation are a few slides on optical and electronic magnification devices.

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What I have learned from 91 years of living

MY ENTIRE LIFE CAN BE SUMMED UP IN ONE Sentence...

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WELL, THAT DIDN'T GO as planned

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Optical & Electronic Magnific



- Merlin Elite Pro 24"
 - > Large screen Magnifier – full HD 1080
 - > Zooms – up to 70x with autofocus
 - > Change Contrast, background
 - > Easily identified controls for visually handicapped
 - > OCR / Text to speech - >30 languages
 - > XY table easily movable
 - > Can be used as monitor for computer or tablet

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Cons of Merlin

- Heavy - > 40 lbs - needs dedicated desk space
- Expensive – about \$4650
- Learning curve for those not familiar with assistive tech
- Needs dedicated power outlet
- Latency – Like all CCTVs, there may be some small latency or lag compared to looking with your own eyes
- OCR can misread depending on quality of print and paper

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Others



- There are multiple types and sizes on the market
- There are lightweight portable optical& electronic magnifiers
- This is a rapidly changing environment now that AI is here.

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