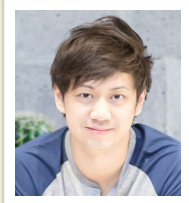


Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Beyond 20/20 vision: the Mojo smart lens

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Getting an alert or notification on your eye might sound like something from a science fiction movie, but a California tech start-up hopes to make this a reality in only a few more years. On January 15th 2020, Mojo Vision unveiled the world's first "smart contact lens" with a display the size of a grain of sand. While there are numerous applications for such a device, the company has said it will first focus on helping people with vision impairment.² Imagine a lens that can detect text on signs in the distance that is too small to read, and then display this information more clearly for the wearer. Or magnify text at a reading distance in people with low vision due to retinal pathology and project the image onto a part of the retina that remains functional. It is envisaged that the Mojo lens will eventually be developed with augmented reality possibilities for applications in the military, emergency services, and commercial sectors.²

Embedded on a rigid, scleral-size contact lens, the Mojo lens' display squeezes an impressive 70,000 pixels into less than half a millimetre.² The display is designed to project directly onto the fovea. This efficient design helps reduce the power and light required for the technology to work. The advanced imaging system is supported by several micro-components, including a microprocessor and an image sensor. The lens currently draws its power from a tiny-solid state battery, which can be recharged in the lens case at the end of the day.² Mojo has revealed that future iterations may include wireless power through an external device worn around the neck. The smart lens will be paired with a smart phone or similar device in order to send and receive data.

Research and development for the Mojo lens began in in 2008, with the company officially being launched in 2015.² The team behind the Mojo smart lens consists of some of Silicon Valley's most seasoned entrepreneurs and engineers from Google, Apple, Amazon, HP, Microsoft, Motorola, Infinera, and Agilent, as well as vision science experts from companies such as CooperVision, Abbott, Johnson & Johnson, Medtronic, Philips Healthcare, and Zeiss Ophthalmology.⁴ To date, the start-up has raised \$108 million in venture capital from Google's Gradient Ventures, Stanford-StartX Fund, Khosla Ventures, and New Enterprise Associates among others.²

Despite the numerous breakthroughs, there are still many hurdles that the company must still address. The main engineering challenge now will be to unite and integrate the various micro-components into a seamless smart contact lens. On the regulatory side, the company is working under the FDA's Breakthrough Devices Program to ensure their lens' safety and efficacy as a medical device.² There are also concerns with privacy associated with a smart contact lens that continuously collects and transmits personal information. In spite of all these challenges, the company is very optimistic that it will be able to launch their smart contact lens display in just a few years. So if you're looking for something beyond 20/20 vision, keep an eye out for the Mojo smart lens.

REFERENCES

1. Smart Contact Lens: 'It Feels Seriously Sci-Fi'. *BBC News* https://www.bbc.com/news/av/technology-51137379/smart-contact-lens-it-feels-seriously-sci-fi?fbclid=IwAR0Qqm49ogi_SoR54R2x6MJQk_njp34kAM3lgQL06kbHTnbXKL0l8IsKycU.
2. The Making of Mojo, Ar Contact Lenses That Give Your Eyes Superpowers. *Impact Lab* <http://www.impactlab.net/2020/01/18/the-making-of-mojo-ar-contact-lenses-that-give-your-eyes-superpowers/>.
3. 'Invisible Computing' Startup Unveils Smart Contact Lens. *Daily Times* <https://dailytimes.com.pk/542072/invisible-computing-startup-unveils-smart-contact-lens/>.
4. Mojo Vision Created the World's First Smart Contact Lens with Augmented Reality. *Click Lancashire Independent News* <https://clicklancashire.com/2020/01/18/mojo-vision-created-the-worlds-first-smart-contact-lens.html>.