

AR, VR, and Brain-Machine Interfaces

Theodor Marcu '20

Mobile Computing

AR/VR

A Decade of Unprecedented Improvements

Neural-prosthetics

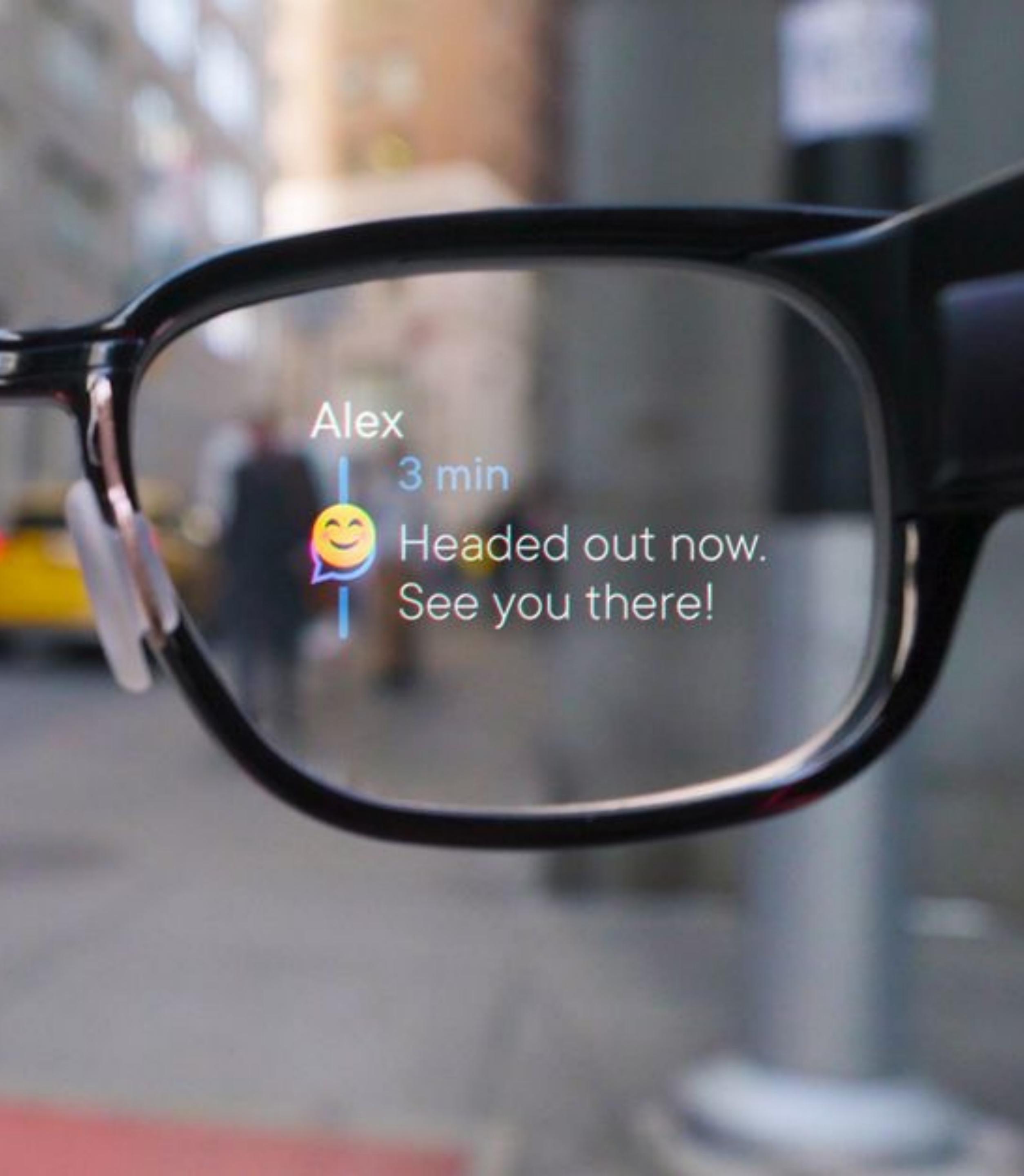
Internet Connectivity

Wearables Are Everywhere

- Airpods
- Apple Watch
- Fitbit
- Oura Ring
- Google Glass
- Focals by North







New Age of Brain-Machine Interfaces



EEG Headsets Now

- Portable EEG Devices Now Between \$350 and \$1000
- Bluetooth-enabled,
comfortable, reusable.



Other non-invasive technologies

- EMG measures signals in neurons in the arm.
- Can be trained to detect shadow movements.
- CTRL-Labs was acquired by Facebook.



Creating New Senses For Humans

- Our brains can be considered universal input machines.
- Neuroplasticity allows brains to learn new things all the time.
- What does this mean for brain-machine interfaces?



What about invasive BMIs?

Neuralink

- Microscopic electrodes can read smaller and smaller groups of neurons.
- Robots can implant those electrodes with minimal damage to the brain tissue.
- A big step up from current ECoG and LFP systems!



**What can we do with this
technology?**

Neurofeedback

- EEG-based neurofeedback helped smokers quit.
- Anxiety
- Depression
- Negative Brain-States
- Muse Headband





Where are we going next?

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SEARCH



Valve Psychologist: Brain-computer Interfaces Are Coming & Could Be Built into VR Headsets

By Scott Hayden - Mar 23, 2019 18

Image courtesy Neurable

A small screenshot of the Road to VR website header is shown in the bottom right corner.

VR

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Facebook acquires neural interface startup CTRL-Labs for its mind-reading wristband

6 ▾

The deal is reportedly worth between \$500 million and \$1 billion

By Nick Statt | @nickstatt | Sep 23, 2019, 9:04pm EDT

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Wellness

Meditation Tech: Muse 2 Brain-Sensing Wearable Review



Lee Bell Former Contributor at

Consumer Tech

Freelance journalist covering health tech and fitness innovation

- f Despite years of scientific research proving that regular meditation helps you sleep better, stress less and focus more, it's still widely considered esoteric.
- Twitter icon
- in Let's be honest, most of us have a hard time getting on



The image shows a woman from the side, looking down at her smartphone. She is wearing a black Muse headband on her forehead and white earbuds in her ears. She has long dark hair pulled back in a ponytail. The background is a plain, light color.

muse™
the brain sensing headband