

# Remote Diagnosis of Neurodegenerative Disease

## University of Kansas Innovation and Collaboration

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### Industry:

Medical  
Telemedicine  
Neurodiagnostics

### Researchers:

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### Status of Intellectual Property:

Patent-pending

### Next Steps:

Partner with a company, investor, or entrepreneur who has the capacity to complete the research and development process, license the technology, or take it to market

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## Wanted

Seeking partners to commercialize the invention.

## Customer Problem

Efficient and accurate diagnosis of neurological issues is essential to successful treatment. Diagnosis requires neurology specialists who are often unavailable in remote areas or to patients with limited transportation. There are very few telemedicine tools available in the market to assist remote evaluation, diagnosis and treatment of neurological problems.

## Potential Market Uses

This technology makes it easy and inexpensive for medical facilities everywhere to provide diagnostic and treatment services from specialized doctors remotely. The virtual reality device facilitates real-time interactive communication between the patient and doctor and improves accuracy by utilizing infrared and three-dimensional technology. The virtual reality interface also provides a low-cost method of remote evaluation and diagnosis.

## Market Size

### Telemedicine Market

- The global telemedicine market was estimated to be worth around \$23,224 million in 2015 and is expected to reach \$66,606 million by 2021, growing at a CAGR of 18.8% during the forecast period (2016-2021).
- Drivers for growth of the global telemedicine market are:
  - Constant technological innovation
  - Increasing remote patient monitoring
  - Rising use of treatments that require long follow-ups
- In the United States, telemedicine has been promoted as a way to serve rural populations, but in the next few years it is expected to spread to a much wider patient base.

### Neurodiagnostics Market

- According to a report by Grand View Research, Inc., the global neurodiagnostics market was valued at \$13.6 billion in 2015 and is expected to reach a value of \$18.3 billion by 2024.



## Innovation

This invention combines several existing technologies in a novel way to efficiently diagnose neurological disorders such as Parkinson's Disease and Multiple Sclerosis. The reduction to practice of this invention is expected to happen relatively quickly. The combination of a portable virtual reality device and infrared cameras to capture eye movements make this invention inexpensive and accurate.

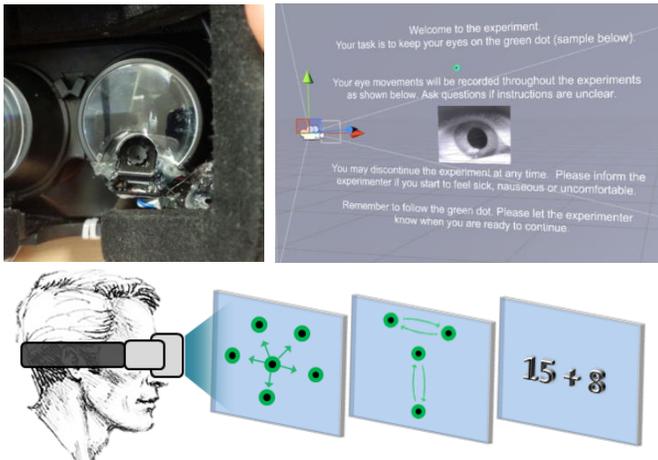


Fig 2. Top row: view from the lens side of the Rift showing the integrated eye tracker (left), and a side perspective view of the introduction screen in the 3D environment (right). Bottom row from left to right: Diagram of a user wearing the display, along with several sample positions of the icons for fixation, pro-saccade (changes in location), smooth pursuit (vertical/horizontal movement), and arithmetic tasks.

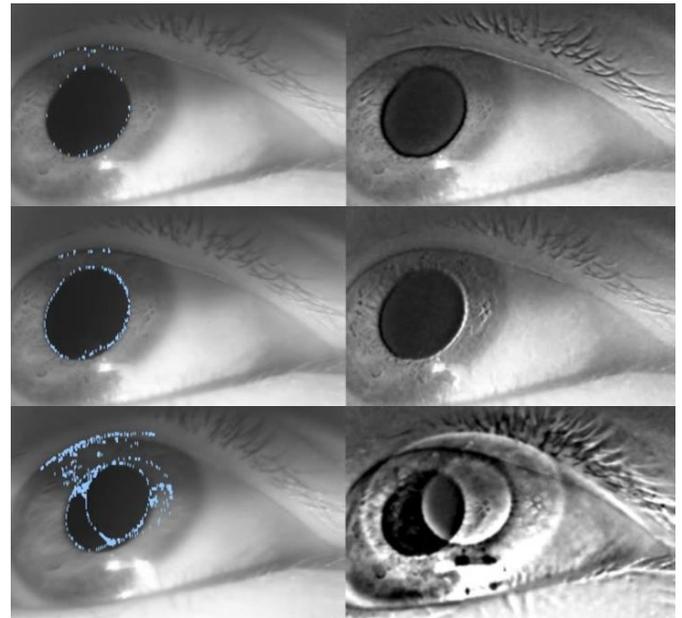


Fig 6. Images comparing TSUB (left column) and EVM (right column) visualizations for a static pupil (top row), microsaccade (middle row), and regular saccade (bottom row).

## Stage of Development

Initial testing is complete; however, further research and development is necessary prior to commercialization. Testing this invention with a geographical segment likely to use the invention will be most beneficial. Additionally, final cost advantage should be fully fleshed out during the research and development stage.

## Competitive Advantages

- VR and 3D technology to emulate physician's tasks
- Improved eye tracking accuracy
- Novel and faster pupil analysis
- Physician-friendly interface
- Potential to enable remote neurological diagnosis on a low-cost, portable VR device

## Competitors:

- i-Prognosis
- Remote Diagnostic Technologies Limited
- Many developing technologies are utilizing remote imaging that still requires extensive medical equipment to collect data and transmit images