



# A low-cost self-expression system for paralyzed patients



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## MOTIVATION



PlayStation Eye Camera

### Need

- A low cost eye tracking system is especially in need for severely paralyzed patients as an essential communication apparatus.

### Problem

- High cost of commercial eye tracking device.
- No self-expression system customized for paralyzed patients.



- EyeCan, Samsung

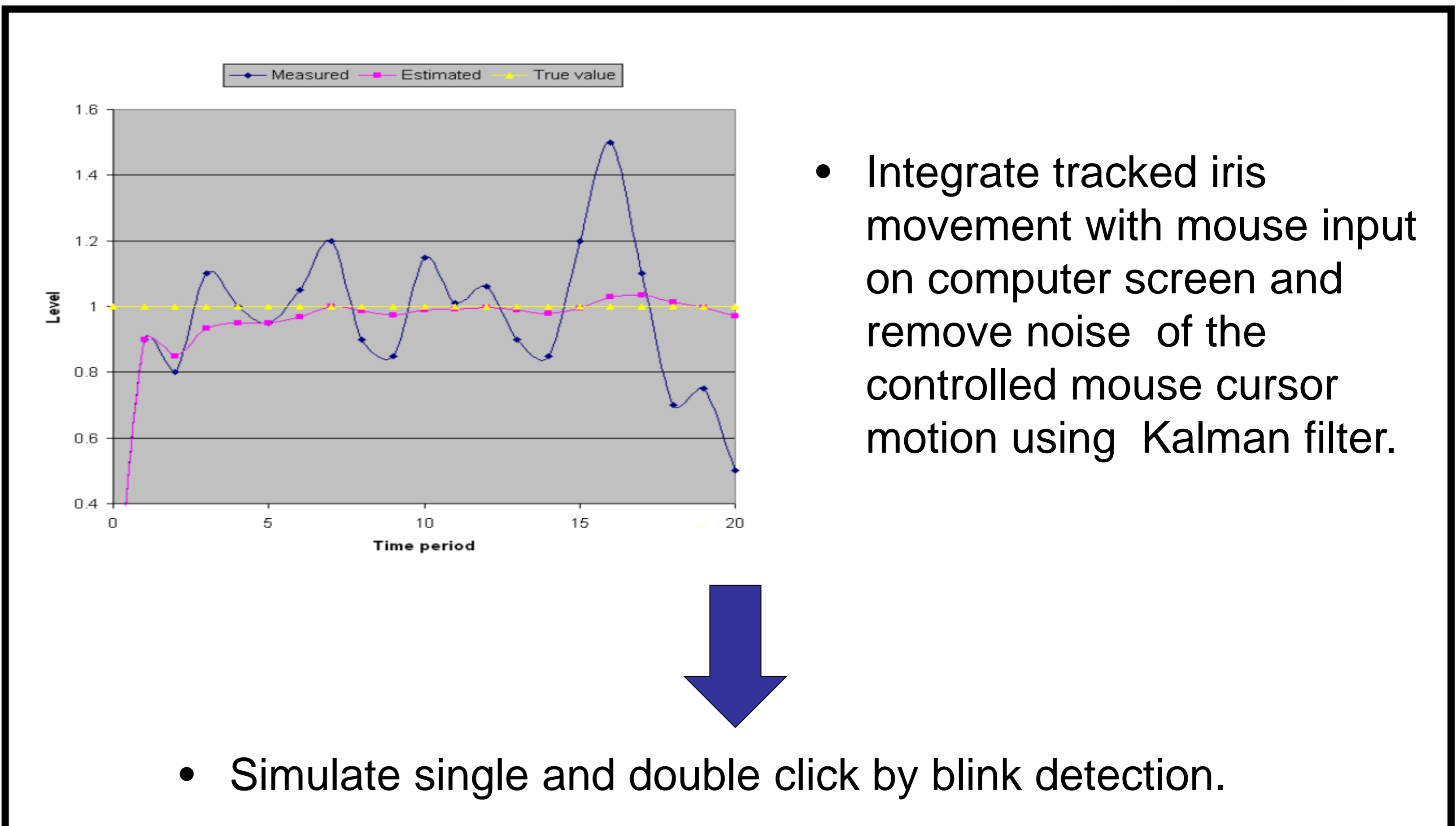


- Commercial eye tracking device -Quick Glance



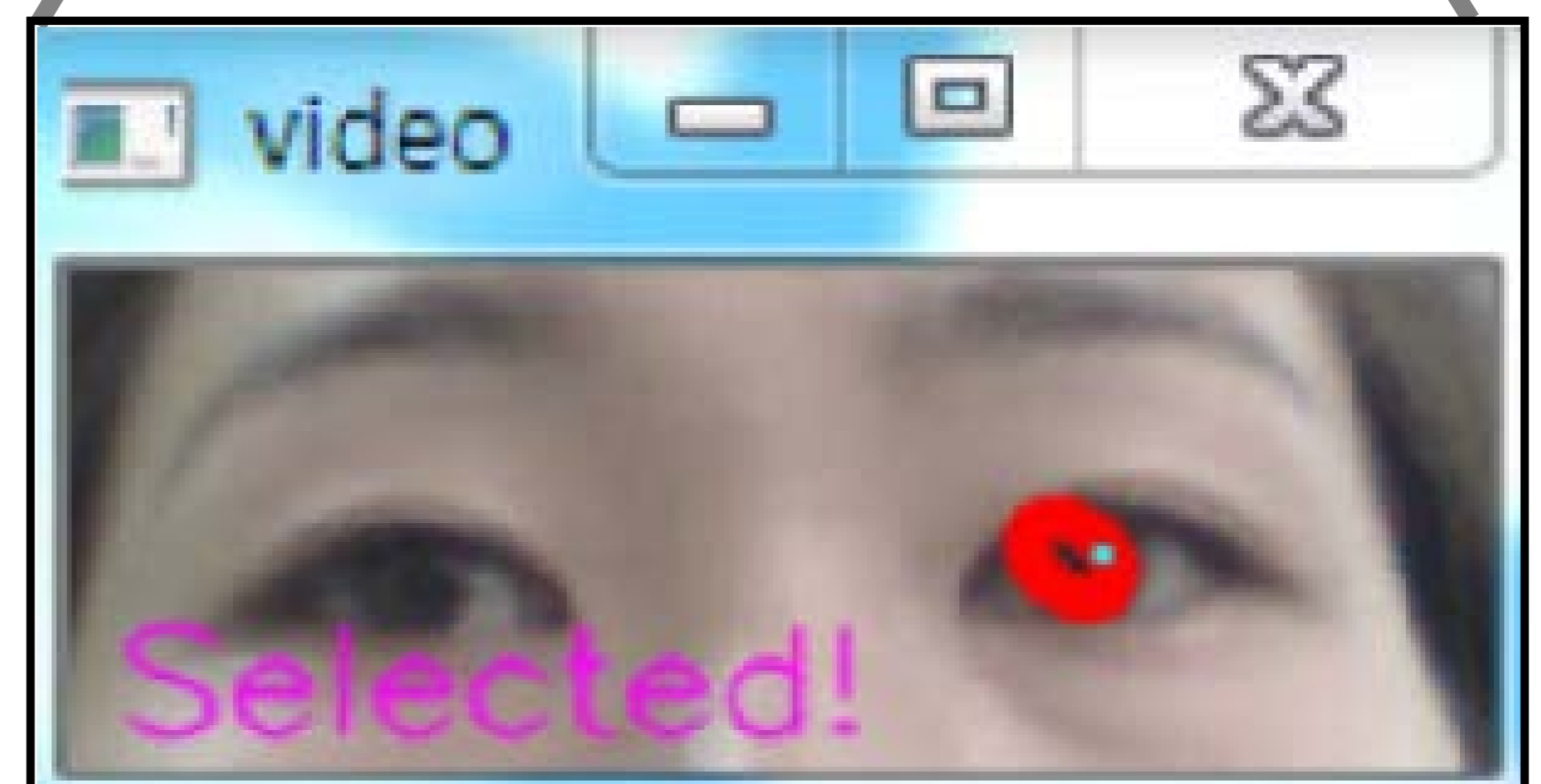
- EyeWriter, the Graffiti Research Lab

- The cost and accuracy of the system are inversely correlated



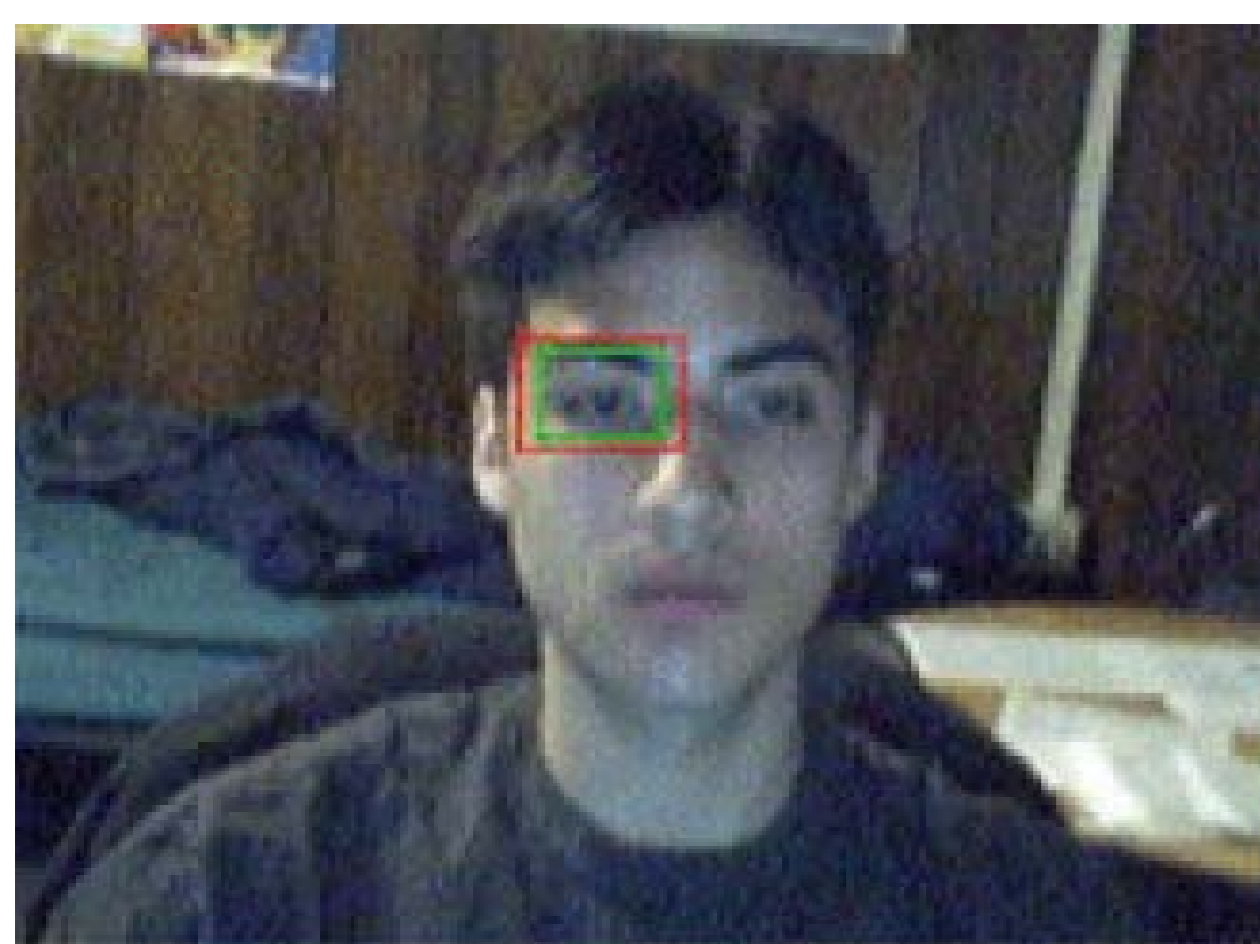
## RESULTS

- Eye tracking system composed of a customized virtual keyboard and a memo pad

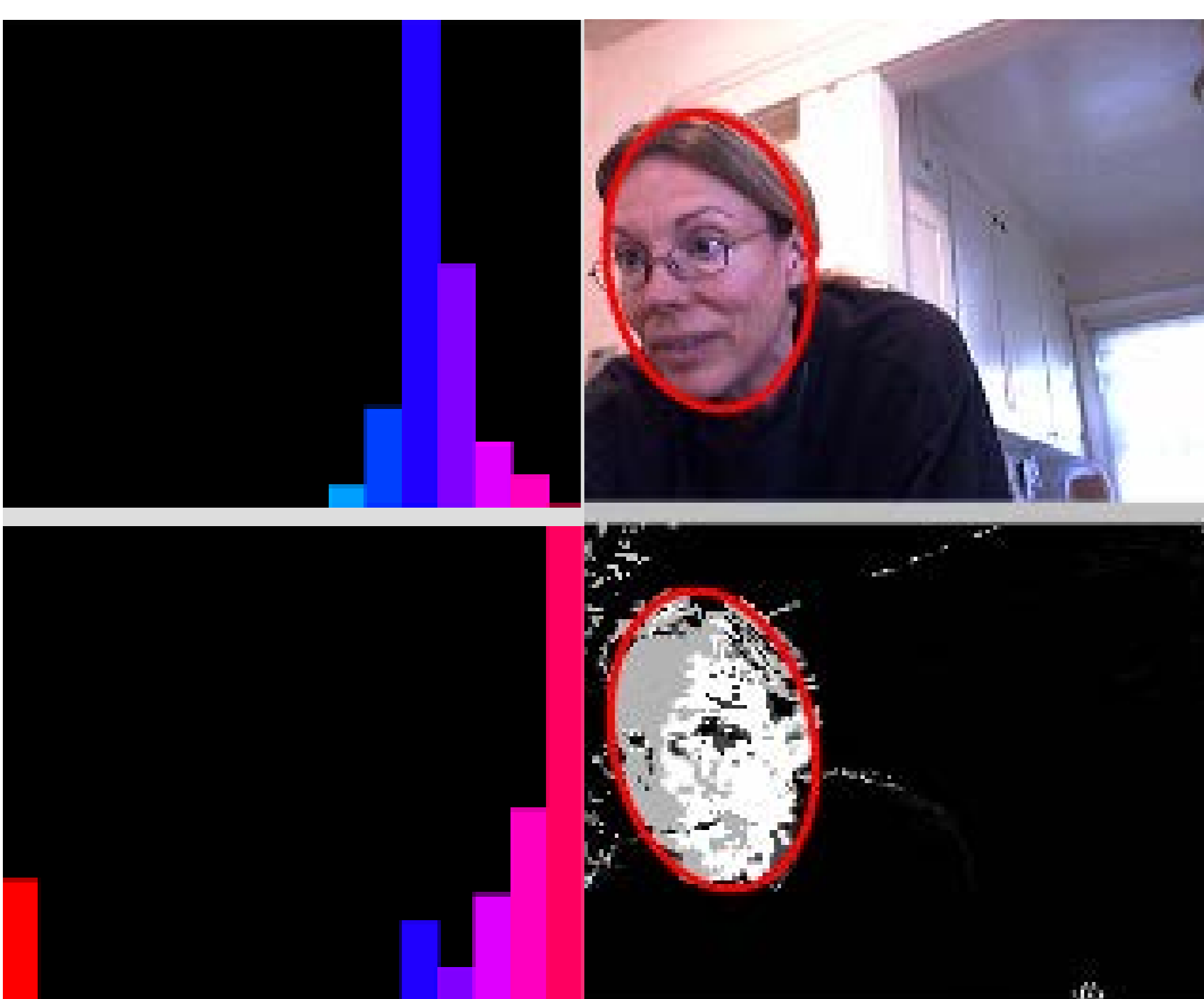
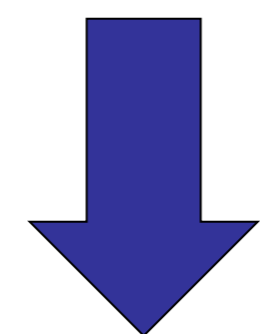


- Automated detection and tracking of iris
- Took 1 minute to write own name.

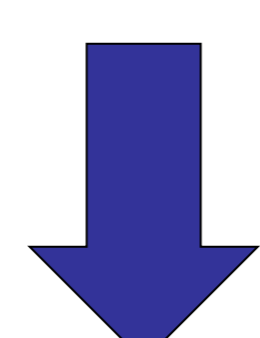
## APPROACH



- Michael Chau, et al., 'Real Time Eye Tracking and Blink Detection with USB Cameras', ICVGIP, 2005
- Identify eye region using 'Blink Detection' algorithm



- 'How OpenCV's Face Tracker Works', SERVO Magazine, 2007.
- Select iris using Camshift algorithm provided by OpenCV.



## FUTURE WORK

- System accuracy enhancement and optimization.
- System validation by performance test with 5 different subjects.