Gaze Estimation with Pupil Tracking in Real-Time

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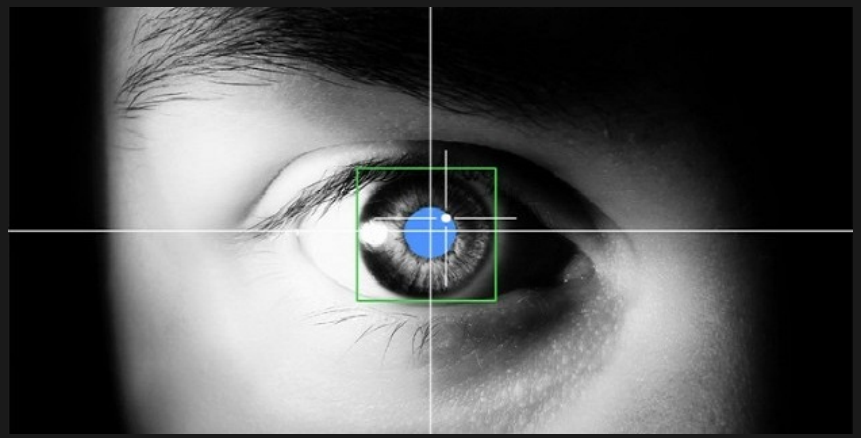
Motivation for Gaze Estimation

- Diagnosis of the eye
- Psychology
- Marketing and design
- Automotive
- Visual-input modality



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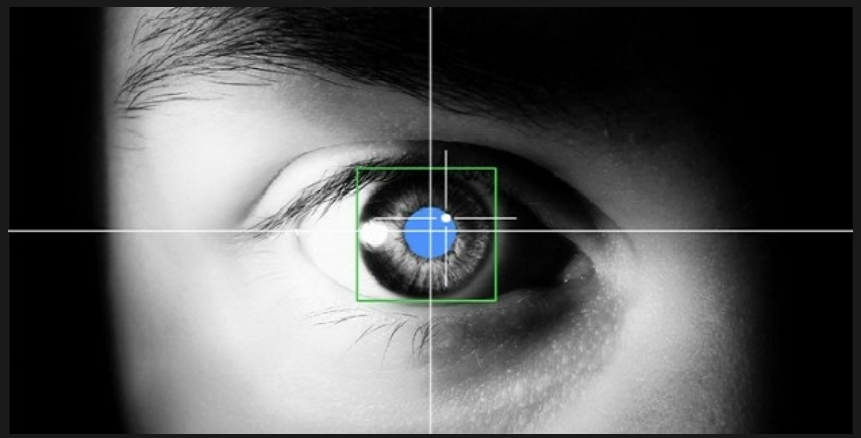

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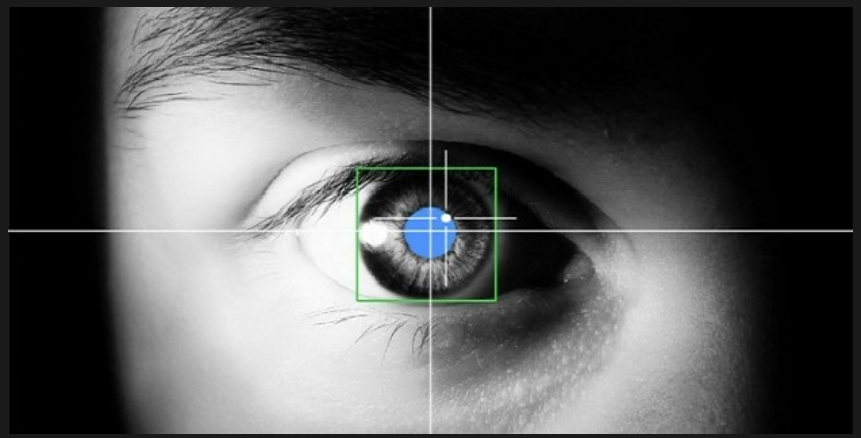

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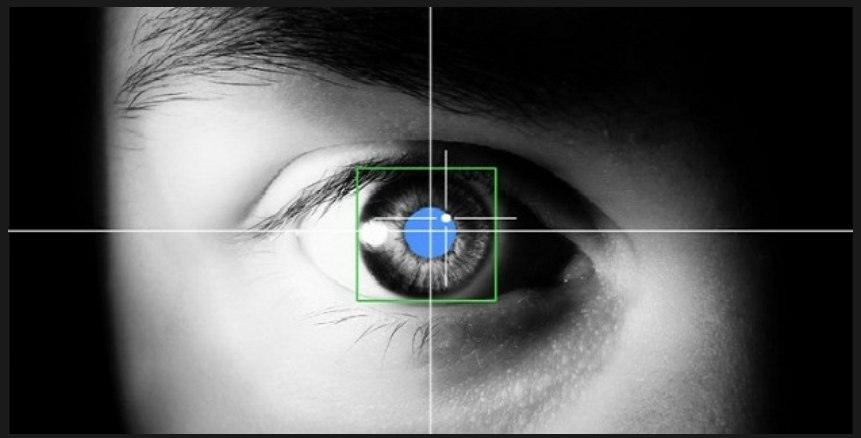

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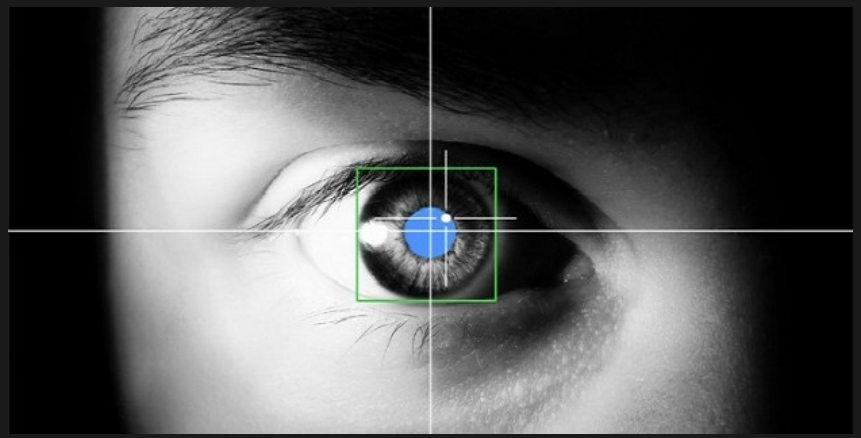

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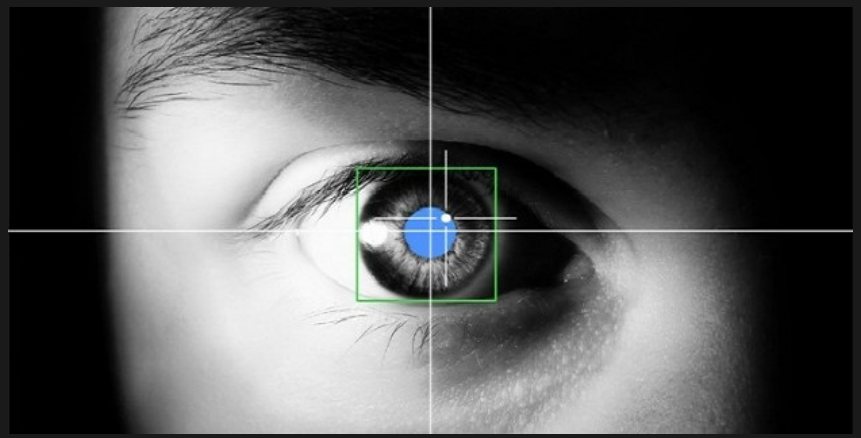
  - Especially for AR



The method, hardware and software

Method

Corneal reflections - find the rotation of the eye based on reflection of Near-Infrared (NIR) light using irregularities in its spherical shape

Hardware

Smartek NIR/Grayscale 1600x1200px, 25fps camera
Falcon ring NIR LED illumination
LAN switch and a computer running Windows

Software

FRAMOS C++ framework
MATLAB for intrinsic camera calibration

The method

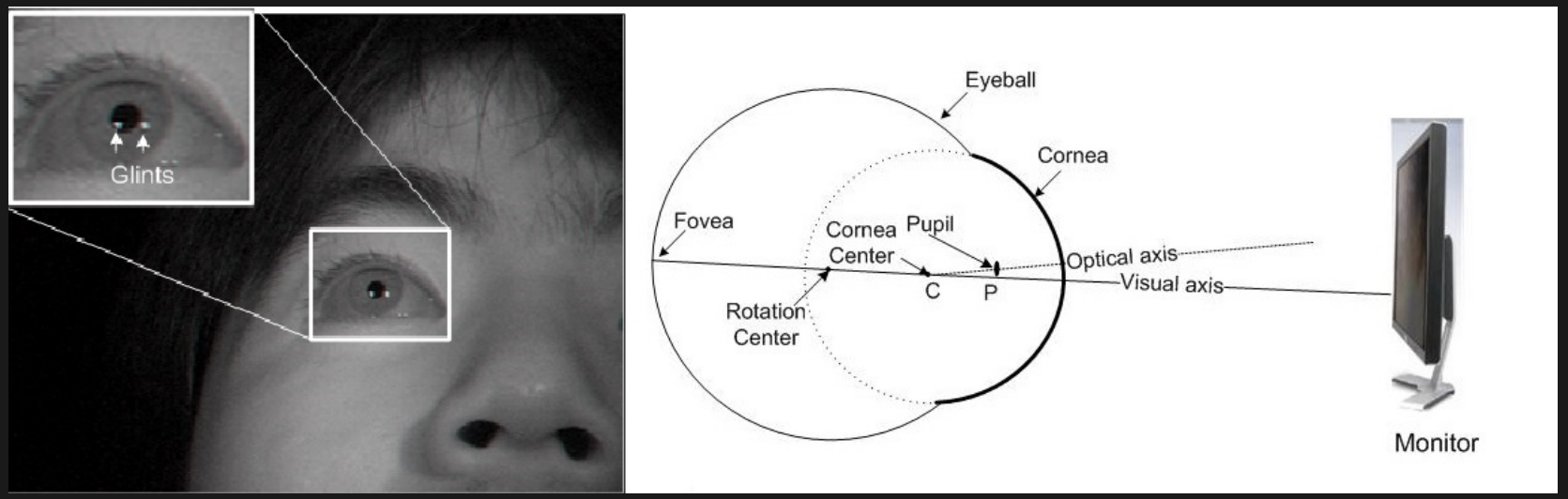


Figure: NIR light reflection and eye schematic

Source:
Real-Time Eye Gaze Tracking Under Natural Head Movements
`https://www.ecse.rpi.edu/~cvrl/zhiwei/gazetracking/gazetracking.html`
Accessed: 9/11/17

The hardware

Figure: Hardware in use

The software

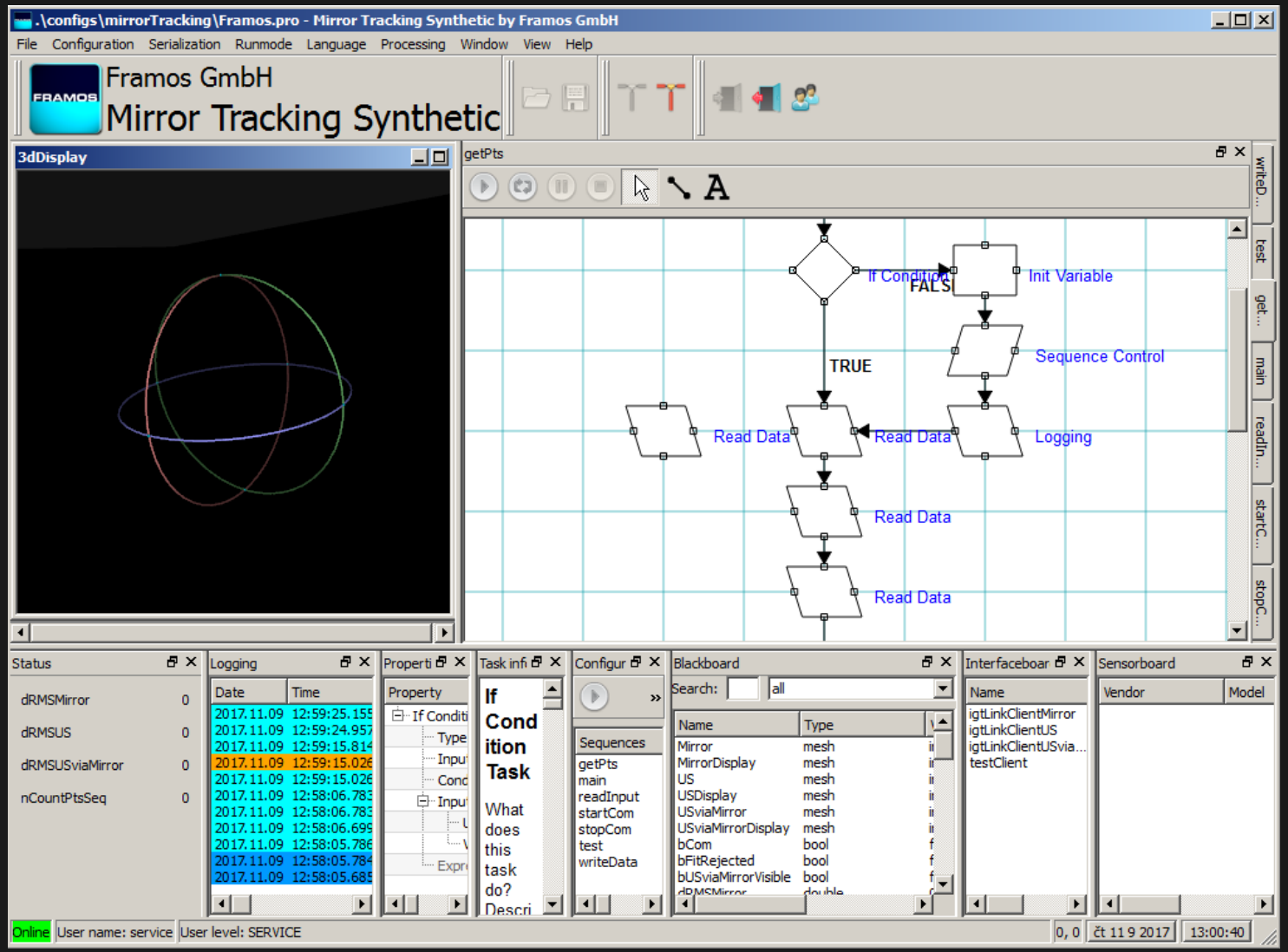


Figure: FRAMOS toolkit

The task at hand

1. Get to know the FRAMOS C++ framework
2. Research possible solutions considering hardware limitations
3. Pick one of the existing solutions
4. Implement iris-detection
5. Implement gaze-estimation
6. Present a prototype at PMSD and FRAMOS

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Optimistic timeline

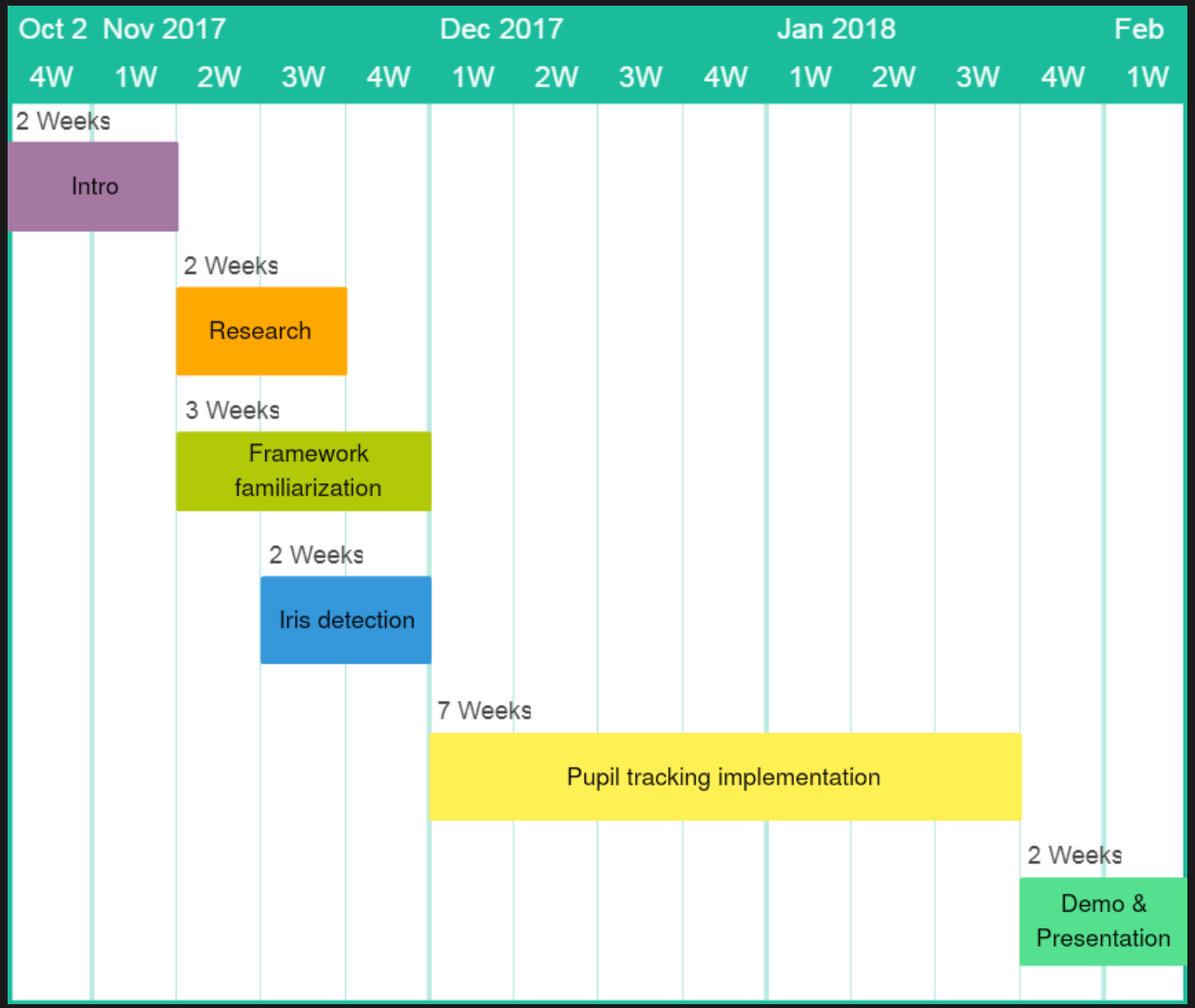

Figure: Gantt time-chart

That's it, folks!

Questions?

Eye picture @ slide 2 credit :
https://www.geek.com/news/
eye-tracking-mario-demo-could-offer-a-glipse-at-the-next-generation-of-google-glass-1577302/
Accessed 9/11/17