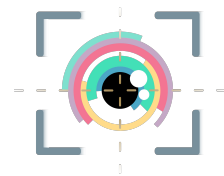# iTracking

Alan Wilms, Jeff Kim, Matthew Kernen, Minh Chung,
Will Lee, Pam Karwowski

Our Team

Hardware

Will Lee

Pam Karwowski

Software

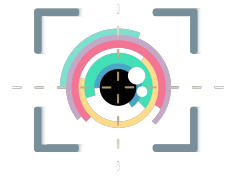Matthew Kernen

Alan Wilms

Biomedical

Jeff Kim

Minh Chung

Sponsors

Dan Levin, PhD

Gautam Biswas, PhD

Background

➢ Eye tracking in middle school classrooms to understand how students follow instructional videos and how they interact with learning programs

➢ Current efforts use Tobii, but require expensive software kits

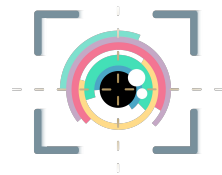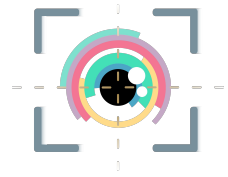➢ Use in classrooms has many calibration issues

Hardware needs

➢ Custom eye tracking system

➢ Low cost

➢ Multi-person tracking
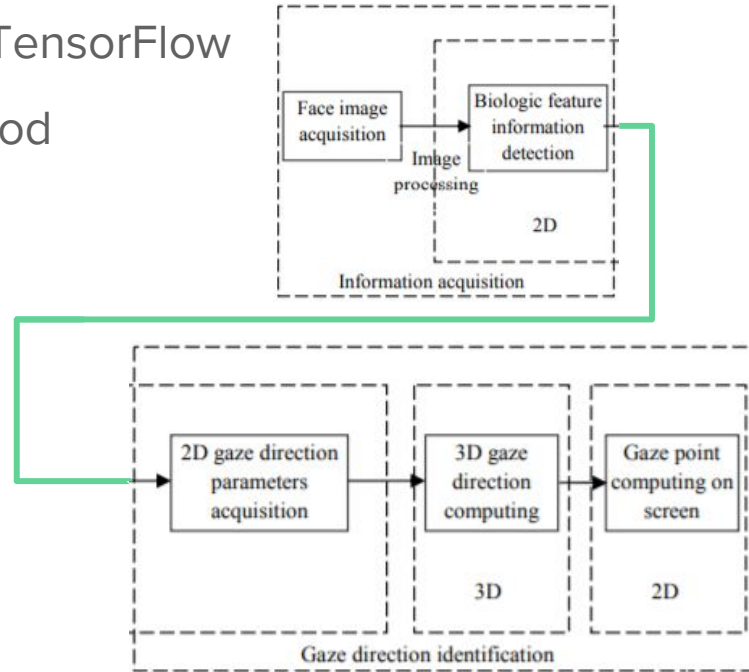
➢ Portable and durable

Software needs

➢ Matching software

○ Focus on calibration

➢ Data acquisition

➢ Robust image processing

Design

➢ Convolutional Neural Networks with TensorFlow

➢ Pupil Center Corneal Reflection Method

➢ Two camera system

 ○ Camera 1: large fov

 ○ Camera 2: focus on eyes

➢ Infrared approach

TASK NAME	START DATE	WEEK*	END DATE	DURATION* (WORK WEEKS)	TEAM MEMBER
Initial Planning and Brainstorming					
Team Selection	9/2	0	9/8	1	All
Meet with Professor Levin (Initial)	9/13	2	9/13	1	All
Acquire and Purchase Parts	9/20	3	11/15	9	Will, Minh
Brainstorm and Design System	9/10	1	10/30	8	All
Write PDR	10/21	7	11/2	2	All
Write CDR	11/21	12	12/7	3	All
Protoype					
Research Eye Tracking Mechanics	10/1	4	10/21	3	Minh, Jeff
Learn Tensor Flow and Neural Networks	10/24	8	11/15	4	Alan, Matthew
Implement Face Tracking	10/21	7	11/4	3	Alan, Matthew
Design Moving Platform	10/21	7	12/1	6	Pam, Will
Implement Eye Tracking	11/25	12	2/15	12	Alan, Matthew
Integrate Both Tracking Systems	2/15	24	3/1	3	All
Additions and Revisions					
Research Infrared Techniques	2/8	23	2/25	3	Minh, Jeff
Add Infrared Illuminator and Camera	2/25	25	3/15	3	Pam Will
Improve Eye Tracking with Infrared Data	3/10	27	4/1	4	Alan, Matthew
Tweak Neural Network	4/1	30	4/8	2	Alan, Matthew
Testing and Finalization					
Testing with Lab	4/1	30	4/15	3	All
Create D-Day Presentation	4/15	32	4/21	1	All
Present!	4/22	33	4/22	1	All

Current Progress

➢ Google AIY Vision Kit

    ○ Demo Programs

    ○ Lens Modification

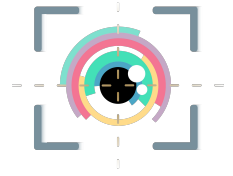➢ Neural Networking

➢ Stepper Motors

Stepper Motor

➢ Smaller

➢ Less expensive

➢ Less parts - no encoder

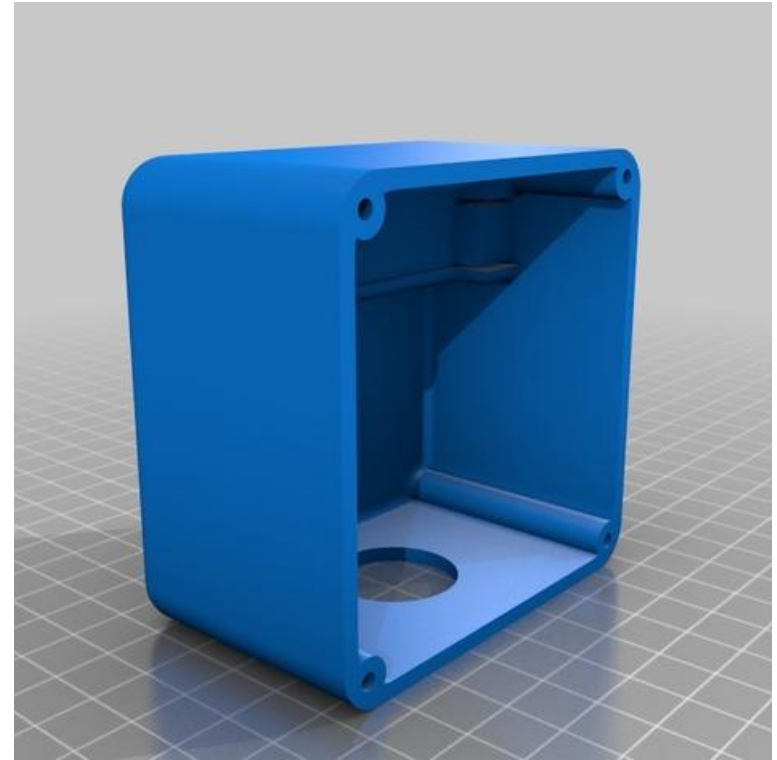➢ Runs hot

➢ Simple controls

Servo Motor

➢ Favorable at high speeds

  ○ 2,000 RPM +

➢ Higher torque

➢ Fine movements

3D Printing in Design

➢ Creating a cover for our camera

    ○ Safe

    ○ Child-friendly

    ○ Durable

➢ Motor connection

➢ Adjustable

Q's?