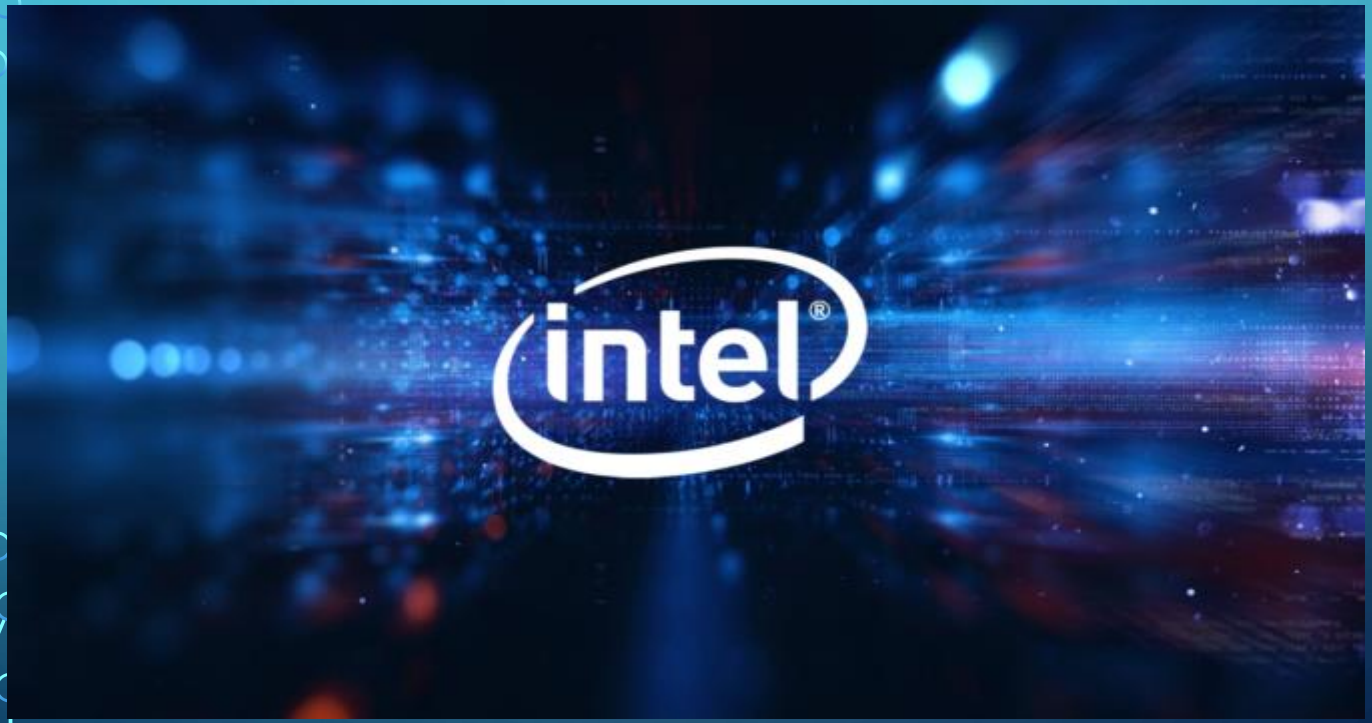
ODIN 2.0

Winter/Spring 2020

ABRAM FOUTS TODD TOWNSEND KARLA BARRAZA LOPEZ XUENING JIA WENHAO CHENG

PROJECT SPONSOR



Problem

Ocular Divergence:

Strabismus: Abnormal alignment of the eyes(mild to severe below)

- Amblyopia (Lazy Eye)
- Diplopia (Double Vision)
- Oculomotor Palsy (The eye will be displaced in different ways---Unsteady)
- Oculomotor Paralysis (The eye will be displaced in different ways-----Fixed)
- Other conditions (physical abnormalities, nerve damage, muscle damage)

PROJECT PURPOSE

Correction of Strabismus

Strabismus is more commonly known as cross-eyed or wall-eyed, is a vision condition in which a person can not align both eyes simultaneously under normal conditions. One or both of the eyes may turn in, out, up or down.

REQUIREMENTS

- Must:
- Establish/Build Host Environment
- Software Migration FOVE to HTC Vive Pro Eye
- Integrate Gaze Vectors into Correction Vectors
- Integrate touch controller
- Host the program within SteamVR
- Should:
- Adjust the view plane per individual eye to match the current gaze vector
- Correction to Cure of strabismus through the use of VR

PROJECT SCHEDULE

	1. Project Span	113 days	Wed 1/1/20	Fri 6/5/20		
	Find a secure location at PSU					
	Get the hardware					
	Environment Setup					
	Environment-Drivers					
	Environment - Applications					
	2. Understanding the Problem	14 days	Mon 2/3/20	Thu 2/20/20		
	Study new API					
	Map out FOVE code flowchart					
	Reverse Engineer FOVE code	1 day				
	Compare Unity code to FOVE code	1 day				
	Understanding how Gaze Vectors are stored	3 days				
	2.1 Set Up Existing	1 day?	Mon 2/3/20	Mon 2/3/20		

Click for complete schedule document

TASK LIST

- Establish Host Environment
  - Research/Acquire/Install Drivers
- Research/Install dependencies for HW/SW
  - Leverage FOVE SW and find missing dependencies for HTC Vive Pro Eye
- Gaze Camera
  - Integrate Gaze Calculation from FOVE to HTC Vive Pro Eye
- Motion Sensor
  - Integrate HMD Orientation from FOVE to HTC Vive Pro Eye
- Touch Controller
  - Integrate all dependencies
  - Modify SW to accommodate

HTC VIVE PRO EYE

TASK LIST OVERVIEW

- HW Setup
  - Modern hardware platform
  - New headset
  - New cameras
- SW Setup
  - Research/Obtain API pipeline of gaze vectors
  - Research/Obtain correction vectors
- Find a secure location at PSU
- Working touch controller (Wands used in VR)

RESEARCH

- SW Dependencies
  - From FOVE to HTC Vive Pro Eye
- HW Dependencies
  - Connection Changes: needed peripheral connections
  - Controlling mechanism changes: X-box controller to touch controller
- HTC Vive Eye Pro capabilities
  - Scope - Needed processor power
  - Speed - Accommodate Bandwidth/Baud Rate

SW DEPENDENCIES

Unity

SteamVR

HTC Vive Pro I API

HW DEPENDENCIES

- HTC Vive Pro Eye
- Strong CPU and GPU for Unity rendering
- Touch controller
- New Headset
- New Cameras

STRETCH GOALS

- Correct/Cure strabismus through the use of VR
- Incorporate our work with Intel's neural network to allow automatic plane adjustments to the gaze vector
- Integrate touch controller into gaze correction vectors

PROPOSAL

- Establish/Build Host Environment
  - Research/Acquire/Install Environment
- Integrate HTC Vive Pro Eye
  - Install dependencies
  - Incorporate Gaze calculation/HMD orientation
- Successful API pipeline of gaze vectors to correction Vectors
- Integrate touch controller for correction vectors
  - Reduce/Eliminate need for x-box controller
  - Incorporate/Integrate gaze vectors into correction vectors
  - Implement SW for holding/distribution of gaze/correction vectors
- Establish correction directives for strabismus