



One Tilt Controller

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Game Hardware Course Project
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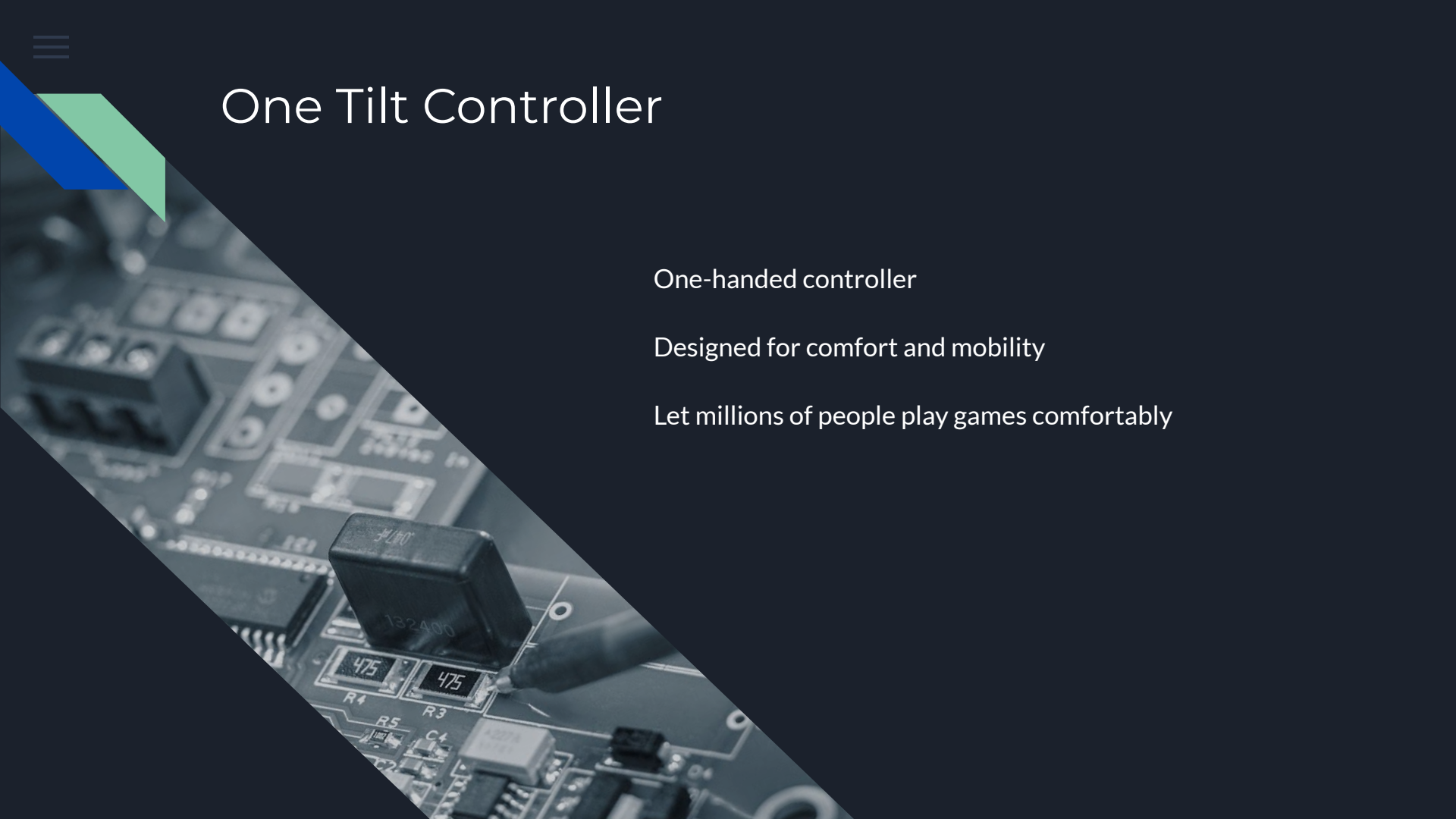


One Tilt Controller

One-handed controller

Designed for comfort and mobility

Let millions of people play games comfortably



Presentation Outline

Problem + Justification + Goal

Methodology

Systems Analysis

Architecture

Developer Tools

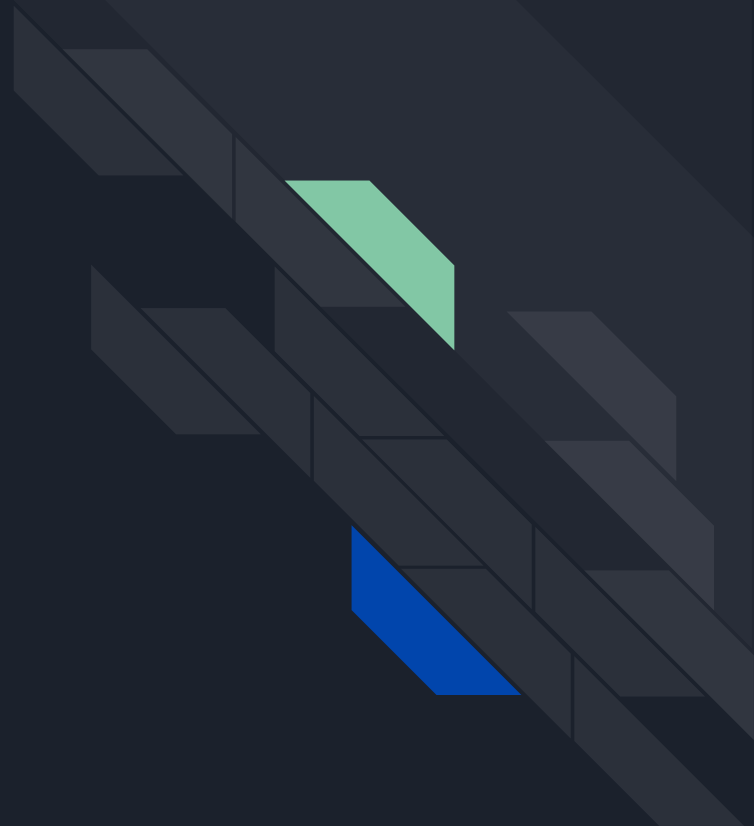
Subsystem Development

Design Process

Demo

Timeline

Results + Conclusions





One Tilt: Introduction

Video games are among the most popular forms of entertainment but inaccessible for some

Standard controllers offer little support for individuals with disabilities

Customizable controllers require the device to rest on a surface, not allowing play from a couch or away from a desk or table, and are not easily portable



One Tilt: Justification

Over 3 million Americans have a hand-related disability

Hand injuries are the most common type of injury in the workplace

Without accessible designs, millions unable to comfortably play games

Our goal is a compact, one-handed controller designed for accessibility, comfort, and freedom of movement

Allow players with disabilities to play games easily and comfortably



One Tilt: Methodology

Draw from established input methods

Adapt for one-handed elements

Refine design for comfort and usability



One Tilt: Analysis & Characterization

While there are video game controllers that are made to be accessible, many are cumbersome or have notable drawbacks for certain use cases

The Xbox Adaptive Controller, for example, is a large rectangular device meant to rest on a surface

Of all the controllers designed with accessibility in mind, few deliver a nimble and mobile experience similar to a regular gamepad



One Tilt: System Architecture

The design process began by looking at existing one-handed controllers through the lens of the intended user, analyzing the benefits and drawbacks of each one

Common drawbacks included the secondary analog input method requiring that the controller be rested on a steady surface, which limits posture options and play spaces, or requiring significant arm movement, which can cause fatigue with extended use





One Tilt: System Architecture

The idea to avoid these issues was to use gyroscopic sensors to detect tilt movements of the controller, and have that act as the secondary analog input method, with the primary method being a regular gamepad joystick

Due to many one-handed players being familiar with standard gamepad layouts due to necessity, it was also suggested that the control scheme be similar to one side of a standard Xbox or PlayStation gamepad

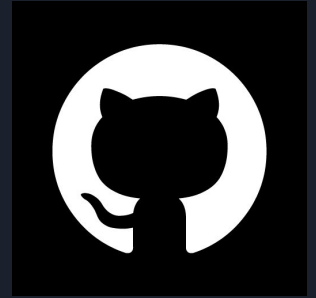




One Tilt: Development Tools



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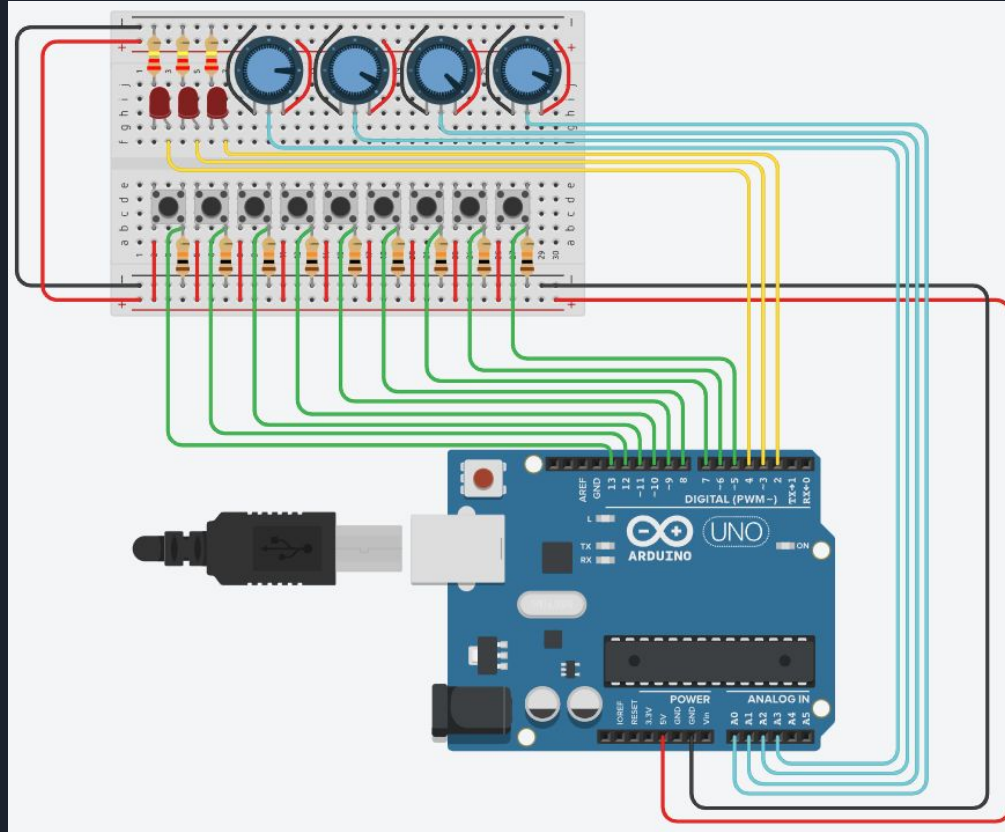


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AUTODESK[®]
TINKERCAD[®]

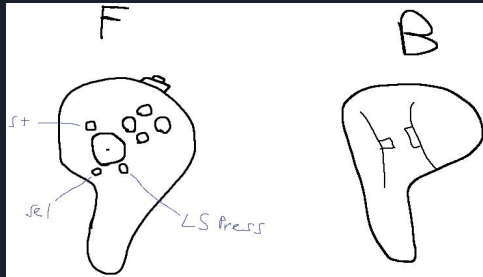
One Tilt: Subsystem Development



One Tilt: Study Design

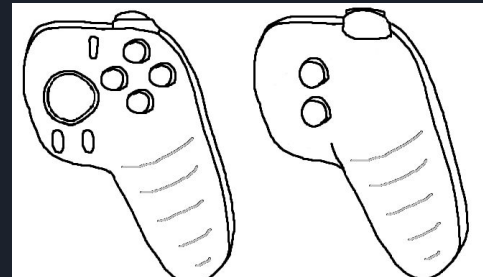
First concept iteration:

- Similar layout to right side of standard gamepads (Xbox and PlayStation)
- Start, select, and left stick press added to cover missing inputs
- Back of the controller includes a groove for the middle finger to rest and press left bumper and trigger



Second concept iteration:

- Inspired by Sony's DualShock 4 controller
- Comfortable grip and compact design
- Utilizes buttons on the back of the controller for left bumper and trigger





One Tilt: Timeline

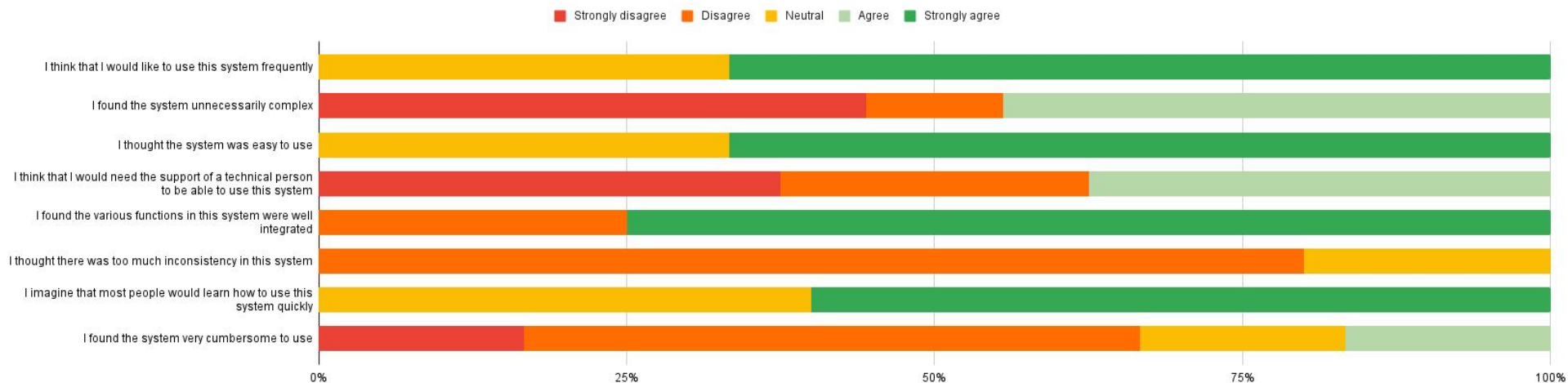
| January 30th | February 20th | March 15th | March 24th | April 1st | April 15th | Future Plans |
|---|--|---------------------------------------|---|---|--|--|
| Brainstorming and Design Process | Design Iterations and Initial Model | Circuitry and Model Schematics | AR Model View and Wiring Changes | Simulated 3D Print and Interactive Scene | Refinement and Refinement | Possible Continuation of the One Tilt Project |
| Brainstorming and planning | Initial design changes | Circuit diagrams and wiring | Model in AR authoring tool | Simulated 3D print of One Tilt controller | Getting One Tilt ready and polished for final submission | Still to be determined |
| Initial designs for controller | First 3D model of One Tilt controller | Model materials and measurements | Changes to wiring and functionality | Simulation of controller in a virtual scene | | May be worth pursuing in the future |

One Tilt: Results

Results:

- Mixed opinions
 - Complexity
 - Controller Feel
- Generally positive usability

One Tilt Controller Survey



One Tilt: Conclusions

Conclusions:

- Problem definition and related analysis led to a clear goal
- Iteration and feedback refined the solution to best cover the needs of the product
- One-handed controller which utilizes a gyroscope and convenient design to provide familiar, comfortable, and portable use to impaired gamers

