Fruit Ninja AR Design

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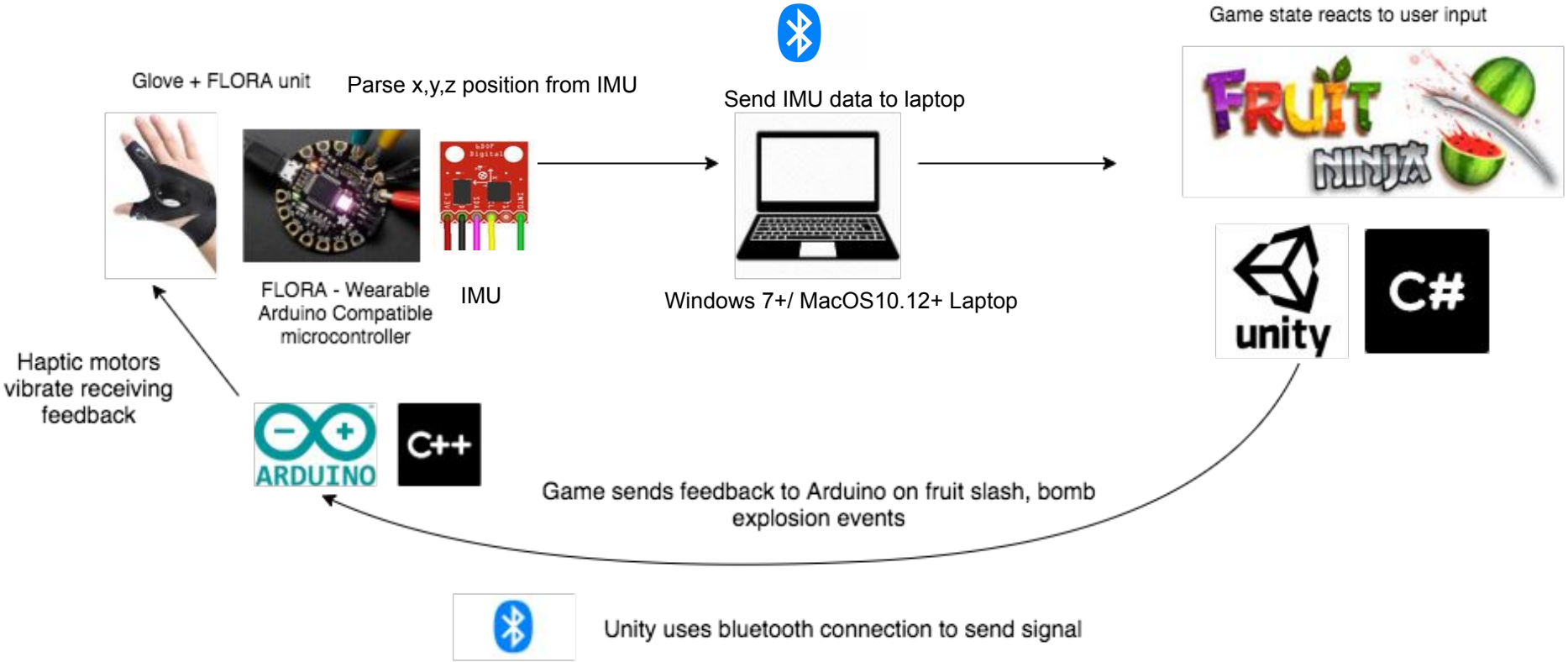
Application Area

Fruit Ninja:

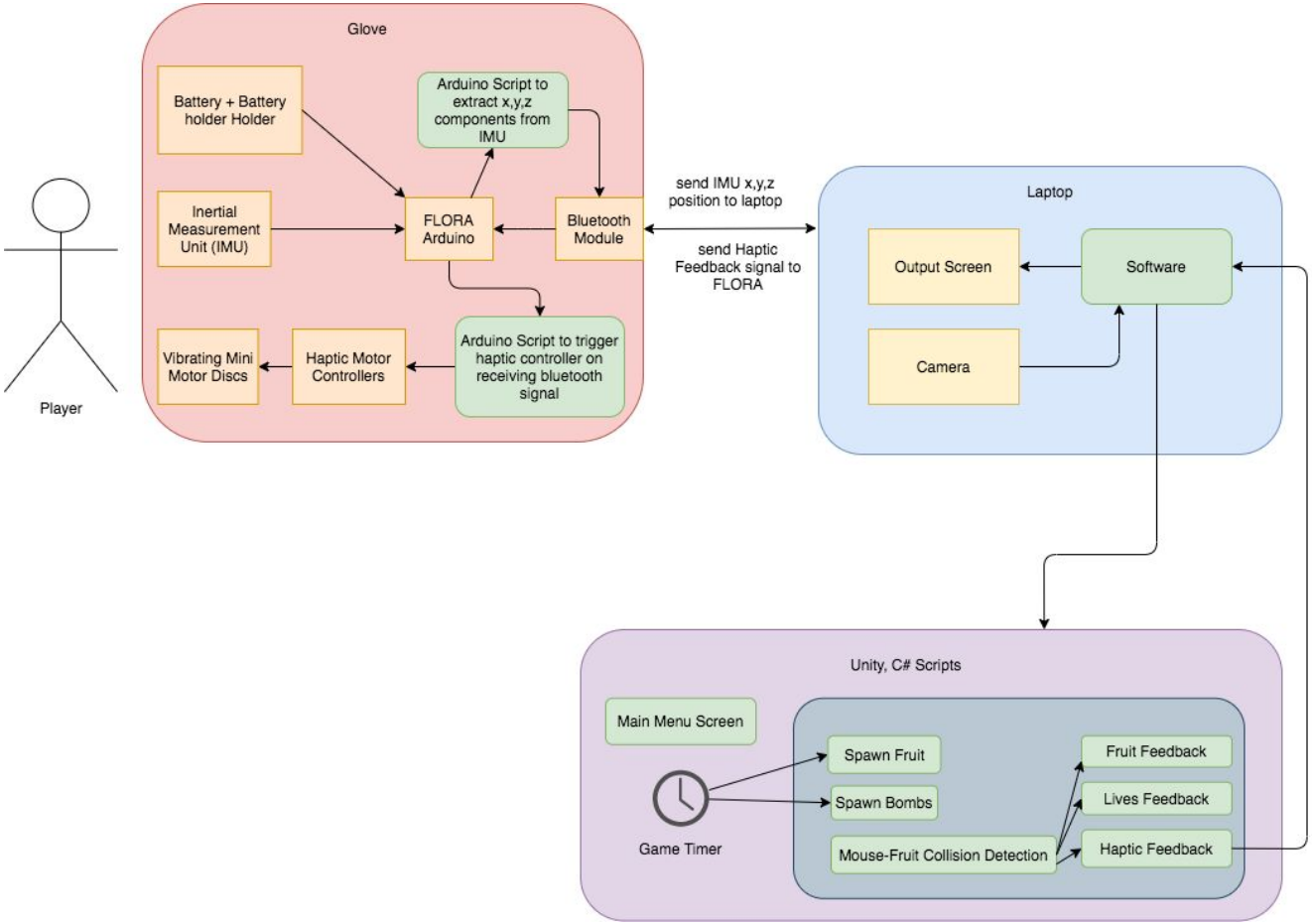
- Has already been adapted to VR, but not AR
- Not everyone can afford an Oculus/VR Headset
- Fun immersive experience when fatigued from Zoom meetings
- A familiar game with intuitive controls (Over 1 Billion downloads)

To showcase our glove, we will develop a Fruit Ninja-style arcade game that utilizes the glove as its sole input mechanism.

Solution approach



System Specification (Block Diagram)



Hardware Elements

General

- FLORA Microcontroller Unit
  - Run Arduino Code
- Adafruit Perma-Proto Quarter-sized Breadboard PCB - Single
- Inertial Measurement Unit
- 2x Gloves

Haptic Feedback

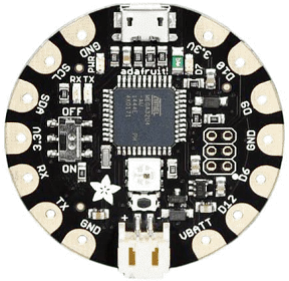
- Vibrating Mini Motor Disc
- Adafruit DRV2605L Haptic Motor Controller
- **Signal from FLORA -> Adafruit haptic motor controller -> vibrating mini motor discs**

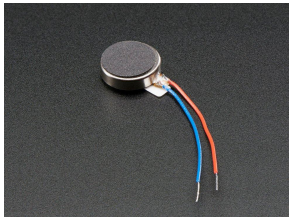
Power

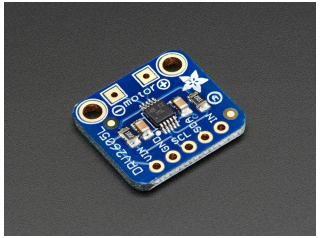
- 3 x AA Battery Holder with On/Off Switch, JST, and Belt Clip

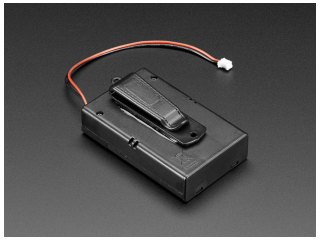
Fabrication

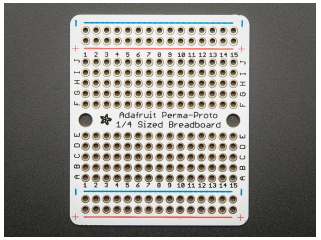
- Velcro strips



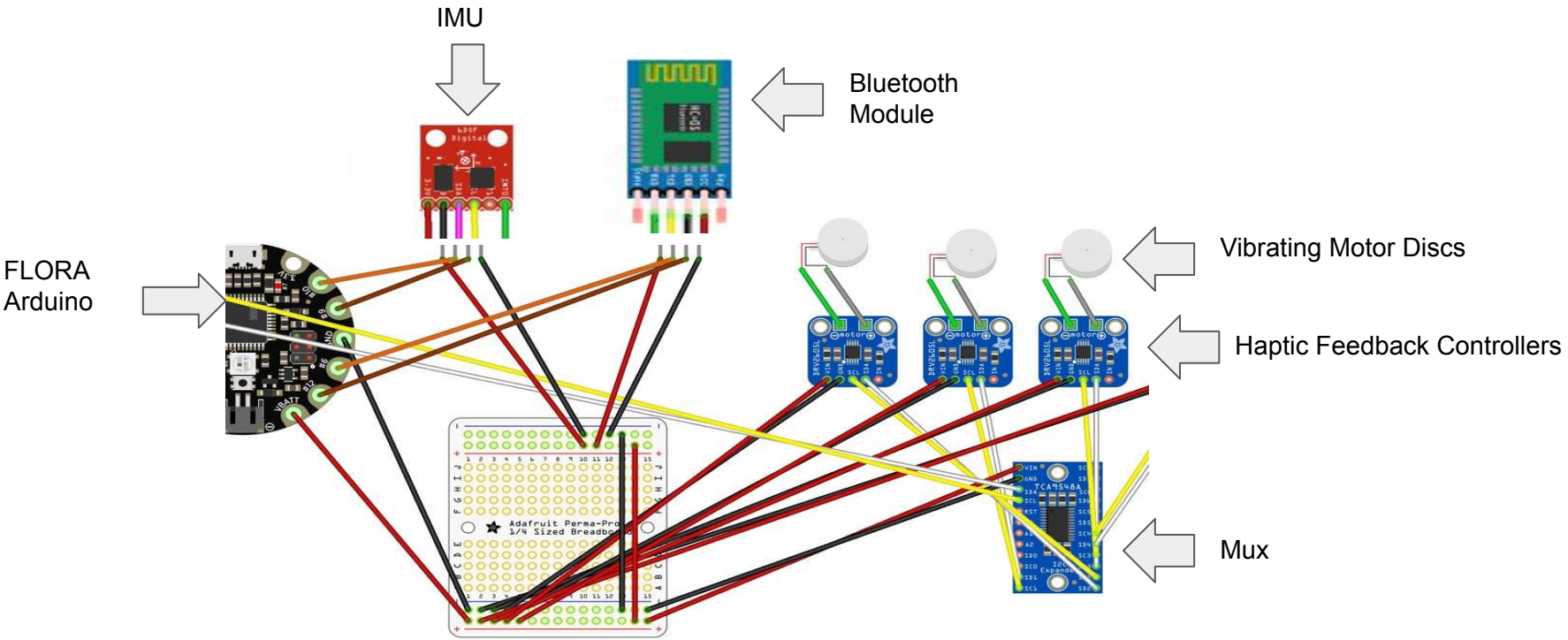




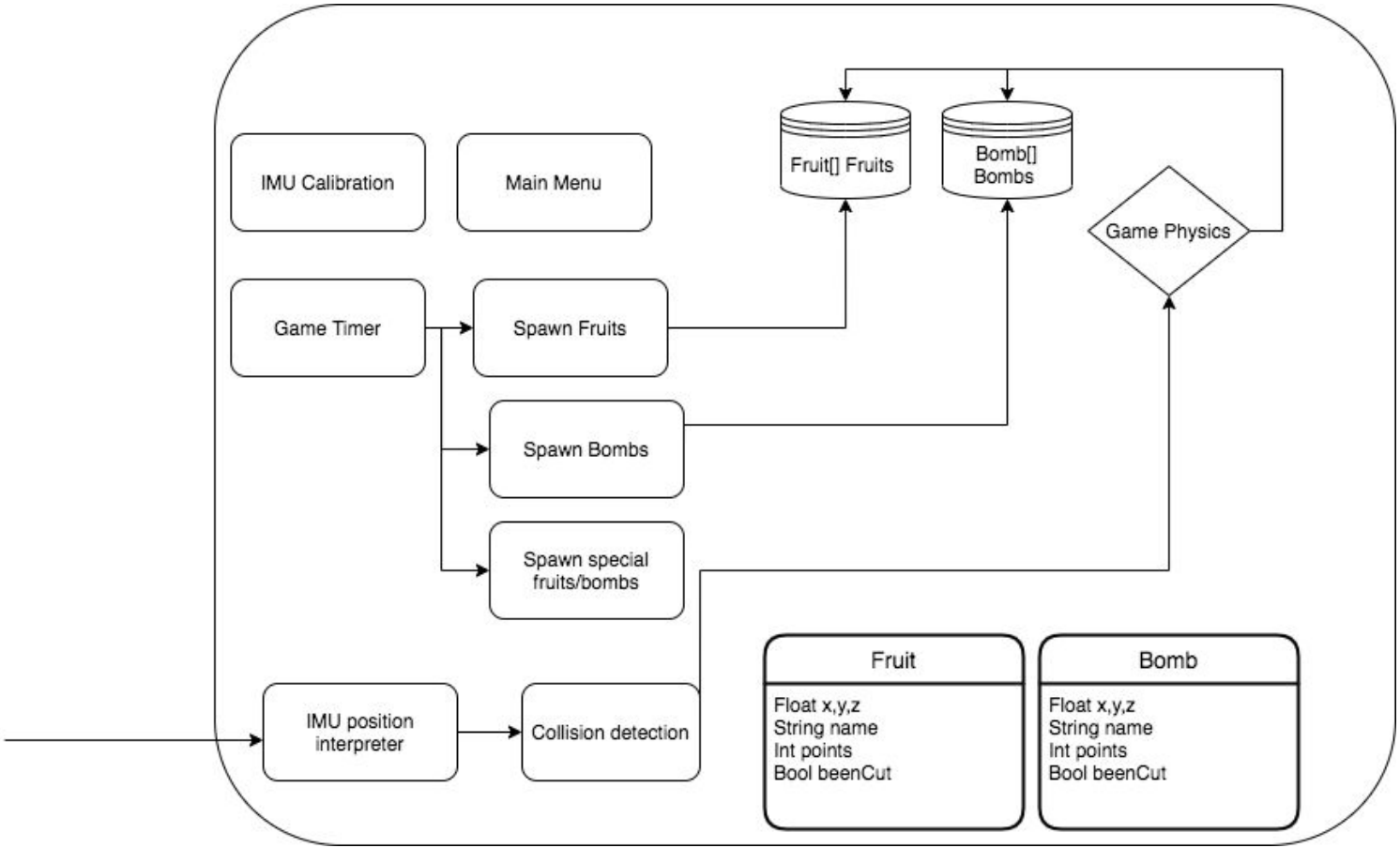




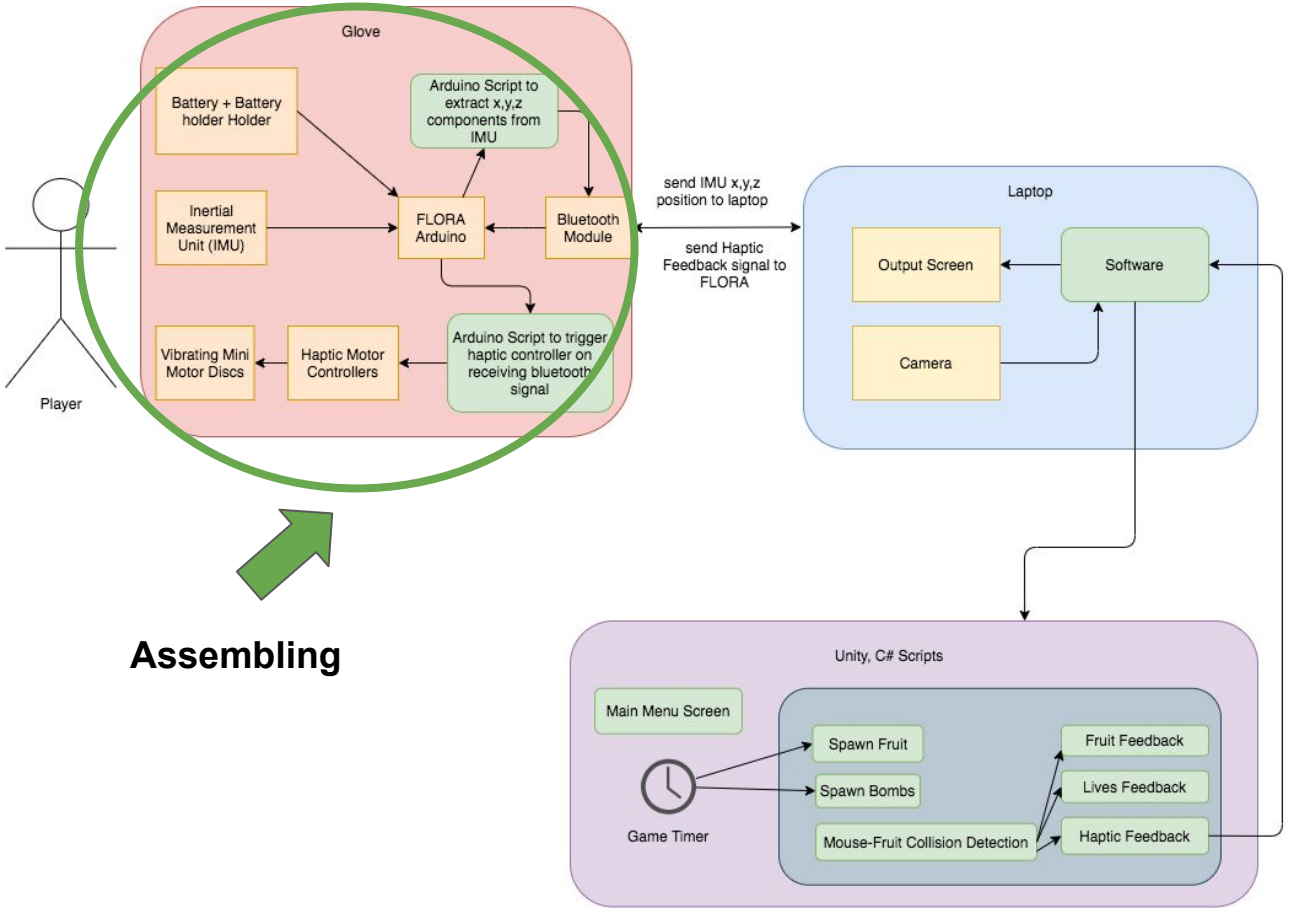
Glove Schematic



Block Diagram for Software



Implementation Plan



Key

- Hardware
- Software
- Buying parts
- Designing and Developing
- Existing hardware to run project

Metrics and Validation

- Tracking Rate (Hz) - Measured by the number of distinct outputs our system produces per second.
- Latency (ms) - By measuring a hand movement and recording the begin and end times manually, we can compare the results against the system's outputs to measure the lag time. The worst-case latency will be bounded by the inverse of the tracking rate.
- Precision (mm) - Measured by moving the glove small distances and determining if the system shows outputs detecting the change

Metric	Min/Max Acceptable Value
Tracking Rate	30Hz Minimum
Latency	100ms Maximum
Precision	100mm Minimum

Risk Mitigation Plan

Our modular approach mitigates risk by allowing us to add and swap components as needed without foundational changes to the design.

Modular Approach

- Communication module can be replaced if needed (Bluetooth vs WiFi)
- Additional sensors/processing as needed (LEDs instead of IMU, or combination, or Flex Sensors)
- The game itself will be programmed to take input independent on how it is being sensed.

Project Management