I.o.Toys

Bridging the Physical and Digital World through Toys

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Background

Internet of Things, the phrase we derived our project title from, is the environment in which objects in real life can be used to send or receive data, eliminating direct human-to-computer interaction. We look to provide a balanced approach to the digital and the physical, utilizing the advancements of technology/the internet of things without sacrificing the hands-on play of traditional toys.

Goals & Objectives

Goal: Create 2 proof of concepts that successfully collects data from controls implemented in tangible objects. The data collected should be represented in a motion/play of a digital object on a phone or tablet.

- Objective 1: (Fall) Design a framework for the project/concepts and research current similar products
- Objective 2: (Winter) Prototype 1 Cube Creator and Smart Soldier
  Hardware, software, documentation
- Objective 3: (Spring) Prototype Version 2 Cube Creator and Smart Soldier
  Fix errors of previous prototypes

Requirement

Function: The proof of concepts must wirelessly connect a handheld physical toy/object to a phone or tablet
User: The proof of concepts should be intuitive to the specified audience (3-6 and 7-11 year olds)
Maintenance: The proof of concepts should have an internal power supply so it can be used unplugged

Current Status

Concept 1: Cube Shape Creator

Physical Object: A six-sided cube where all sides can rotate clockwise and counter clockwise. Bluetooth connected.

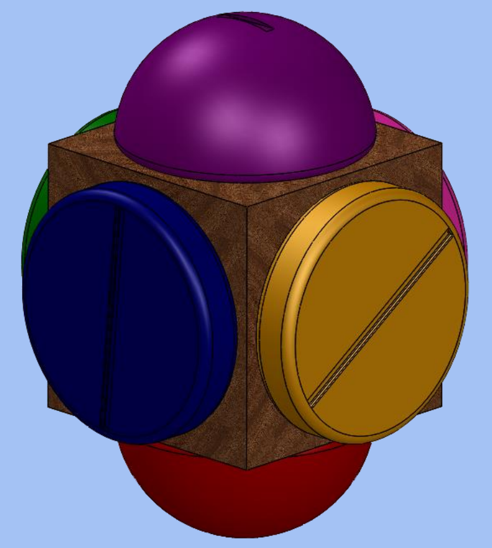
Digital: Image of multiple shapes in a design workspace which can be seen and selected on a tablet

Functionality: Rotate a side of the cube, it can alter:

- Color
- Length
- Width/Radius
- Rotate along X, Y, and Z axis

Audience:

Ages 3 – 6 year olds



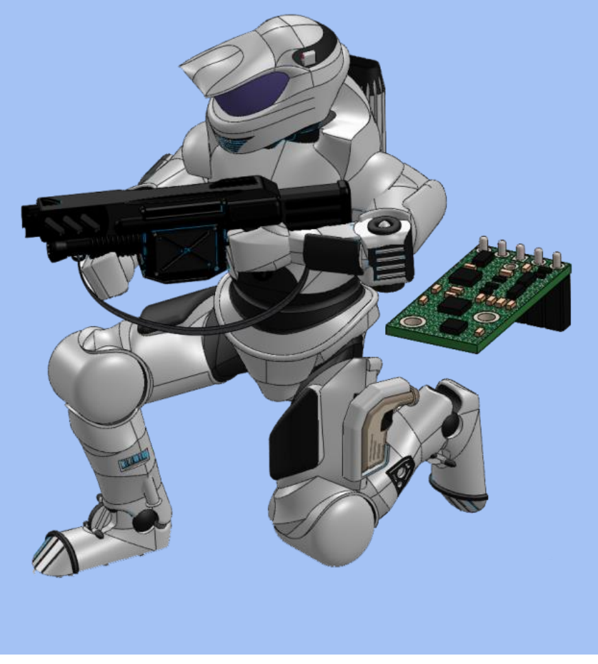
Concept 2: Smart Soldier

Physical Object: A Smart Action Figure incorporating gameplay tailored to the movement of the figure. Features an accelerometer for motion, and buttons for gameplay mechanics.

Digital: App game run on a tablet or mobile device where the toy soldier becomes the game avatar.

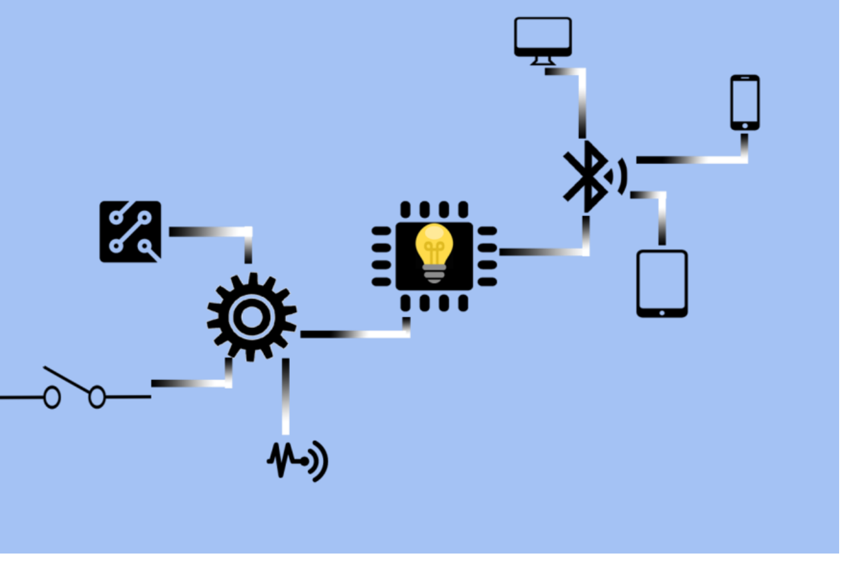
Functionality: Character movement based on accelerometer, gameplay buttons featured on the figure

Audience: Ages 7 – 11 year olds



Innovation

We will be using existing technologies like 3D printing, Unity, and Arduinos to bring to fruition our proof of concepts.



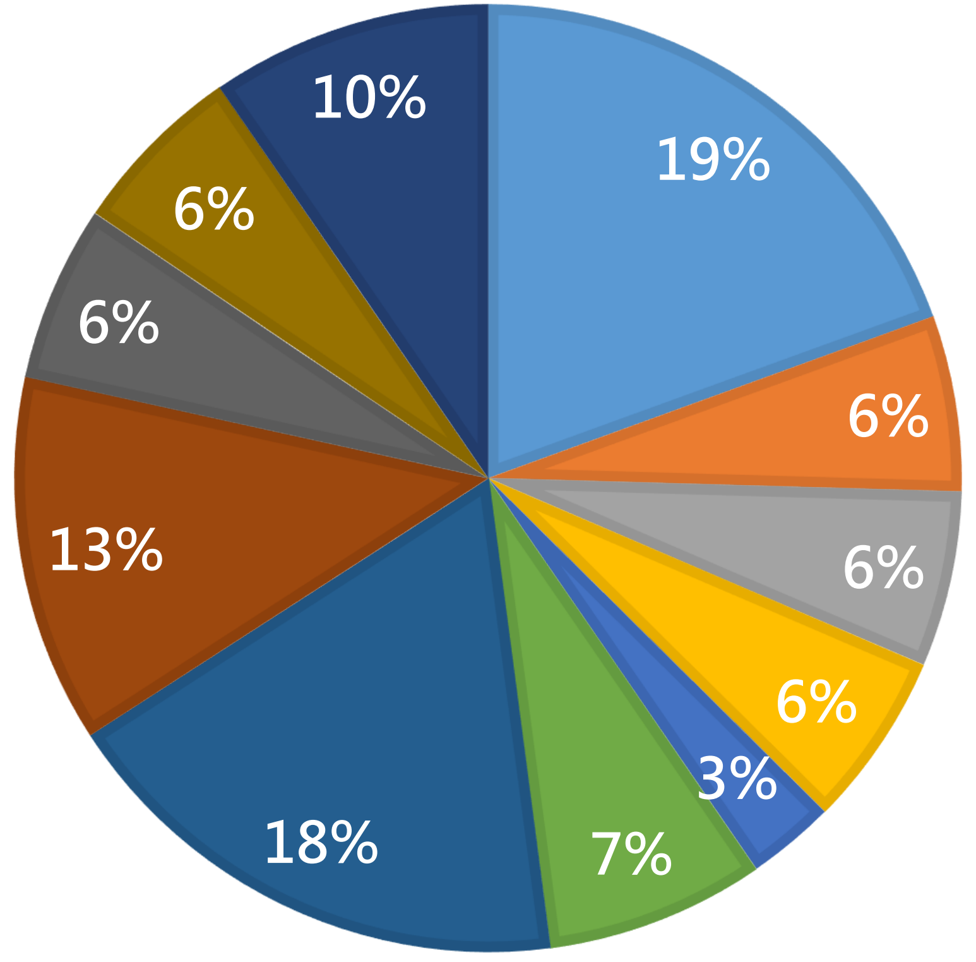
Bigger Picture

We look to promote early exposure of STEM subjects, like 3D modeling, to young children and seek to further explore the physical and digital connection.

Next Steps

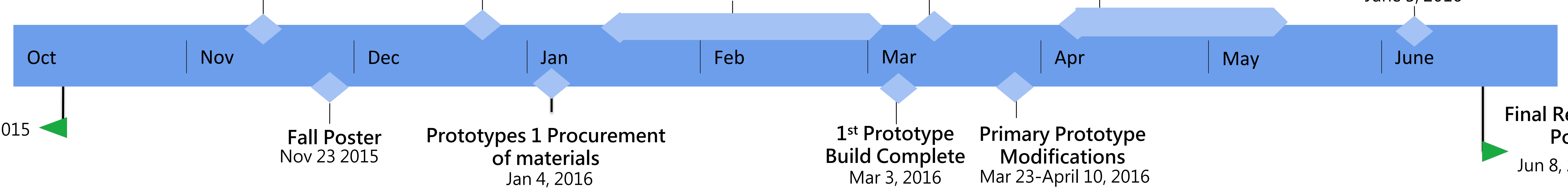
- materialize CAD designs via 3D printing
- Configure hardware
- develop code
- develop software/video game motion
- Validate and adjust prototype when ready

Budget



- Arduino Ultimate Starter Kit $65
- Bluetooth Chip (2) $20
- Accelerometer (2) $20
- Rotary Encoder (4) $20
- Pressure Sensor (2) $10
- Tact Switches (5) $25
- Potentiometer (6) $60
- Push Button Potentiometers (6) $42
- Wires (2) $20
- Mihappy Arduino Starter Kit (2) $20
- Power Source (2) $32

Total: $334



Research Concepts, Designs, and Requirements
Oct 12, 2015

Project Planning/Preliminary Design
Nov 2, 2015

Fall Poster
Nov 23 2015

Fall Design Review
Dec 2, 2015

Prototypes 1 Procurement of materials
Jan 4, 2016

Prototypes 1 Build
Jan 10-Mar 1, 2016

1st Prototype Build Complete
Mar 3, 2016

Winter Design Review
Mar 8 2016

Primary Prototype Modifications
Mar 23-April 10, 2016

Prototypes Version 2 Build
Apr 10-May 27, 2016

Final Documentation and Prototypes Version 2 Complete
June 3, 2016

Final Report and Poster
Jun 8, 2016

Sponsored by Mattel

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