

Rolling Musical Ball

A musical toy for everyone

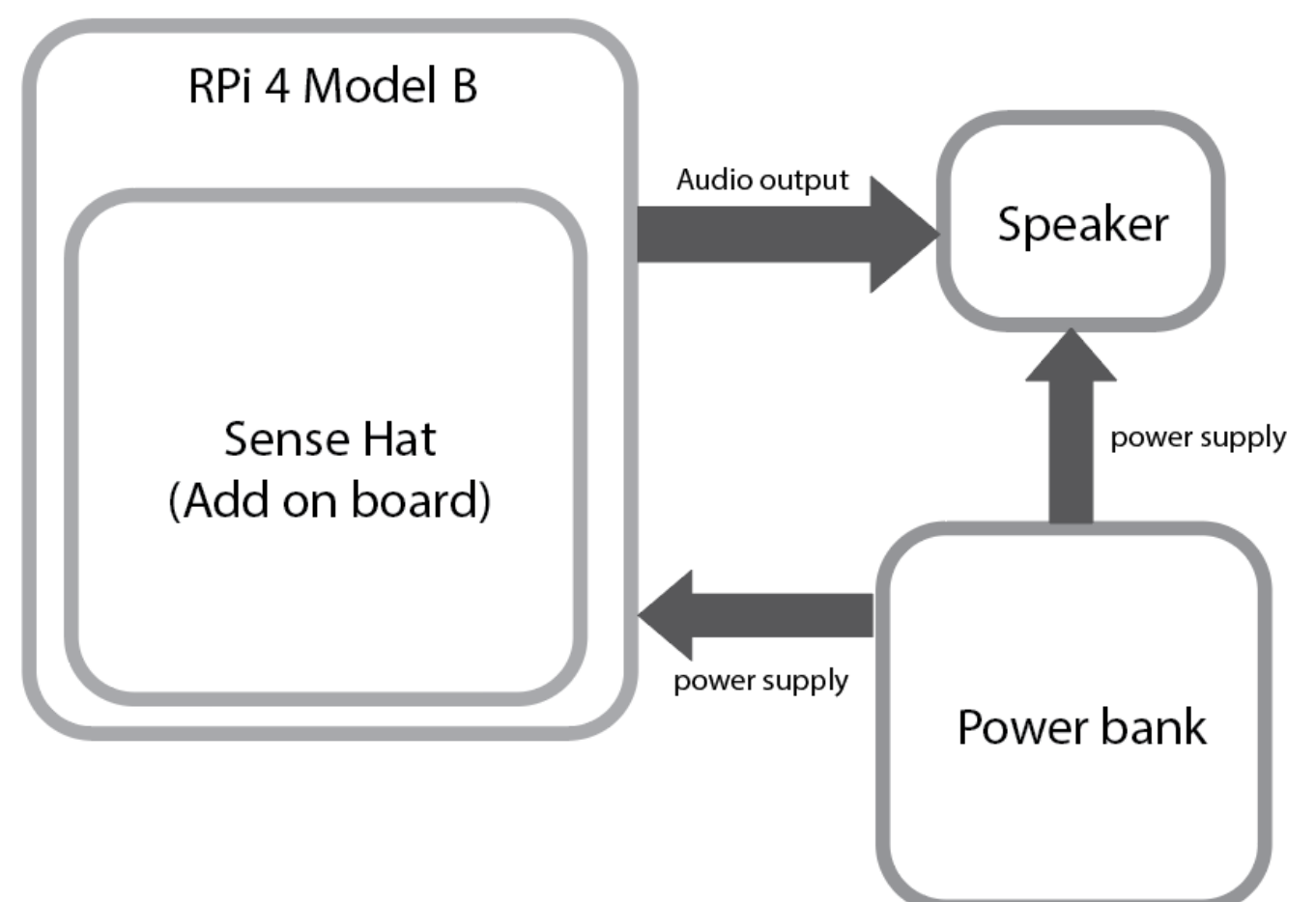
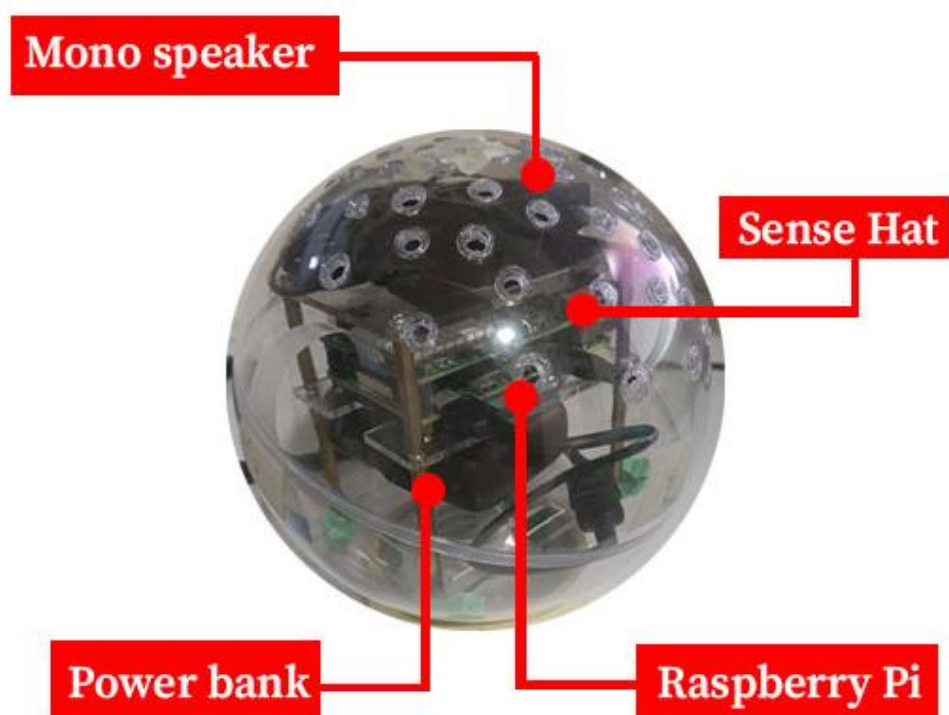
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PROJECT OBJECTIVES

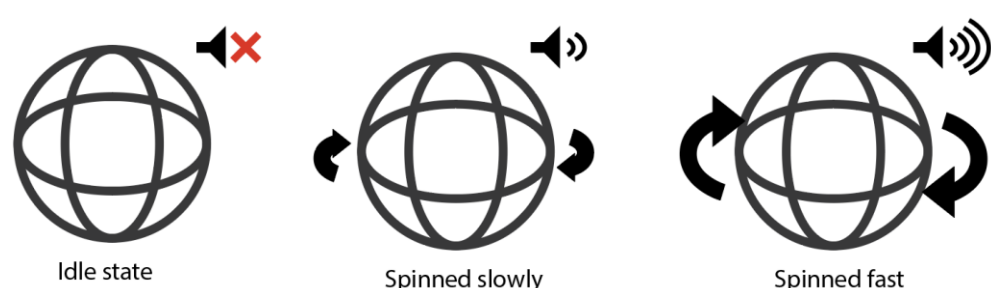
This project aims to create an embedded system that simplifies musical engagement by replacing complex finger movements with intuitive user interactions. This system, in the form of a rolling-based musical toy, aims to offer a user-friendly interface for effortless musical interaction, allowing individuals without extensive musical training to engage with music easily and explore their creativity.

Hardware component

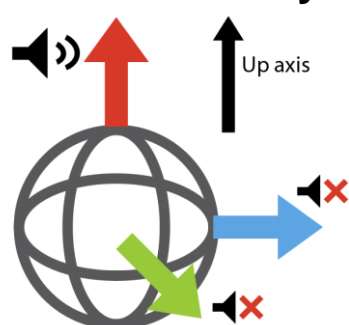


Four play modes

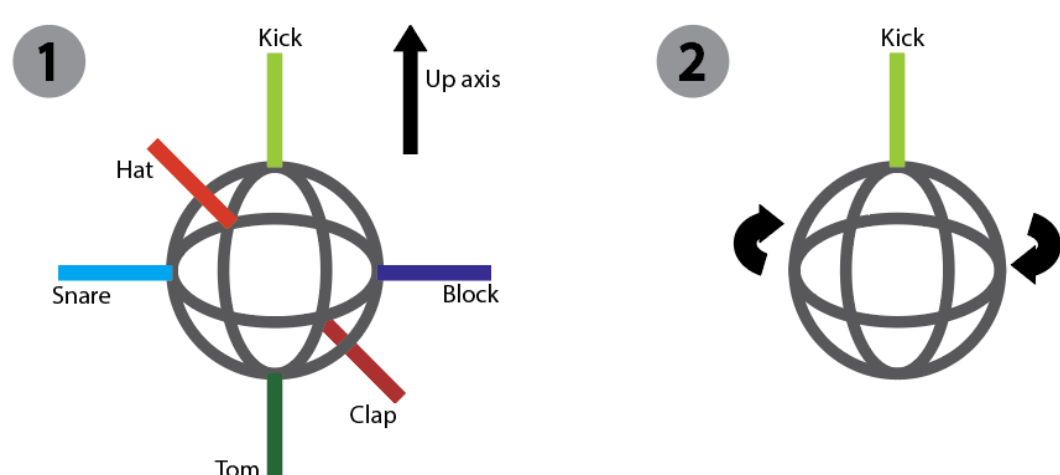
Mode 1: Rotate/Roll the ball to play a music sequence



Mode 2: Explore three music tracks by adjusting the ball orientation



Mode 3 & 4: Play/customize your own percussive music pattern



Implementation

- **Application development:** develop the Rolling Musical Ball application using Python.
- **Sensor Reading:** Read and processed raw accelerometer and gyroscope data into format suitable for the system usage.
- **Multiprocessing:** Running three separated processes parallelly to maximize the computing power of Raspberry Pi 4.
- **Music note synthesis:** Programmatically generate sinusoidal waveform data with specific frequency that represents a particular musical note.
- Multiple music stream synchronization