

# Multipurpose Controller Using Sensing Technology

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## Objectives

- To build a hardware device that is capable of sending data such as acceleration and angular speed, and button state to other devices.
- To develop a standard software interface that is flexible and scalable.
- To develop some particular applications out of the standard software interface, such as remote mouse control, Microsoft PowerPoint control and 3-D object control.

## Background

Innovative sensors and sensor systems have been one of the cores of smart structures technology, which forms the essence of system intelligence. Smart sensors are made possible because of Micro Electro Mechanical systems (MEMS) Sensing Technologies are often used together with embedded microprocessors and wireless communication modules and are widely applied to innumerable applications such as acoustic control lamps, computer touchpads, heading indicators and smartphones. Rarely, however, do we see a product that utilizes Remote Sensing Technologies for general purposes.



## Methodology

### 1) Working flow of the system

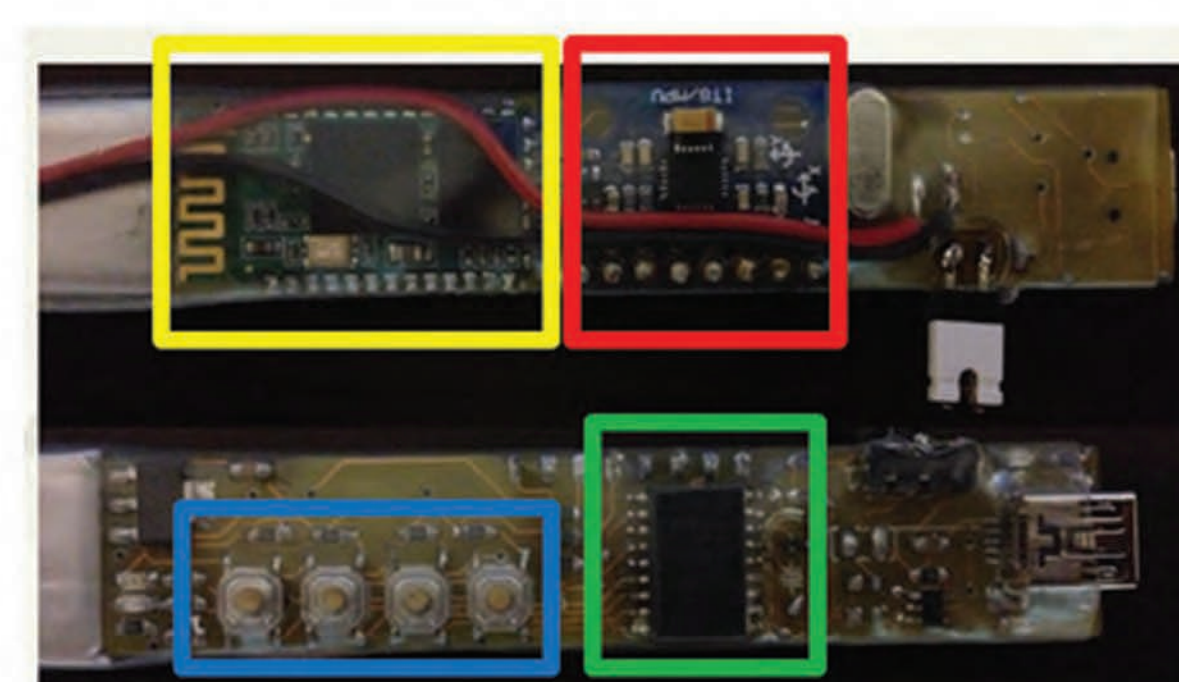
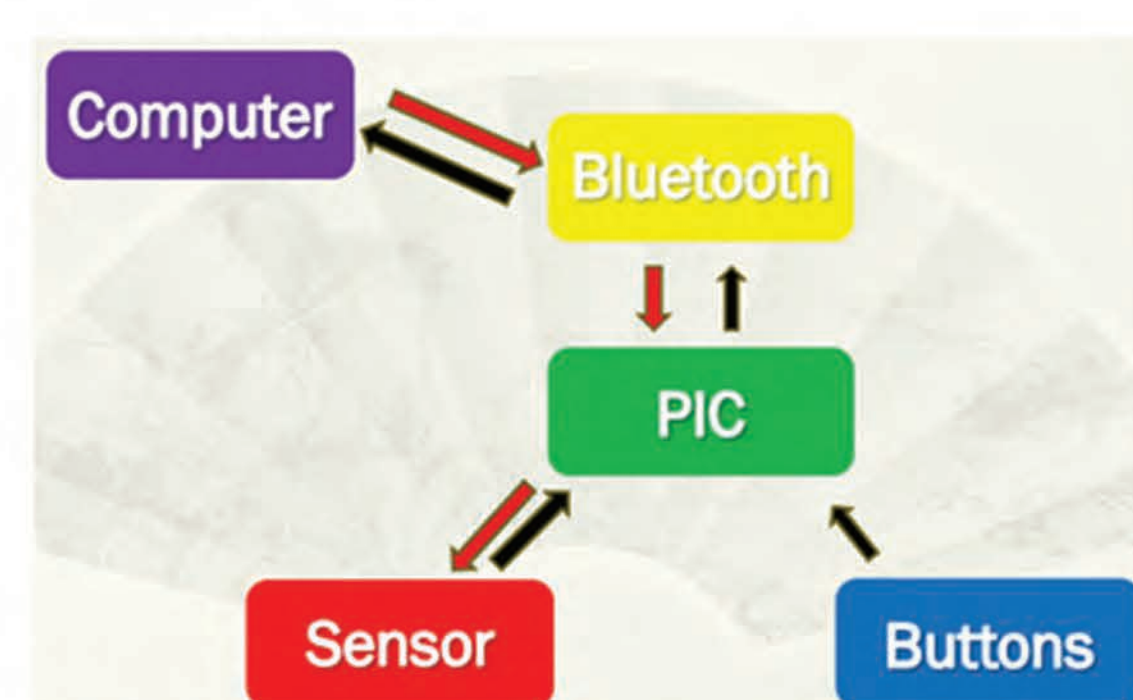
The computer first send commends to the device  
After receiving those commands, the Bluetooth module will pass them to the PIC Microprocessor.  
The PIC Microprocessor then, based on those commends, fetch the data needed and transmit the data all the way back to the computer for further processing.

### 2) HardwareDesign

The main electronic components required for this project includes: MPU 6050 Six-Axis sensor, Bluetooth serial interface module HC-05, Microprocessor PIC16F88

### 3) Software Design

The class design of this program strictly follows object oriented programming principles, which makes it flexible and extendable.  
The software is designed in such a way that it is extremely easy for users to develop their own applications.



## Results/Applications

### 1) Computer mouse control

Contorlling mouse cursor by moving the controller to different directions, and the button clicks as well as the scrolling of the wheel can be imitated using the buttons

### 2) 3D object control

Using a 3D object created by OpenGL to mimic the movement of the controller

### 3) PPT control

PowerPoint controlling using buttons or user defined gestures.

