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## Home Automation via Smart Technology

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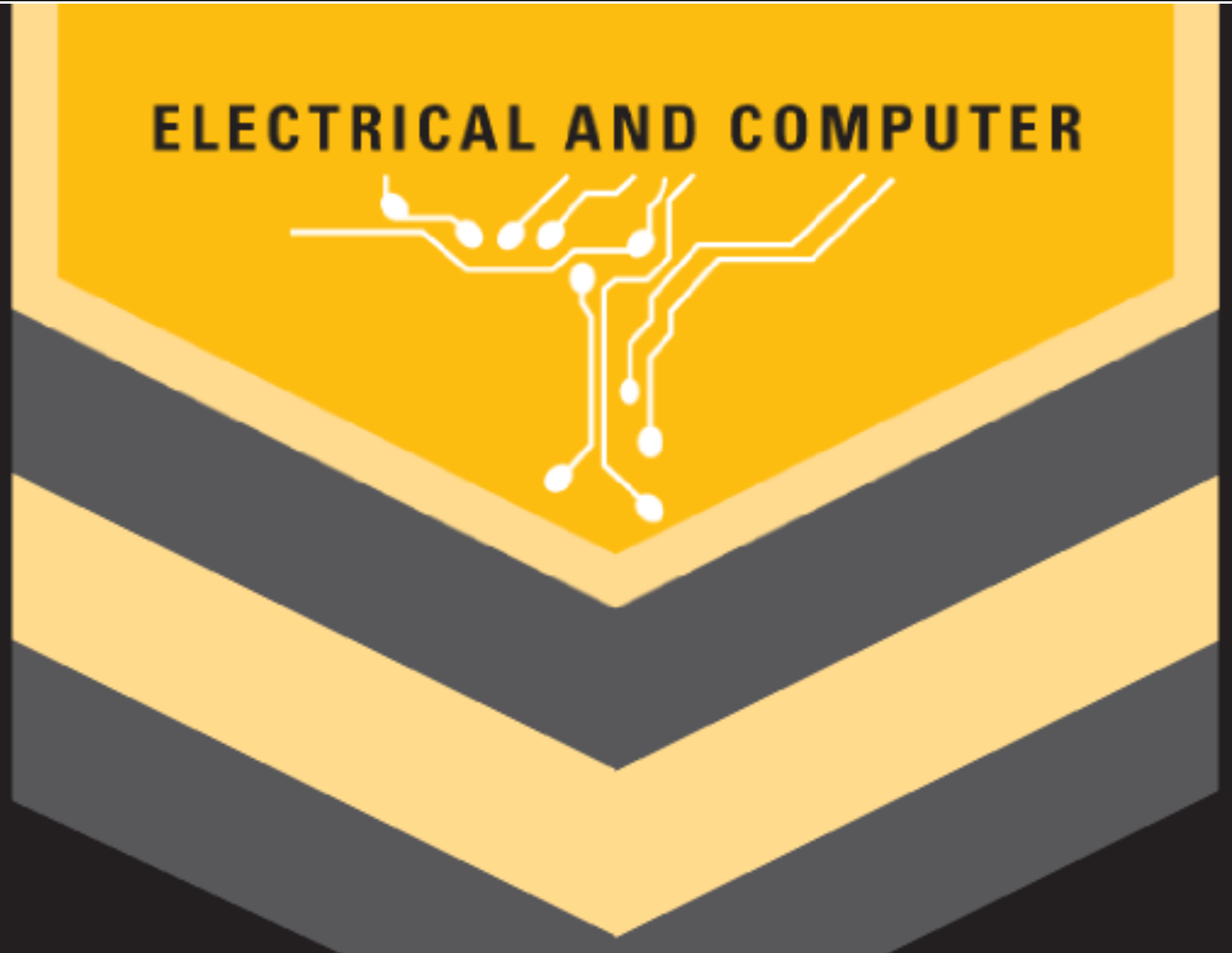
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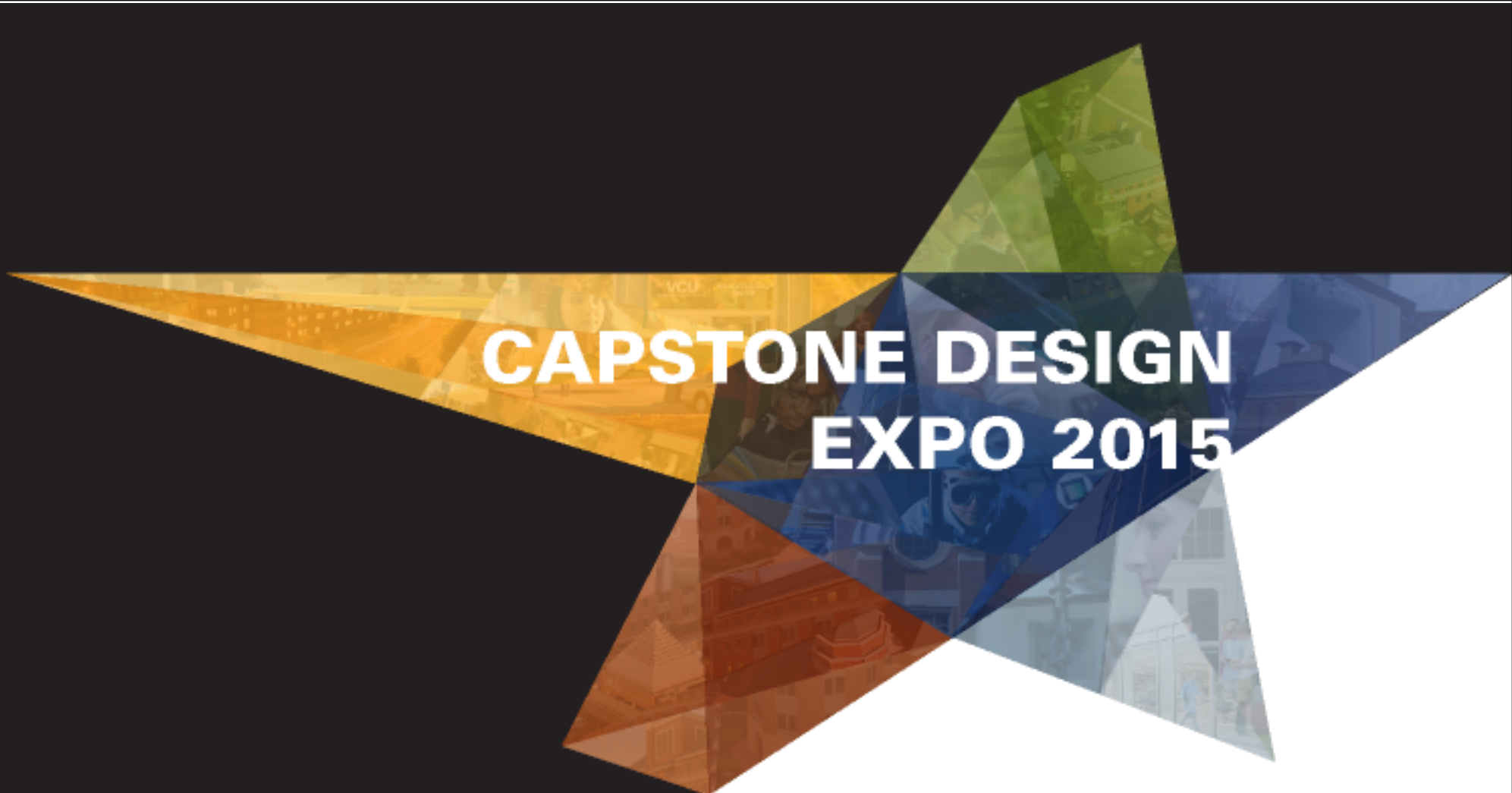
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# Home Automation via Smart Technology



## Rationale

### Objective

To create a system to monitor the operation of an electronic device, capable of being easily integrated into an existing system, which can transmit operational data and finally display that information on the end user's mobile device/smart technology. The ultimate goal of the project being to create a device, capable of monitoring a set of electronic signals (ex. Power consumption of the device), send those signals to our central hub to be turned into a data packet, and ultimately sent to an Android App displayed for the end user to empower the user to make informed decisions regarding use.

### Background and Motivation

Smart technology has led to the connectivity of nearly everything in our daily lives. As time progresses and technology improves, the very likely scenario is the continued integration of internet connectivity in nearly all electronic devices. This end goal of complete connectivity, has been dubbed "The Internet of Things" (IoT). With the rapid expansion of smart technology, companies have seen the potential of extending their products into the IoT, but existing solutions are designed with specific technology in mind, or perhaps worse yet, capitalizing on the novelty of smart technology rather than given serious consideration. There exists a need to prove the value of smart technology, and provide a motivation for faster integration into the IoT given its potential to improve our lives.

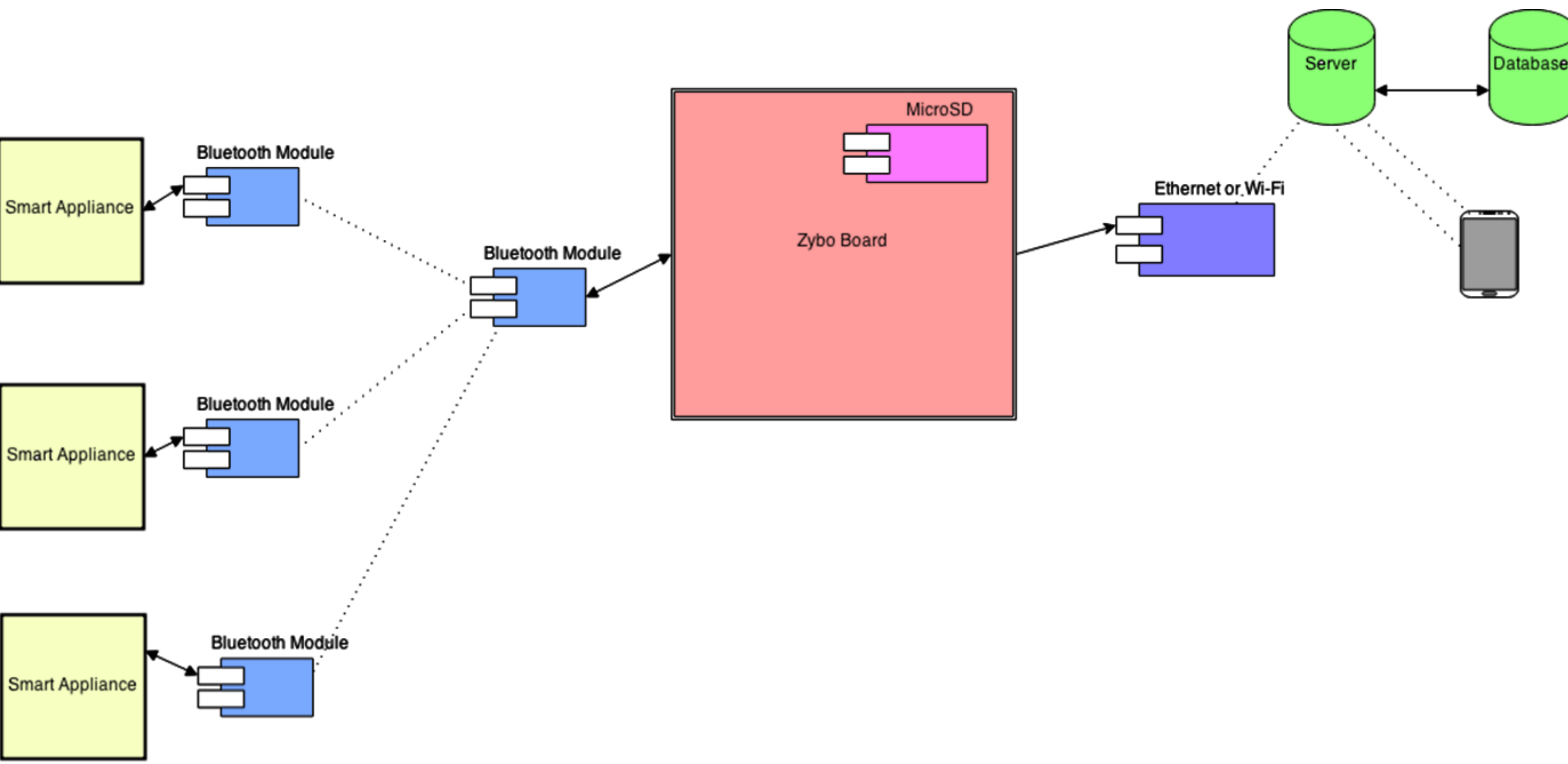
### Prospects

The finished design exists as a proof of concept, a demonstration of the potential of a tech agnostic design. Choices were made to afford maximum flexibility to future designers of IoT technology and ease of integration within new or existing devices. With the framework we've devised one can track any chosen number of values related to the operation of a device, and monitor them remotely.

## High-Level Design

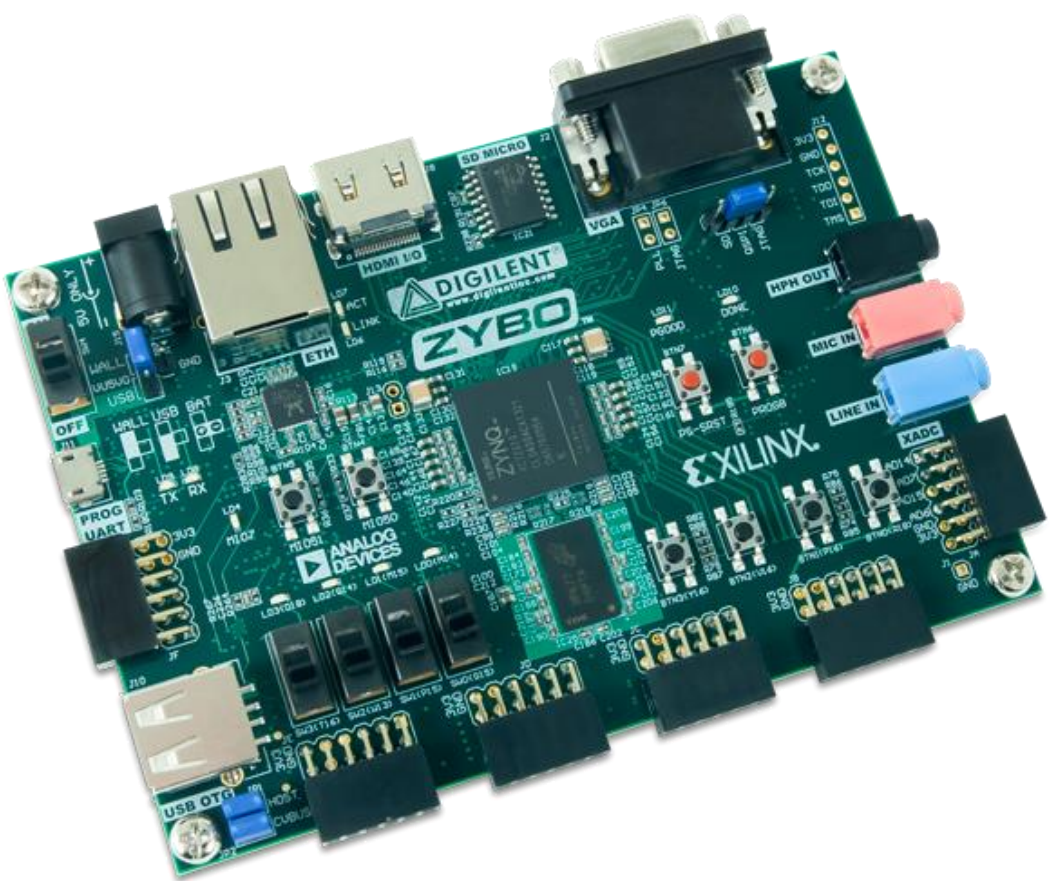
### Architecture Diagram

The ZYBO board functions as the central hub for our design. It's functions include collecting data from other appliances using Bluetooth modules, storing the information on the MicroSD card, sending the information to the server to store the data, and then finally maintaining and creating said connections for the entire transfer.



### Development Board

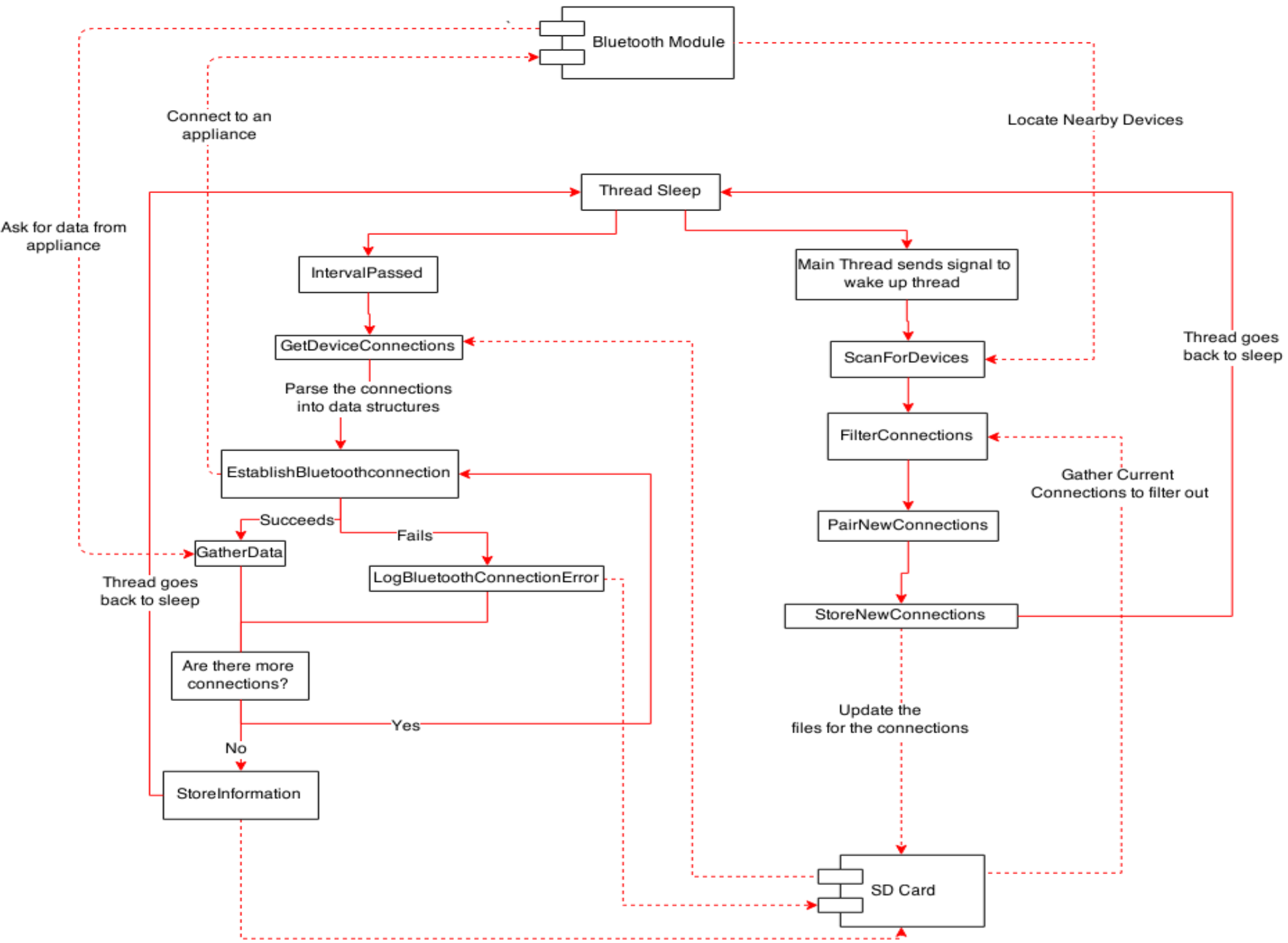
The board used in our design is the Zynq 7000 Development board. The Zynq 7000 makes an ideal central hub for our design, given its ability to interface with multiple peripherals simultaneously, the body of resources and documentation at our disposal, and the rapid development the platform allows for



## Implementation

### Functional Diagram

The central hub scans for a bluetooth capable device; upon communicating with one of the available bluetooth modules it gathers data from the device, and then proceeds to scan for additional devices. Should no additional devices be found, or it returns to the original module, it stores the data on the MicroSD card to await formatting into a packet ready to be sent to the app.



### API/Server



Upon retrieving the data from a given device, that information is formatted into a JSON data packet (table illustrates values contained within a typical data packet). The server holds that data until a request is made from an Android device with our demo app installed.

