INDOOR POSITIONING SYSTEM (IPS)

USING Wi-Fi

Objective

Learning how to implement an Indoor Positioning System(IPS) using Raspberry Pi server and Wi-Fi modules.

Motivation

The Indoor Positioning System (IPS) is an indoor version of the Global Positioning System (GPS).GPS tracking systems make our lives easier by enabling us to locate or navigate to various places, using an internet connection or GPS to do this. However, GPS is limited to outdoor locations and are not suitable for indoors, since the microwaves used get scattered by surroundings.

To overcome this issue,IPS is used which helps us track the location of an android device within a closed room, using Wi-Fi signals, which can work even in the absence of internet.

Once established, the IPS can be used to navigate through malls, indoor parking locations,airports, offices, etc.

Introduction

IPS uses Wi-Fi modules(ESP 8266) for positioning. These modules are placed at various spots in the room, and they act as wireless access points. The localization technique used with these modules is based on measuring the intensity of the Received Signal Strength (RSS) by each access point. These measurements are read by Raspberry-Pi which uses algorithms to compute the location and position of the device within the room. One such computation could be done using the Kalman Filter. Once the location is computed it is displayed.

Basic Block Representation

BLOCK DIAGRAM FOR RECEIVER
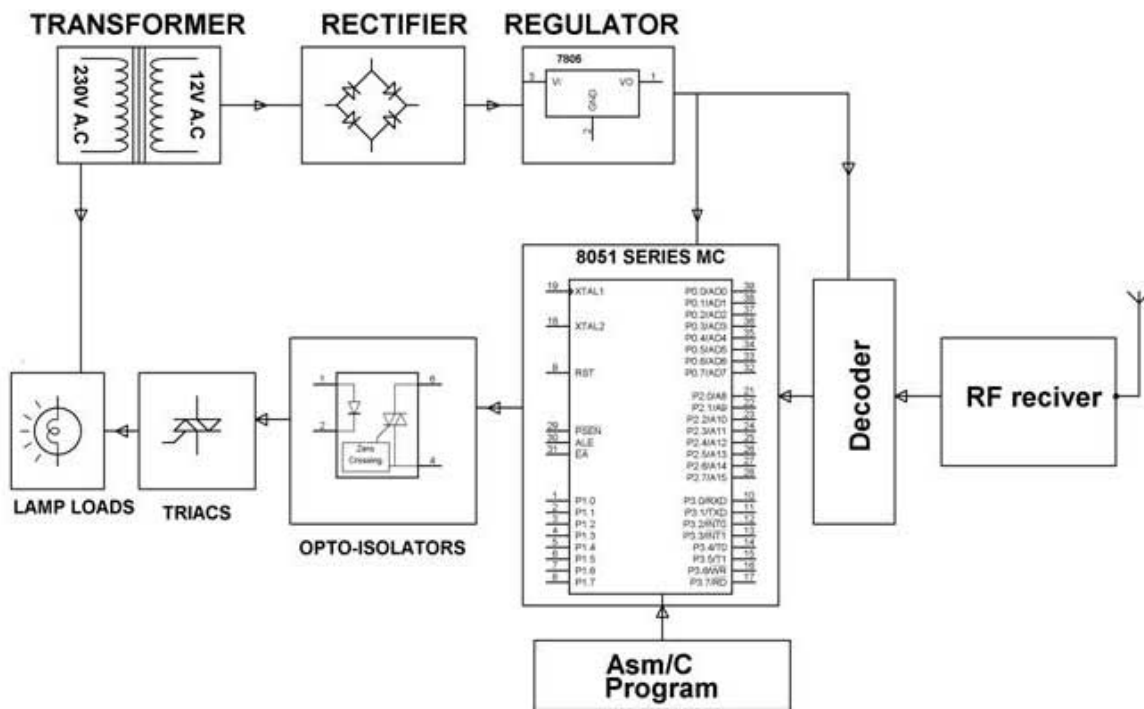
Hardware and Software

- **Hardware -**

  1. Raspberry Pi 2 (with Wi-Fi receiver) or Rasperry Pi 3
  2. ESP 8266 Wi-Fi modules

- **Software -**

  1. Raspbian/NOOBs for Rpi
  2. Code Composer Studio (Python)

Plan of Work