Power Saver

Reducing power wastage problems, the Arduino Way!

The Current Problem

It is commonly observed that in almost every house, the electrical appliances in a room are left switched on when you leave the room. Many a times either we forget to switch them off or feel too lazy to even walk up to the switch board. As a result, these devices/appliances when left unattended and switched on, leads to wastage of power and sometimes heavy electricity bills even for some cases if the time period is very often and prolonged.
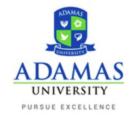
Solution

Human Interference Based Load Control System

Current Activity Tracking Methods

Nowadays in the malls and various corporate office washrooms, you will find a PIR sensor embedded in the ceiling of the washroom.

The sensors track movement and turn on the lights and keep it switched on for a fixed time interval right after sensing complete absence of human activity.

The only problem with this process - if a person is sitting quietly in a room, the PIR sensor might pickup this inactivity state as absence of humans in the room and switch off the appliances.

What can be done ?

A system that can count the number of humans in a room, can get rid of the inactivity state as which happens with the PIR sensors, where no movement inside the room is treated equivalent to no human presence inside the room.

Components available

- **Barebone** (AT8 based Arduino Clone)

- **Uploader** (CH340G based USB Serial)

- **Input Card** (Sensor Array Board)

- **Output Card** (Output Passive Board)

- **HCSR04** (Ultrasonic Sensor)

- Female to Female **Jumpers**

The Requirement

- Build a human counter and track count of the humans entering the room and subtract the count of the humans leaving the room.

- If a person stands in front of the sensor, he will always walk inside the room if the room is empty; and will always walk out of the room when the room is not empty.

- Switch on an LED only if humans are present in the room and it is night time. Use the LDR in the input card to keep track of the ambient lights.

- On detecting human absence, do give a resting period before the lights turn off.

Point System

- Initially Lights (**GREEN LED**) should be OFF – **100 Points**

- Human counter i.e. track count of the humans entering(+1) and leaving(-1) the room – (**250+250) Points**

- Lights (**GREEN LED**) should be ON only if human count is more than 1 and Its Night time - **1000 Points** to **1500 Points** depending on the efficiency of the method used

- There should be a resting period (5s) when Lights(LED) changes its state from ON to OFF - **100 Points**

Log this in a Serial Monitor in the fashion – **1000 Points**

STATE – NIGHT , HUMAN COUT – 0 , LED STATE – OFF

STATE – NIGHT , HUMAN COUT – 1 , LED STATE – ON

STATE – NIGHT , HUMAN COUT – 2 , LED STATE – ON

STATE – NIGHT , HUMAN COUT – 1 , LED STATE – ON

STATE – NIGHT , HUMAN COUT – 0 , LED STATE – OFF

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STATE – DAY , HUMAN COUT – 0 , LED STATE – OFF

STATE – DAY , HUMAN COUT – 1 , LED STATE – OFF

STATE – DAY , HUMAN COUT – 2 , LED STATE – OFF

Log this in a Serial Monitor in the fashion – **500 Points**

EMERGENCY

EMERGENCY

EMERGENCY

EMERGENCY

EMERGENCY

When you press a button,

engage a interrupt and Serial Monitor should print this 5 times

And **RED LED** should blink 5 times with the following output in Serial Monitor.

After that your program should return back to its normal execution – **500 Points**

Point Calculation

- Time taken to complete the task will be calculated in Seconds and divided from your total points.

- The team with the highest Score/ Seconds Ratio gets rewarded.

Connection Pin Outs

OUTPUT CARD

L1 – Led1 (Digital Pin)

L2 – Led2 (Digital Pin)

L3 – Led3 (Digital Pin)

Gnd - Ground

INPUT CARD

LDR – LDR (Analog Pin)

Gnd – Ground

5V – 5 V

Things to Remember

- If you declare submission, you cannot make changes. So test your solution thoroughly before declaring Submission.

- Use delays carefully as heavy use of delay can make your ultrasound malfunction. Better to go with millis() if you can.

- In case of emergency **RED LED** should blink for 5s and then return to its normal functioning.

Things to Remember

- You can use the internet for help in basic functions, however if you are copying the code from anywhere and if caught, your submission will be cancelled instantly after code check.

- There will be a demo round where you will have to explain your code so as to check the integrity of the solution.

All The Best !!!