IoT Project Idea

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Overall objective

For our IoT project, we wanted to address and tackle a common problem observed among many students across the IIIT campus as well as provide a working, practical solution that can be used by all.

This problem is the availability of western bathrooms. Students often have to manually check if the western toilets are available and often end up wasting lots of time, especially in the morning before classes. We decided to optimize this task by providing the availability of all western toilets via a web/mobile app, which tracks and displays live data. This quality of life solution can be conveniently checked on any device.

In addition to this, there are many cases where the toilets are not flushed after use. Hence, we can use this IoT device to automatically flush the toilet after sensing when one leaves.

.What are the inputs/physical quantities measured?

1. **Ultrasonic sensor** to measure distance of door from object of reference (wall).
2. **Motion Sensors** to track when someone enters or leaves the bathroom stall.

How are you going to use the input?

The **ultrasonic sensor** will be able to calculate the distance of the wall from the door such that if the distance is less than the actual distance from door to wall, then it will output that the door is currently open, else the door is currently closed. We will use the **motion sensors** in coordination with the ultrasonic sensor to reaffirm this output data by sensing whether or not someone enters or leaves the bathroom stall, further ensuring that the output data produced is accurate and reliable.

After someone leaves, measured by the door-to-wall distance being less than when the door is closed as well as motion sensor tracking someone leaving, a **servo motor** will be implemented to flush the toilet after use.

Description of the output

We will take the data of whether a stall is empty or in-use, and send this data to our server, which will contain the data for all stalls. We will then utilize this data by creating a web/mobile app to display the status of whether a stall is in use or not.

In addition to this, we will also obtain the time ranges of when the bathroom stall was occupied and when it is empty and moreover produce relevant data analysis such as histograms, time frequency charts, etc.

In this data analysis, we would also observe the floor by floor data as well as the most common times in the day that the bathroom is used such that people can figure out which western toilet is available before wasting their time to manually check.