**Discussion Room Booking System as follows:**

* **Light sensor to track room light is on. How often**
* **RFID to detect the RFID student card to track whether student used the room after booking**
* **Motion sensor to track if student is active in the room. If no movement for a while sound buzzer and further no movement will auto release the room**

**Analysis:**

* **You can track Actual Room Utilisation**
* **You can track stats like whether student booked but didn't use the room**
* **Whether student booked but use only a while**
* **Whether student left without offing the lights**

**This may used as a demo.**

**You'll need to look at my Lab practicals to learn how to use the sensors to develop this project, sensor data send over to Windows Form. Windows Form writes to local mdf and Spotfire visualise the date**

**Reference Links:**

<https://dzone.com/articles/ideas-for-using-beacons-to-enhance-events>

<https://www.engineersgarage.com/articles/sensors>

<https://www.elderresearch.com/analytics-solutions/sensor-data-iot-analytics-solutions>

<https://www.engineersgarage.com/blogs/sensor-types-used-iot>

<https://www.techradar.com/sg/news/captcha-if-you-can-how-youve-been-training-ai-for-years-without-realising-it>

**Available IoT sensors:**

- LED and push button

- Buzzer

- Rotary Knob

- PIR motion sensor

- Light sensor

- Ultrasonic distance sensor

- Water sensor

- Temperature sensor

- RFID reader

- Vibration sensor

- Sound sensor (mic)

**Introduction**

The ideas created are grouped into sections: SIT, General, Others. Currently, others only include Library Ideas. These are ideas on how to make use of possible obtainable IoT data, and if the data can be put into a form of analysis.

|  |  |
| --- | --- |
| SIT Idea 1 | |
| Idea | Push buttons for QnA and surveys (Yes/ No)  E.g. Was your experience satisfactory?  Press left button for ‘Yes’, right for ‘No’ |
| Description | Faster to press a button than to open a survey |
| Sensors: | Push button |
| Pros | 1. Impress visitors 2. Fast when a few visitors |
| Cons | 1. Might double tab, duplicate entries 2. Slow on many visitors (30+) 3. SIT already has a tablet at frontdesk for this |
| Data | Number of button inputs for each answer |

|  |  |
| --- | --- |
| SIT Idea 2 | |
| Idea | Buzzer Question Game |
| Description | For any tour events with youngsters, a buzzer quiz game can be implemented. The purpose is not to create games, but to gain information. Such as interest and understanding to the topic. Similar to this article [here](https://www.techradar.com/sg/news/captcha-if-you-can-how-youve-been-training-ai-for-years-without-realising-it). |
| Sensors: | Buzzer |
| Pros | 1. Impress visitors 2. Free information |
| Cons | 1. May deem redundant |
| Data | The answer to the buzzer |

|  |  |
| --- | --- |
| SIT Idea 3 | |
| Idea | Free Lab Tracker |
| Description | In SIT, there are free computer labs on level 6 during the weekdays. We can track the frequency of visits, and how often students use the labs. |
| Sensors: | PIR motion sensor, Ultrasonic distance sensor |
| Pros | 1. Estimate how often free labs are used 2. Identify peak timings, and how many labs are taken 3. Can be used in other rooms as well |
| Cons | 1. School PC may interfere with accurate data |
| Data | Time and duration of used rooms. |

|  |  |
| --- | --- |
| SIT Idea 4 | |
| Idea | Leaving Lecture Doors |
| Description | During long lectures, students may leave the LT, which can indicate uninterest. Using the sensor behind the doors, we can track the number of times each door opens. |
| Sensors: | Ultrasonic distance sensor |
| Pros | 1. Observe leaving patterns in lectures 2. Find frequency of early dismissal |
| Cons | 1. Students may sleep in lectures instead of leaving 2. Genuine frequent toilet visits affects data 3. Data can be difficult to collect accurately 4. Late arrivals can affect accuracy |
| Data | Time of any door opening before lecture end |

|  |  |
| --- | --- |
| SIT Idea 5 | |
| Idea | Kept Closed Doors |
| Description | Certain doors must be kept close, such as the FYPJ entrances. This can help track any patterns in doors being opened for extended periods of time. |
| Sensors: | Ultrasonic distance sensor |
| Pros | 1. Track closed doors 2. Identify any unusual patterns that doors are opened |
| Cons | 1. Some doors may not have a parallel wall when opened to place the sensor |
| Data | Time of any long durations of open doors |

|  |  |
| --- | --- |
| SIT Idea 6 | |
| Idea | Rowdy Students in FYPJ labs |
| Description | In SIT FYPJ labs, staff will patrol to monitor student behavior. However, the frequency is too little due to the lack of staff and students are able to observe staff patrolling patterns. These students tend to talk loudly, affecting others in the room. Tracking noise in each FYPJ room can help track for rowdy students. |
| Sensors: | Sound sensor |
| Pros | 1. Track for patterns in loud noises 2. Catch when students are being disruptive to other students |
| Cons | 1. Random high pitch noises can interfere 2. Students may gather to another room to create false data about original students of the room |
| Data | Time of extended periods of loud noises |

|  |  |
| --- | --- |
| SIT Idea 7 | |
| Idea | Monitor School Equipment |
| Description | Placing vibration sensors, we can track if students are treating school equipment with care. Can be useful for keyboards, as stressed students may tend to bang both hands onto the keyboard out of frustration. |
| Sensors: | Vibration sensor |
| Pros | 1. Track condition of each keyboard 2. Identify students that hit on keyboards |
| Cons | 1. Typing too aggressively can create false data |
| Data | Time of large vibration detected |

|  |  |
| --- | --- |
| General Idea 1 | |
| Idea | Lighting Tracker |
| Description | Light sensors are placed opposite any lighting to measure the intensity of light. This can track when to replace lightings by predicting faulty lightings. |
| Sensors: | Light sensor |
| Pros | 1. Track faulty lightings 2. Predict faulty lightings (Long term data) |
| Cons | 1. Costly 2. Random object can obstruct light sensor 3. Have to maintain sensors |
| Data | Intensity of light over time |

|  |  |
| --- | --- |
| General Idea 2 | |
| Idea | Empty Free Room Lights |
| Description | Empty rooms with lights turned on can create problems, financially to the school and to students looking for empty free rooms. |
| Sensors: | PIR motion sensor, Light sensor |
| Pros | 1. Track frequency in empty rooms with lights 2. Observe any patterns |
| Cons | 1. May deem excessive and too redundant 2. Patterns will be rarely found |
| Data | Intensity of light over time |

|  |  |
| --- | --- |
| General Idea 3 | |
| Idea | Faulty Windows |
| Description | Track for any faulty windows by monitoring if rain water managed to leaked into edges of the window. |
| Sensors: | Water sensor |
| Pros | 1. Identify for any leakage 2. Predict for any patterns in leakages/ faulting windows |
| Cons | 1. Accidental spillage will interfere with data |
| Data | Time and duration any water detection |

|  |  |
| --- | --- |
| General Idea 4 | |
| Idea | Faulty Air Conditioning |
| Description | Track the air conditioning of each room. |
| Sensors: | Temperature sensor |
| Pros | 1. Track for unusual temperature fluctuations 2. Predict faulty air conditioners (Long term data) |
| Cons | 1. Unusual temperature fluctuations can be by other objects |
| Data | Temperature of each room |

|  |  |
| --- | --- |
| Library Idea 1 | |
| Idea | Library Noise Pollution |
| Description | At level 5, it is strictly no-noise. However, noisy students may still go there. The free desk are arranged specifically for individual or pair use. Placing sensors in each desk can help track noise pollution in level 5 Library area. |
| Sensors: | Sound sensor |
| Pros | 1. Observe frequency patterns of noisy students 2. Identify the rowdy students |
| Cons | 1. May be deemed excessive 2. Too many desks, costly 3. Catching rowdy students may not be efficient 4. Student pairs talking softly may be falsely accused |
| Data | Time of any sound pickup |