**Plan of Action**

**IOT CASE STUDY**

**Iot – Based Automated Control Of**

**Computer Labs**

**(Using ESP32 and CO2 Sensor)**

Plan of Action proposed for Review 2 and Review 3:

(Considered for End Semester Lab Component)

Section: CSEA Project Title: Smart Lab

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**Team Members:**

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| TOPIC | RUBRICS FOR EVALUATION | OUTCOME | DATE OF SUBMISSION |
| Review 2 Implementation  (20 Marks) | 1.Prototype of the suggested design  Simple and Not working – (0-4 M)  Simple and working –  (5 – 7M)  More Realistic and Working – (8 – 10 M) | 1.Will be implementing the logic for power consumption and Air Quality Monitoring of Smart Lab and Analyse it. | 11/05/24 – Logic implementation. |
|  | 2.Cloud Storage –  Influx Db or Dynamo DB or Fire base and EDA | 2. 2-3 weeks of data pushed into the cloud and analysis it. | 11/05/24 – Push Data to cloud. |
| Review 3  Final Project review  (20 Marks) | 3.Stored data less than 3 days – (0 – 2M)  Stored data upto 3 days and not analysed (3 – 4M)  Stored data upto 3 days and analysed (5 – 8M)  Stored data upto 7 days – (9 – 10M) | 3. we will be showing data pushed into the cloud upto 3 weeks  and analysis | 19/05/24 –Show the Data that is pushed |

**Logic of How this Works :**

The approach we are employing involves gathering data from the laboratory over a period of one month, corresponding to four weeks, with a focus on three specific days of the week: Monday, Wednesday, and Friday. This data collection will include the number of laboratory sessions conducted on these days, the power consumed in each of the lab session, as well as the number of systems utilized during each session along with reading the level of CO2 in the Lab.

**Examining Week 1, as detailed in the provided table below:**  
Monday:  
 On Monday, there is one laboratory session scheduled, attended by all students, resulting in the utilization of all 72 systems. Given that each system operates at a power consumption rate of 30 watts per 15 minutes, the total power consumed during this session amounts to 2160 watts (72 systems \* 30 watts). As the laboratory operates at maximum capacity, the CO2 levels are anticipated to exceed 1000 parts per million (ppm), indicating poor air quality.

Wednesday:  
 On Wednesday, one laboratory session is scheduled, during which 60 systems are utilized. Using the same power consumption rate of 30 watts per 15 minutes per system, the total power consumed amounts to 1800 watts. With the laboratory operating at this capacity, the CO2 levels are expected to surpass 700 parts per million (ppm), indicating a medium level of air quality.

Friday:  
 On Friday, there are two laboratory sessions planned. Each session involves the utilization of 15 systems, resulting in a total of 30 systems being used throughout the day. The total power consumption for both sessions combined is 900 watts, calculated using the same power consumption rate of 30 watts per 15 minute per system. Since the total CO2 levels remain below 700 ppm, the air quality is categorized as good. The lower number of systems in use on Friday compared to that of Monday results in reduced CO2 emissions as number of people in the lab will be less, which contributes to the maintenance of good air quality despite the presence of multiple sessions.

**WEEK 1:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DAYS | No: of Lab Sessions that took place. | No: of Systems used. | Total Power Consumed. | Air Quality in Lab. |
| Monday | 1 | 72(100%) | 2160 watts | >1000 ppm(Poor Air Quality) |
| Wednesday | 1 | 60 | 1800 watts | >700 ppm(Medium Air Quality) |
| Friday | 2 | 15\*2 | 900 watts | <700 ppm(Good Air Quality) |

**Examining Week 2, as detailed in the provided table below:**

Monday**:**  
 No laboratory sessions are scheduled; the lab remains inactive. Consequently, no power is consumed during this period. The absence of activity shows us that there was no one present in the lab on Monday which means that air quality of the lab would be good.

Wednesday:  
 One laboratory session is scheduled for Wednesday, during which 70 systems are utilized. Employing the same power consumption rate of 30 watts per 15 minutes per system, the total power consumed amounts to 2100 watts. Given the significant utilization, CO2 levels are projected to exceed 1000 parts per million (ppm), indicating poor air quality.

Friday:  
 One laboratory session is planned for Friday with 15 systems in use. The total power consumption during this session is calculated to be 450 watts, maintaining the same power consumption rate of 30 watts per 15 minutes per system. As the total CO2 levels remain below 700 ppm, the air quality is classified as good, contrasting with the preceding Wednesday's scenario of poor air quality due to lower system utilization.

**WEEK 2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DAYS | No: of Lab Sessions that took place. | No: of Systems used. | Total Power Consumed. | Air Quality in Lab. |
| Monday | 0 | 0 | 0 watts | <700 ppm(Good Air Quality) |
| Wednesday | 1 | 70 | 2100 watts | >1000 ppm(Poor Air Quality) |
| Friday | 1 | 15 | 450 watts | <700 ppm(Good Air Quality) |

**Examining Week 3, as detailed in the provided table below:**

Monday:  
 Consider a scenario where Week 3 represents a busy period in the academic calendar, with numerous laboratory sessions scheduled on Monday, the laboratory hosts three scheduled sessions, where 2 sessions were accommodating 25 systems, and 1 session was accommodating 30 systems. This configuration results in a total power consumption of 2650 watts, calculated at a rate of 30 watts per 15 minutes per system. However, the increased utilization contributes to elevated CO2 levels, surpassing 1000 parts per million (ppm), indicative of poor air quality.

Wednesday:  
 No laboratory sessions are scheduled for Wednesday, rendering the lab inactive. Consequently, no power is consumed during this period, and no people using the lab leaving it with good air quality.

Friday:  
 A single laboratory session is slated for Friday, with 30 systems in operation. The total power consumed during this session amounts to 900 watts, maintaining the established power consumption rate of 30 watts per 15 minutes per system. Despite the session, the CO2 levels remain below 700 ppm, ensuring good air quality within the laboratory environment.

**WEEK 3:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DAYS | No: of Lab Sessions that took place. | No: of Systems used. | Total Power Consumed. | Air Quality in Lab. |
| Monday | 3 | 80(25+25+30) | 2650 watts | >1000 ppm(Poor Air Quality) |
| Wednesday | 0 | 0 | 0 watt | <700 ppm(Good Air Quality) |
| Friday | 1 | 30 | 900 watts | <700 ppm(Good Air Quality) |

**Examining Week 4, as detailed in the provided table below:**  
 Represents a typical week in the lab, with consistent activity levels across the scheduled sessions

Monday:  
 One laboratory session is scheduled for Monday, involving 40 systems. The total power consumption during this session is calculated to be 1200 watts, maintaining the same power consumption rate of 30 watts per 15 minutes per system. This level of utilization results in CO2 levels exceeding 700 parts per million (ppm), indicating medium air quality.

Wednesday:  
 One laboratory session is planned for Wednesday with 50 systems in operation. The total power consumed during this session amounts to 1500 watts, calculated at the established power consumption rate of 30 watts per 15 minutes per system. With increased system utilization, CO2 levels are projected to surpass 700 ppm, indicating medium air quality.

Friday:  
 One laboratory session is scheduled for Friday with 20 systems in operation as the students would go home considering the weekend resulting in less number of people attending. The total power consumed during this session is 600 watts, maintaining the same power consumption rate of 30 watts per 15 minutes per system. As the total CO2 levels remain below 700 ppm, the air quality is classified as good despite the moderate level of system utilization.

**WEEK 4:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DAYS | No: of Lab Sessions that took place. | No: of Systems used. | Total Power Consumed. | Air Quality in Lab. |
| Monday | 1 | 40 | 1200 watts | >700 ppm(Medium Air Quality) |
| Wednesday | 1 | 50 | 1500 watt | >700 ppm(Medium Air Quality) |
| Friday | 1 | 20 | 600 watts | <700 ppm(Good Air Quality) |