Bring ideas to life
VIA University College

SEP4 - CO2 Sensor

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1 Background description

IAQ (Indoor air quality)

In recent years there has been an increasing number of students complaining about health problems in schools and institutions. Hypersensitivity and allergies seem to flourish with poor learning and increased absenteeism as the main consequences.[1]
Researchers and scientists seem to agree that poor indoor air quality is to be blamed. They find that high levels of carbon dioxide influence people's health, particularly the brain. They find that even low levels of CO2 are dangerous in closed rooms. The same issues apply to business meeting rooms. This means that poor IAQ may be the cause of poor productivity and increasing health problems in general among many people.[2]
Scientists have researched carbon dioxide levels and potential health problems and have listed five levels: 250-350, 350-1,000, 1,000-2,000, 2,000-5,000, >5,000, and >40,000 ppm[3]. It has been found that the maximum acceptable level of Co2 should be between 600 and 1000 ppm[4]

Increasing ventilation in classrooms and business meeting rooms would substantially decrease illnesses and absence rates, thus creating economic benefits in the whole society.[5] The challenge is to make people aware of the increased levels of Co2 in rooms and act accordingly. CO2 makes up a part of every breath humans exhale causing the levels to rise as more people gather. people must, therefore, be aware of the dangers of the increased level of CO2 all the time. By making the teachers in the institutions aware of the increased level of co2 inside their classrooms, they can act properly to that by refreshing the air in order to improve students' concentration and focus.

2 Definition of purpose

The purpose of this project is to create a system that will track CO2 levels and temperature in the classrooms, to ensure the best indoor environment quality required for the best learning process. Moreover, the system will make some analyses of the collected data from the system and reflect the result into an Android device.

3 Problem Statement

How to make it efficient for users to get information about indoor air quality inside the classrooms?

- How to make it efficient for users to get information from the database
- How to deal with cloud service providers.
- How to handle security.
- How to protect copyrights.
- How to display the analyzed data to the user.
- How to handle different types of data, and how to parse it.
- How to make the system respond to data analysis.

4 Delimitation

1. The project will not get the legal documentation related to copyright.
2. The system will not respond to any user actions. (opening the windows)

5 Choice of models and methods

What are the partial problems	Why study this problem related to the purpose of the project.	Which methods/models/ Theories will be used.	Which level of the outcome expected.	Who in the group is the main responsible person for this point.	What is the estimated workload (hours
How to make it efficient for users to get information from the database.	To ease the communication between the user and the database.	Web service, Bridge app.	The system should work as expected and should meet all the requirements.,	Data group	We planned to spend about 140 hours/student, but it is changeable according to the Conditions.
How to deal with cloud service providers.	To structure the database according to the customers' needs.	SQL and Dimensional Model.		Data group	
How to handle security.	To give access only to valid users, protect data privacy.	User validation. Encryption. Use SSL to ensure more secure communication between layers.		Data group	
How to protect copyrights.	To protect the ownership of this system.	Ensure that the work is properly marked.		The whole group	
How to display the analyzed data to the user.	To provide the user-friendly interpretation of analyzed data to the consumer.	Graphs, GUI.		Android group	

How to handle different types of data, and how to parse it.	To unify the process of measuring data and parsing them into the database.	LoRa Wan (transmitting) C (parsing data)		Embedded group	
How to make the system respond to data analysis.	To regulate CO2 levels in the room.	RC-servo		Embedded group	

6 Time schedule

Total work time: 1400 hours.

Work time per group member: 140 hours.

Project kick-off: 7th of February.

Group info deadline: 8th of February.

Idea deadline: 13th of February.

Project description deadline: 27th of February.

Use cases deadline: 6th of March.

Analysis deadline: 13th of March.

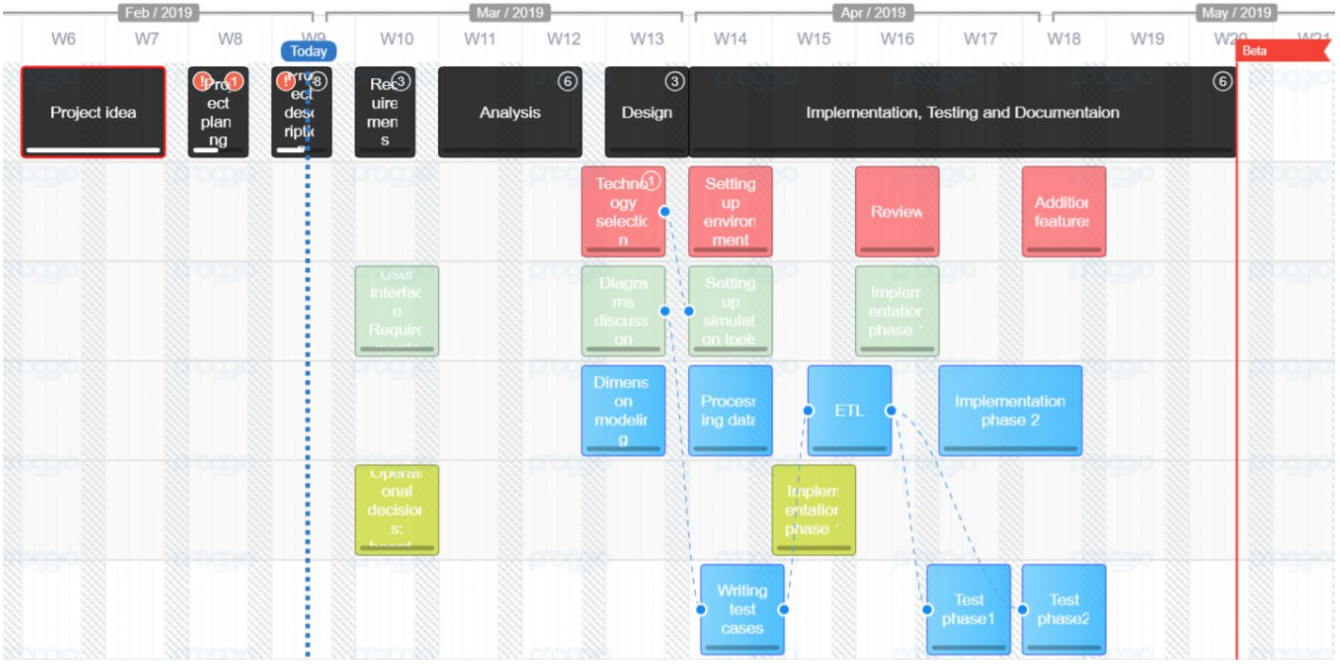
Design deadline: 3rd of April.

Proof of concept deadline: 25th of April.

Project implementation, testing and documentation date start on 8th of April until 15th of May.

Project period deadline: 15th of May.

6.1 Agile Unified Process



7 Risk assessment

Risk	Severity (1-5)	Likelihood (1-5)	Risk Mitigation
Project member absence	3	3	Either the person can work on the task from home or the group can take responsibility for their task or tasks for that missing day.
Github merge	5	4	Creating branches for bigger projects and pushing small commits to master that will not create errors. Work only on a local copy and do not push until it is checked for errors. Always communicate when pushing to avoid merge errors.
Lost of data	5	1	Create a copy of the part you are working on locally. A copy of the latest changes is required to have at all times.
Miscommunication	1	3	Openly talk and listen to all of the group members. Communication with supervisors is necessary to avoid further confusion.
Deadlines	5	1	Correct planning for the deadlines. Help group members that are behind.

8 Sources of Information

Sources of Information

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Appendices