Indoor parameter monitoring system

Alexandru Mihai Serb, 266913

Mihail-Alexandru Ciornea, 266875

Raul Andrei Pologea, 266240

Rares Dumitru Bunea, 266983

Liviu Lesan, 241737

Ilie Putina, 266060

Boris Staver, 267315

Ionut Iulian Boitan, 266869

Alexandru Mircea Dima, 266006

Alexandru Vieru, 267013

Ib Havn

Erland Ketil Larsen

Lars Bech Sørensen

Kasper Knop Rasmussen

Knud Erik Rasmussen

[ICT]
[4th semester]
[February 2019]

Table of content

1 Background description

One of the most bothersome issues in a closed space is the fact that it may often become an unsuitable working environment. Human activities happen almost always in a closed environment. No matter if the activity relates to working or to studying, or just to relax, human performance and behavior is strictly related to indoor conditions regarding multiple factors such as: CO_2, temperature, humidity etc.

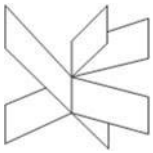
"Associations of higher indoor carbon dioxide (CO_2) concentrations with impaired work performance, increased health symptoms, and poorer perceived air quality have been attributed to correlation of indoor CO_2 with concentrations of other indoor air pollutants that are also influenced by rates of outdoor-air ventilation."[1]

"For example, increasing humidity may reduce the incidence of common respiratory infections and provide relief for asthmatics. On the other hand, an increase in humidity may increase the prevalence of microorganisms that cause allergies. Criteria for indoor exposure must balance both effects."[2]

Considering the results of the studies stated above, there is a need to measure / monitor the overall conditions of indoor environment in general and specifically at VIA.

2 Definition of purpose

The purpose of project is to create a device that will use sensors to monitor quality of air in a closed environment by measuring parameters such as CO_2 levels, humidity and temperature, store data on a dedicated server therefore to display it on a android device.

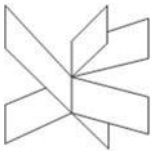


3 Problem Statement

The system is one for measuring the CO2 level from a closed environment and alarm the users if the level is too high .The system also measure the temperature and the level of humidity.

The system is one that will measure the quality of the working enviroment.
Various problems will be tackled:

- How to measure the quality of the air ?
- How will the gathered data be stored for future analysis?
- How will the assesment for the gathered data will be made?

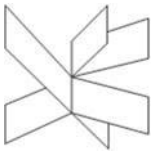


4 Delimitation

- The system cannot be used in an open environment.
- To access the system an android device is needed.
- To access the system an internet connection is required.

5 Choice of models and methods

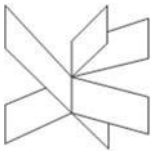
How to measure the quality of the air ?	In order to gather the data that will be later analyzed	Arduino Mega2560 MCU, LoRaWAN(Iot-Network), C programing language,	Liviu Lesan Alexandru Mircea Dima Ionut Iulian Boitan
How will the gathered data be stored for future analysis?	For the results to be valid in the long term, a average has to be calculated from saved data	MongoDB,Sql, Power BI	Raul Andrei Pologea Alexandru Mihai Serb Mihail Alexandru Ciornea
How will the assesment for the gathered data will be made?	Average data and curent parameters are interpreted according to certain limits and displayed on a mobile device	Android froamework, Java, Google Material design	Ilie Putina Dumitru Rares Bunea



6 Time schedule

For this project, each member of the group must work around 7 hours in every project day. This equals to a required 140 hours per student and 1400 hours for the whole team. These hours will be distributed among the different tasks and split according to the future sprints.

The project started on the 7th of February when we had to form the project group. In the following days we had to write the group contract to ensure that all the team members agree to a set of rules and a working schedule. The first deadline our team had was on the 14th of February. It consisted of delivering the “project idea” to our supervisors. The second deadline was on the 27th of February, when we had to present our “project description”. The rest of the hand-ins are going to be fulfilled by the team in the future of the project. The final hand-in of the project will be on the 15th of May.



7 Risk assessment

Description	Likelihood	Severity	Risk mitigation	Identifiers	Responsible
Lack of knowledge	2	5	Keep working as a team on every exercise	Impossibility of creating the system	The entire team
Bad time management	2	4	Agreeing on reasonable windows in our schedules	Not finishing our checkpoints on time	The entire team
Lack of communication	1	3	Understanding our strong points	Misunderstanding each other	Individual members
Losing part of / all data	1	4	Storing all the information online	A member's computer breaks down	Depends on the event

8 Sources of information

1. Huttunen, K. (2018) 'Indoor Air Pollution', in *Clinical Handbook of Air Pollution-Related Diseases*. Cham: Springer International Publishing, pp. 107–114. doi: 10.1007/978-3-319-62731-1_7.

2. Sterling E.M., Arundel A., Sterling T.D., (1985) *CRITERIA FOR HUMAN EXPOSTORE TO HUMIDITY IN OCCUPIED BUILDINGS.* Available at: www.pro.net/sterlingiaq.com/html/photos/1044922973.pdf (Accessed: 21 February 2019).

3. Rice, S. A. (2002) *HEALTH EFFECTS OF ACUTE AND PROLONGED CO 2 EXPOSURE IN NORMAL AND SENSITIVE POPULATIONS **. Available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.464.2827&rep=rep1&type=pdf (Accessed: 21 February 2019).

4. Jonny Peters (2013) *The Importance of a Positive Working Environment | Leadership | Business Chief Australia*. Available at: https://anz.businesschief.com/leadership/143/The-Importance-of-a-Positive-Working-Environment?fbclid=IwAR0sJdNDTBS6VFmsHWrVWwfIzQmFTWSbajalzCN1fvlw9JNVx2D2VI2Qaw0 (Accessed: 21 February 2019).