**AN INNOVATION AMONG AIR QUALITY MONITORING.**

**System Description:**

The environmental monitoring, diﬀerent approaches and solutions are available in our project. In contrast with these perspectives, we will consider a system consists of four components: The web page, two servers, and the data acquisition system. The proposed architecture of our project with some Innovative ideas are initiated.

**Perspectives**:

The aim of this paper is to present an Internet of Things or IOT-based system which can monitor the air quality and send notiﬁcations in case of emergency. The main goal of the whole system is to provide a way to prevent emergencies inside the compartments containing this system. This system monitors the following Properties of air: temperature, humidity, the level of carbon dioxide, gas and alcohol. After calibration, it will be able to provide notiﬁcations via SMS if the values of the variables mentioned above exceed a certain threshold. The four main protocols followed by this system are described below;

**STEP-1(Web Platform):**

The main functions that the web platform performs concern: accounts management and authentication, attaching devices to the accounts, diﬀerent formats for data viewing, settings and platform customization. The web component provides the ability to create a new account for customers who interact with the system for the ﬁrst time. The input data entered the related fields are real-time veriﬁed, and the user is promptly alerted in case of an error. This way, when the data are sent for processing, many problems that might appear on the server side are already anticipated and predicted. Authentication is also provided by the web component.

**STEP-2(Login interface):**

After the ﬁrst login, the web component will automatically ask the user to attach a device to the account. In order to be able to attach a device to the account, the platform will look for the compatible devices on the same network by default. Although the platform can ﬁnd a compatible device, it does not mean hat the attachment to the account has been performed, which is actually part of the server component. At the same time, speciﬁc data packets are sent in order to locate the device for later authentication. Platform content may not be available until the device attached to the account will have been located.

**STEP-3(Setting Access):**

Access to settings, Whether related to system control, such as data sampling rate or even customization of the platform by selecting a preferred theme, is also oﬀered through our system’s web platform. Secure browsing from one page to another is assured by restricting access to certain pages for customers who are not authenticated.

Showing pages in a user-friendly way was an interface priority. Both the pages and the platform components merge on diﬀerent existing resolutions, so that they can be appropriately accessed both on a mobile device and on a computer screen.

**STEP-4(The Main Server as a Communication Server):**

The main server is the basic architectural component since most of the communications between the other components have been made through it. The most important functions performed by the main server are:

1. Providing communication between components, most of the data are ﬁrst passed to the server, and then they are forwarded to the destination components.
2. Operating the customers management by creating links between customers for amore eﬃcient communication.
3. Assuring the communication with the database, speciﬁcally where the interpretations of the data packets require this.
4. Quickly and eﬃciently interpreting the data packets using an event based system.
5. Saving the history of actions for evidence, recovering possible Errors, or even security breaches.

**STEP-5(The second Server dedicated to attaching the devices to the user Account):**

The system got a second server, which is dedicated to attaching the devices to the user account. It is an invisible component to any user, the access to it is possible exclusively through other associated applications, such as the web component. This server mainly operates on:

1. Permanent communication with the main server, whether or not the device has been attached to an account.
2. Sending identiﬁcation packages to the web component as well as to the main server.
3. Sending package attachments to a speciﬁc account to the main server.
4. The possibility of pairing with applications other than the web component of this system.

**STEP-6(The Data Acquisition System):**

The acquisition System mainly deals with collecting and sending data to the customers. It is also an invisible component to customers, and it may be accessed only through project related applications, such as the web component. We can refer to this component as a client since it is connected to the main server. The main functions performed by this document system refer to;

1. Collecting data from the connected modules and sending them to the main server.
2. Hosting the server dedicated to attaching the devices to the user account.
3. Assuring the communication between the connected modules and the acquisition system in an eﬃcient way, with respect to the fact that the system permanently reads data from modules and not just on request.
4. Providing the ability to attach the device to a user account, or even to another linked a applications, if applicable, via an interface button.

**STEP-7(Developing of Monitoring Measurement):**

For the instance of developing this speciﬁc IOT system, some applicable sensors have been chosen, mainly a digital DHT11 temperature and humidity sensor and an SNS-MQ135 sensitive air quality sensor. The DTH11 sensor is an NTC-based one (Negative Temperature Coeﬃcient) for measuring temperature and humidity. It interfaces with an 8-bit serial and bidirectional communicating microcontroller to output the values of temperature and humidity as serial data. Moreover, it easily interfaces also with other microcontrollers, in our case, one provided by a Rasp-berry Pi single board micro-computer.

**Libraries used for sensor Air monitoring**:

Using these library you can directly get the PPM(Parts Per Million) values by just using the below two lines,

**MQ135 gasSensor = MQ135(A0);**

**float air\_quality = gasSensor.getPPM();**

But before that we need to calibrate the MQ135 sensor for calibrating the sensor upload the given below code and let it run for 12 to 24 hours and then get the RZERO value.

**#include "MQ135.h"**

**void setup (){**

**Serial.begin (9600);**

**}**

**void loop() {**

**MQ135 gasSensor = MQ135(A0); // Attach sensor to pin A0**

**float rzero = gasSensor.getRZero();**

**Serial.println (rzero);**

**delay(1000);**

**}**

After getting the RZERO value. Put the RZERO value in the library file. From the next phase we can begin the actual code for our Air quality monitoring project.

An SNS-MQ135 sensor is a useful solution for measuring the air quality parameters, both in analog and digital format, by detecting ammonia, nitrogen oxides in combustion environments, alcohol, benzene, smoke, carbon dioxide, and other air pollutants. These sensors have ﬁtted very well the scope of this project by classifying the output values in many risk classes, as follows: no risk, moderate air quality, sensitive people could be harmed, all people are aﬀected, negative eﬀects and emergency. National considerations and premises for an acceptable indoor air quality are coming out as very important research topics also in crowded, digitalized and over-tech societies.

**Conclusion**:

The web platform was conceived in a manner that allows access to it from most modern devices and beyond, thus increasing step by step the portability of our system. Information is always displayed in an easy-to-read format, regardless of the host-screen resolution, encouraging the user to utilise this application. The project was conceived in a manner that allows the user to conﬁgure both the account and the device in the most accessible possible conditions, providing a low level of diﬃculty in use and a very user-friendly interface overall….