Air Quality measurement and Pollution monitoring system and Blockchain Solution

Air pollution : Air pollution is occured due to addition of peculiar proportion of subtances ie small particles, biological molecules along with severe gases, which may lead to short and long term disease, allergies and in worst cases mass death.

Types of pollutants :
1. Green house gases (CO2,CH4,03,CO)
2. Acid rain (NOx, SO2,SO4)
3. Particular matter (PM2.5,PM10)

Air Quality Index : AQI is a method of representation of air quality in terms of its terminology, purity and colour into a single index varying from 0 (meaning the best quality possible) to 500 (impossible to sustain in the environment)

There are different methodology to calculate the AQI (Calculation of AQI by CPCB and AQI Calculation Only Using PM2.5)along with different parameters like calculation of Dew points and speed of wind are to be considered as a severe factor while calculating AQI.

Introduction of IoT to the project :
4 layers of IoT artictures would be used in the process.
1.Application Layer: This layer acts as the user interface for the user who interacts with the android application, along with this shows the fetched data from lower layers which could be easily transmitted to represent the facility of showing the air quality level along with disease and allergies user has to be worried of by judginng from his profile.

2. Middle layer (Cloud server and DataBase) : This layer is used for storing data and processing through Cloud Storage and Cloud Database.
    The sensor data, either filtered or the otherwise, reaches cloud environments. The cloud environments are typically provisioned by a few public cloud providers such as Amazon AWS, Google Compute Engine, or IBM Cloud, or by a few in-house opensource cloud setup based on OpenStack, OpenNebula or so forth.
    IB-AQMS are, typically, a few VM instances or dedicated servers of cloud providers.
Blockchain nodes are connected in a Peer-2-Peer distributed network fashion such that the nodes belong to various organizations. Each organization shall include multiple peer nodes where the copy of blocks are located. Each block contains the hashed values of the previous blocks and the transaction data along with the timestamp.

3. Communication layer : This layer is there to make the connection between the hardware (i.e. sensing layer) and the software (i.e. to application layer through middleware layer). This uses the HTTP communication protocol
to transfer the data from the hardware.

4. Sensing layer : It allows us to connect the various sensors to a processor (in this case a raspberry pi). most of the sensors are analog type so there comes the need for an ADC which is ARPI6000 ADC module which is used to convert the analog value into the digital data. The raspberry pi allows us to connect our
system to the internet via Wi-Fi or Ethernet. whereas to increase the communication options
a SIM7000C module is also used to enable the communication through 3G/LTE or NB-IoT
technologies.
The sensor unit includes the ten gas sensor, one dust sensor, one wind speed sensor and
one integrated sensor for temperature, humidity and dew point, and the Gas sensors are as follows
1) CO2
2) CO
3) NO2
4) NO
5) NH3
6) H2S

7) SO2
8) CH4
9) O2
10) O3
Additional Power supply unit :
Power supply unit consists of a step-down circuit, a battery, a charge controller, and power input to the controller. It's specification is 12.8V/20Ah. The proposed
hardware requires a different level of voltages 3.3V, 5V and 12V so for that purpose a step-down circuit is used.

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