

# Introducing A Sensor Network For Reducing The Traffic By Using IoT

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**Abstract:** As country grows as economy improves, the financial status of each individual is raising that results owning a car or a bike for everyone. This results large amount of traffic and pollution in the cities, which causes intensive health problems like cancer, braintumour etc. In a cities like Newyork, Taiwan, Tokyo, Hongkong are concentrated to an efficient pollution monitoring systems to control pollution, density in particular areas. They are controlling it by a simple remedy called traffic diverting. A sensor network collecting information from the network from different places by monitoring their thresholds action will be taken. Based on introducing Internet of Things (IOT) into the field of environmental protection, this paper puts forward a kind of real-time air pollution monitoring and forecasting system. The existed system needs supervisor (Human) to operate it, proposed system is a standalone artificial intelligence based expert system. That can take decisions by past experiments, helps to execute stand alone as a human exporter to replace him at accurate.

The system can be laid out in a large number in monitoring area to form monitoring sensor network. Besides the function of conventional air automatic monitoring system, it also exhibits the function of forecasting development trend of air pollution within a certain time range by analyzing the data obtained by front-end perception system according to neural network technology.

**Keywords:** Neural Network; Air Quality Monitoring; Air Pollution Forecast;

## I. INTRODUCTION

Using laboratory analysis, conventional air automatic monitoring system has relatively complex equipment technology, large bulk, unstable operation and cost. Expensive and enormous bulk allows it to be impossible for big-scale installation. This technique are only able to be set up in key monitoring locations of some key businesses, thus system information is not available to calculate overall pollution situation [1]. To beat defects of traditional monitoring system and recognition techniques and lower test cost, this paper proposes a technique mixing IOT technology with atmosphere monitoring. Impacted by meteorological and physical conditions, polluting of the environment is going to be highly clustered very quickly after happening, causing great harm or perhaps extreme destruction to both human and atmosphere. So it's particularly significant to setup a genuine-time polluting of the environment monitoring system.

## II. OVER VIEW OF THE SYSTEM

Based on IOT architecture, the machine is principally made up of perception layer, network layer and application layer. In request, current climate conditions (temperature, humidity, wind direction, wind speed, etc.) and physical conditions have important effect on polluting of the environment degree and polluting source diffusion. While system implementation, therefore, a complete consideration should automatically get to the influence of ecological factors on monitoring and conjecture effect. Perception layer mainly includes Field Sensor Network which according to front-finish acquisition device. The slather of sensors reduces the price of hardware. Within this system, we are able to monitor a minimum of five types of ecological parameters in a single monitoring point and also the cost under very couple of. Generally such typically sensitive areas as production area and boundary are selected as monitoring points.

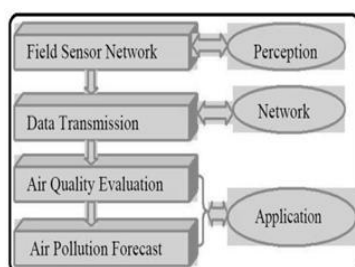


Fig.1. Framework of the proposed system

Different types are made for those possible dripping methods for different hazards sources. Monitoring point's layout plan is enhanced by thinking about influence from the region's climate on pollutant diffusion range and intensity, population density, important target areas and key equipment areas thoroughly [2]. In ecological sensor deployment, all sorts of ecological sensors are set up in monitoring points, including sulfur dioxide, nitrogen dioxide, smog, inhalable particle, deadly carbon monoxide, swimming pool water,

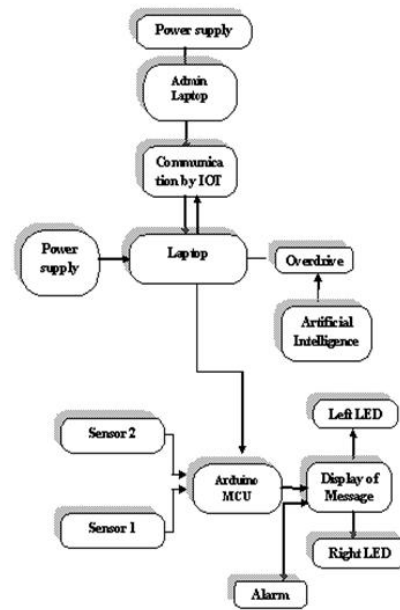
and hydrogen chloride and hydrogen fluoride sensors. Meteorological sensors are set up in a few of the monitoring points during deployment. Meteorological parameters including wind direction, wind speed, temperature, humidity and air pressure could be perceived instantly to assistance with pollution situation analysis and pollution diffusion forecast. The main purpose of network layer to deliver ecological and meteorological data, connect all of the air sensors and meteorological sensors deployed in monitoring place to a main server and transmit the information perceived by sensors to data center instantly. Transmission product is built based on service oriented requirement. By utilizing XML as information exchange language, information is encapsulated according to unified information exchange interface standard and knowledge exchange methods. By utilizing message passing mechanism, information communication, data exchange between fundamental data and business data and change in control instruction are recognized in order to integrate business collaboration and application system. Because of complex relationship between quality of air, air pollutants trend and meteorological factors, it is not easy to mine the helpful information in historic data to calculate precisely with traditional conjecture method. Within this system, we introduced neural network technology.

Neural network, characterized by nonlinear processing and multivariable input and output, are utilized to mine mass of information delivered back by perception layer and network layer. Model is produced in line with the study of input data rather than established equation. In quality of air evaluation, by examining quality indexes including temperature, dangerous gas concentration, particle concentration, taking ecological factors different programs as parameters and taking advantage of the genetic formula and neural network technology, key indicators of quality of air are selected. Additionally, quantitative relationship type of atmospheric quality factor and level is made using self-organization modeling and gray system control modeling to understand comprehensive evaluation and analysis of atmospheric quality. Because the core from the whole system, polluting of the environment conjecture is really a multiple-input-multiple-output forecasting tool according to neural network technology. It's high extensibility and can be used as different programs. An artificial way of comprehensive quality of air index verified by experiment is made to produce a group of accurate and efficient quality of air evaluation system. Quality of air conjecture would be to predict future trend of quality of air according to unique circumstances, pollutant dispersion, current climate conditions and physical position of monitoring

area, providing decision support for emergency disposal and save after pollution accident happens.

If you take quality of air indexes as neural network of coaching sample, quality of air index parameters within the following time node not surprisingly output, by grasping the natural law between meteorological factors(for example temperature, wind direction) and quality of air, this technique is capable of accurate conjecture of quality of air. Evaluation weight of various quality indexes are analyzed according to their effect on overall look at quality of air.

### III. BLOCK DIAGRAM



Initially the laptop can be connected to the arduino microcontroller by using the USB cable. Communicating the IOT in the laptop by connecting the client with the server. The server has one IP address and the port number, by using this IP address and port number the client can be connected. Establish the communication between the server and the client by selecting the COM port. After selecting the COM port connection between the server and the client made successfully. For detection of the air pollution Smoke detectors can be used, these are connected to the arduino microcontroller by using the connecting wires.

### IV. METHODOLOGY

In network training, inputs are endowed with similar important position to avoid neurons output saturation brought on by large absolute worth of internet input. The size transformation of information is dependent on normalization method within this system [6]. Because of close relationship between polluting of the environment forecast and meteorological factors, much meteorological information is utilized in this technique including daily mean temperature,

average dew point temperature, average ocean level pressure, average pressure of monitoring station, visibility, average wind speed, max sustained wind speed, max gust velocity, greatest temperature, cheapest temperature, total precipitation, snow depth and probability index of utmost weather. This technique can be used inside a chemical industrial park near ocean. We build two models for various seasons based on the geography and climate. After adding meteorological factors, the nodes of input increases to 29 and also the nodes of hidden layer increases to six. In comparison from the conjecture performance between includes meteorological factors and without meteorological factors, it's discovered that adding meteorological factors can enhance the conjecture performance greatly. To determine artificial neural network, we want mass data because the input. We show the outcomes of conjecture models which derive from recent 5 years' data.

### V. RESULT

In this project first we are connecting arduino microcontroller with the Laptop or PC by using the USB power cable. Initially in the arduino microcontroller we can observe the flashing of the green LED, which is always ON condition this indicates that arduino is in working condition. IOT can be connected by configuring the sever with the client. Initially the server window can be opened it contains IP address and the port number.



**Fig Establishing of IOT server with the Client**

The client network can be connected to the sever by entering the IP address and the port number of the corresponding server by selecting of the COM port. This can be observed in the following diagram.

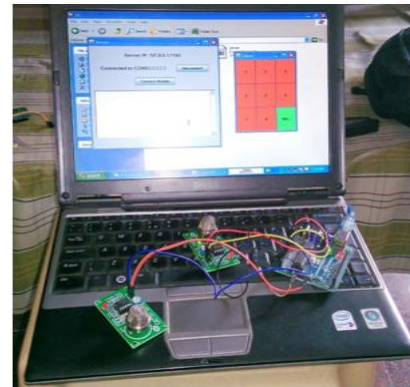


**Fig Selection of COM port**

The Working of the IOT can be verified by entering the 1 in the client side, it can shows in the

sever with value 0. In this process the arduino microcontroller shows red LED light as a indication, after this by entering the 2 value in the client side the server shows value 1 with the OFF condition of the red LED in arduino micro controller.

The air pollution can be monitor by using the by connecting the arduino microcontroller with the smoke detector. Initially the sensors can be placed in all the traffic junctions. The sensor detects air pollutant concentration automatically by analyzing the past 24hrs predictions, a prediction network can be established. In air quality evaluation, by analyzing quality indexes including temperature, harmful gas concentration, particle concentration, taking environmental factors different applications as parameters and using the genetic algorithm and neural network technology, key indicators of air quality are chosen. The neural network can be used for analyzing this prediction.



**Fig Working of the KIT**

Initially this sensor network can be established in two sides of the traffic signal. If the traffic is high in either end this network detects automatically in the form of air pollution by indicating the traffic condition to the traffic signals. In this manner easily reduce the traffic in particular area by diverting vehicles to the another way. This air pollution monitoring will helpful for reducing the traffic density in particular area for by the prediction of air pollution.

### VI. CONCLUSION

Perception layer mainly includes Field Sensor Network which according to front-finish acquisition device. The slather of sensors reduces the price of hardware. Within this system, we are able to monitor a minimum of five types of ecological parameters in a single monitoring point and also the cost under very couple of. Polluting of the environment monitoring and forecasting system developed in this paper suggested a great choice towards the complexity of polluting of the environment. Using a many sensors ensures monitoring precision reduces monitoring cost and

makes monitoring data in monitoring area more systematic and excellent. A lot of field data supplied by front-finish sensor network makes big data analysis in background application layer more direct efficient, supplying a genuine and efficient decision -making grounds for emergency response after pollution accident happens. Quality of air conjecture would be to predict future trend of quality of air according to unique circumstances, pollutant dispersion, current climate conditions and physical position of monitoring area, providing decision support for emergency disposal and save after pollution accident happens.

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