
Gnanamani
College of Technology
Gateway to Great Life !
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AUTONOMOUS

DEPARTMENT: BIO MEDICAL ENGINEERING

YEAR: THIRD YEAR

PROJECT SUBMISSION PHASE -3

TOPIC – AIR QUALITY MONITORING

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AIR QUALITY MONITORING

Introduction:
Air quality monitoring refers to continuous measurement of specific air pollutants also known as “criteria air pollutants”. Obtained air pollution data together with natural background/trace gas monitoring and stationary source emission monitoring helps to define what kind of air pollution people are exposed to.

IoT enabled proactive indoor air quality monitoring system for sustainable

health
management:-

This paper proposes an IoT based indoor air quality monitoring system for tracking the ozone concentrations near a photocopy machine. The experimental system with a semiconductor sensor capable of monitoring ozone concentrations was installed near a high volume photocopier. The IoT device has been programmed to collect and transmit data at an interval of five minutes over blue tooth connection to a gateway node that in turn communicates with the processing node via the Wi-Fi local area network.

HARDWARE REQUIREMENTS:

 For Different Parameter Sensing:-

- Temperature and Humidity sensor (DHT11)
- Air Quality sensor (MQ 135)
- 2n2222 Transistor
- DC Fan
- Potentiometer
- 16x2 LCD Panel
- NodeMCU
- Arduino Uno

 For Power Supply:-

- Step down transformer (12-0-12 V,1 A)
- Diodes
- Voltage Regulator (7805)
- Capacitors (0.01 micro Farad, 470 micro Farad)
- Wires

SOFTWARE REQUIREMENTS:

- Arduino (Version 1.8.2)
- THINGSPEAK website

OBJECTIVE:

 To measure and display temperature and humidity level of the environment.

 To combine advanced detection technologies to produce an air quality sensing system with advanced capabilities to provide low cost comprehensive monitoring.

 To display the sensed data in user friendly format in LCD display panel.

PYTHON CODE FOR AN AIR QUALITY MONITORING SYSTEM THAT USES MACHINE LEARNING TO PREDICT AIR QUALITY LEVELS

```
# Import necessary libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.model_selection import train_test_split
# Load the air quality dataset
df = pd.read_csv('air_quality_data.csv')
# Explore the data
print(df.head())
# Split the data into training and testing sets
X = df[['Temperature', 'Humidity', 'Wind Speed']]
y = df['Air Quality']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)
# Train a linear regression model
model = LinearRegression()
model.fit(X_train, y_train)
# Evaluate the model on the test set
y_pred = model.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
rmse = np.sqrt(mse)
r2 = r2_score(y_test, y_pred)
print("Mean Squared Error: ", mse)
print("Root Mean Squared Error: ", rmse)
print("R-squared: ", r2)
# Visualize the predicted vs actual values
plt.scatter(y_test, y_pred)
plt.xlabel('Actual Air Quality')
plt.ylabel('Predicted Air Quality')
plt.title('Air Quality Prediction')
plt.show()
```


