VELAMMAL
INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROJECT NAME: ENVIRONMENTAL MONITORING
TEAM NAME : Proj_224786_Team_3
TEAM MEMBERS:

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DEFINITION:

The Environmental Monitoring using IOT Project aims to deploy a network of Internet of things(IOT) devices to collect real-time data about various environmental parameters.

These parameters typically include temperature, humidity, air quality, pollution levels, soil moisture, and more depending on the specific objectives of the project.

The collected data is then transmitted to a central database or cloud platform for analysis and visualization, enabling stakeholders to make informed decisions regarding environmental conversation, resource management, and public health.

OBJECTIVE:

1. **Data Storage and Management:**

   Implement a database or cloud-based storage solution to securely store the incoming environmental data. Ensure data integrity, availability and scalability.

2. **Data Analysis and Visualization:**

   Develop the analytical algorithms and visualization tools to process and Present the collected data in a user-friendly format.

3. **Environmental Impact Assessment:**

   Use the collected data to access the impact of human activities on the environment.

PROJECT:

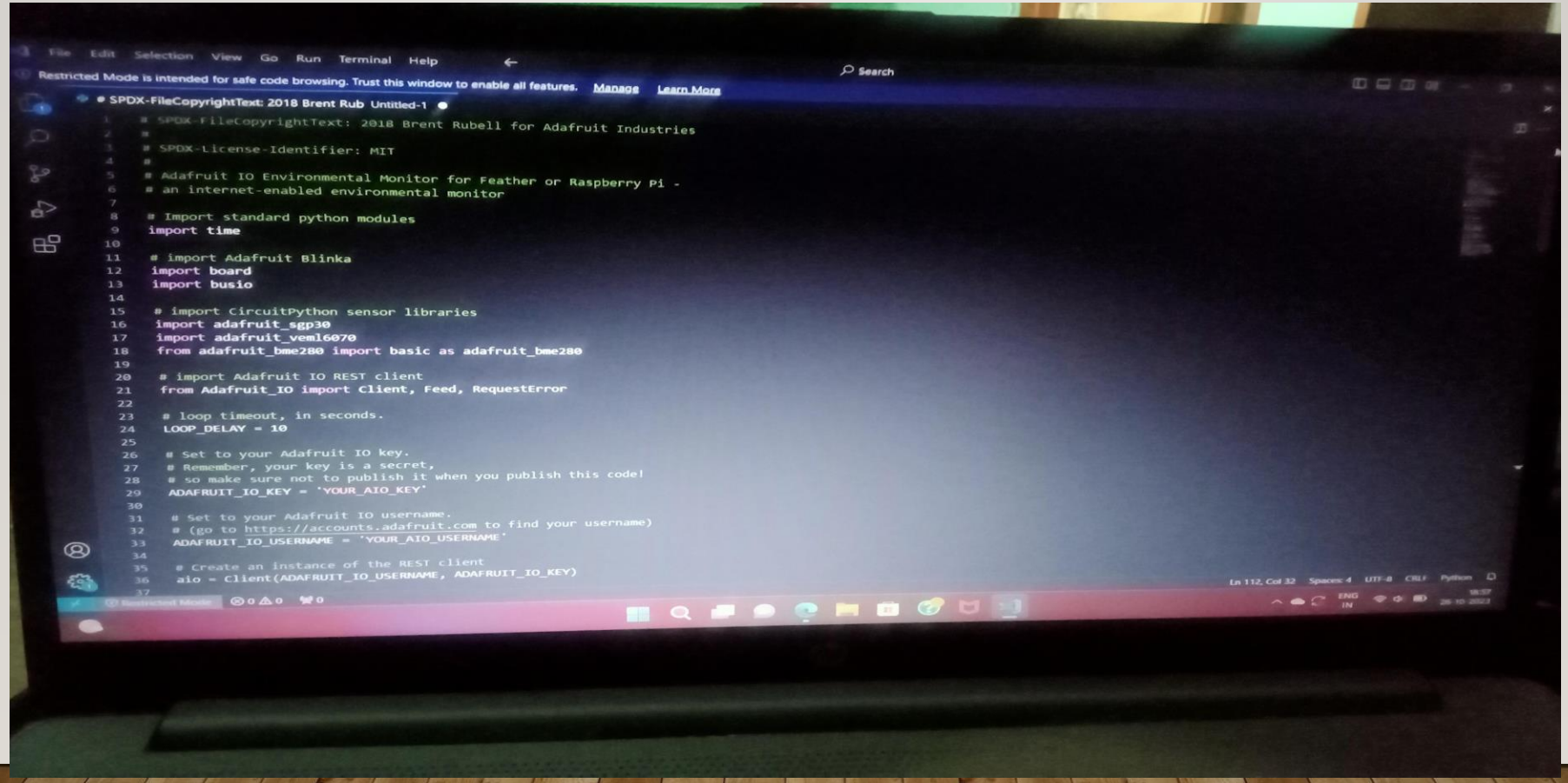
This guide covers building a small, internet-enabled environmental monitor which can track a range of data such from temperature to UV-level to the amount of total-volatile-organic-compounds present in the air.

Build it, place it in a location you'd like to log , and then monitor it from anywhere in the world using our internet of things platform – AdafruitIO.

REQUIREMENTS:

- Temperature sensors.
- Air quality sensors.
- Gas sensors.
- Humidity sensors.
- Water quality sensors.
- Radiation sensors.
- Research and policy Support.

PYTHON CODE:


File Edit Selection View Go Run Terminal Help
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SPDX-FileCopyrightText: 2018 Brent Rub Untitled-1
SPDX-FileCopyrightText: 2018 Brent Rubell for Adafruit Industries
#
SPDX-License-Identifier: MIT
#
# Adafruit IO Environmental Monitor for Feather or Raspberry Pi -
# an internet-enabled environmental monitor
# Import standard python modules
import time
# import Adafruit Blinka
import board
import busio
# import CircuitPython sensor libraries
import adafruit_sgp30
import adafruit_veml6070
from adafruit_bme280 import basic as adafruit_bme280
# import Adafruit IO REST client
from Adafruit_IO import Client, Feed, RequestError
# loop timeout, in seconds.
LOOP_DELAY = 10
# Set to your Adafruit IO key.
# Remember, your key is a secret,
# so make sure not to publish it when you publish this code!
ADAFRUIT_IO_KEY = 'YOUR_AIO_KEY'
# Set to your Adafruit IO username.
# (go to https://accounts.adafruit.com to find your username)
ADAFRUIT_IO_USERNAME = 'YOUR_AIO_USERNAME'
# Create an instance of the REST client
aio = Client(ADAFRUIT_IO_USERNAME, ADAFRUIT_IO_KEY)
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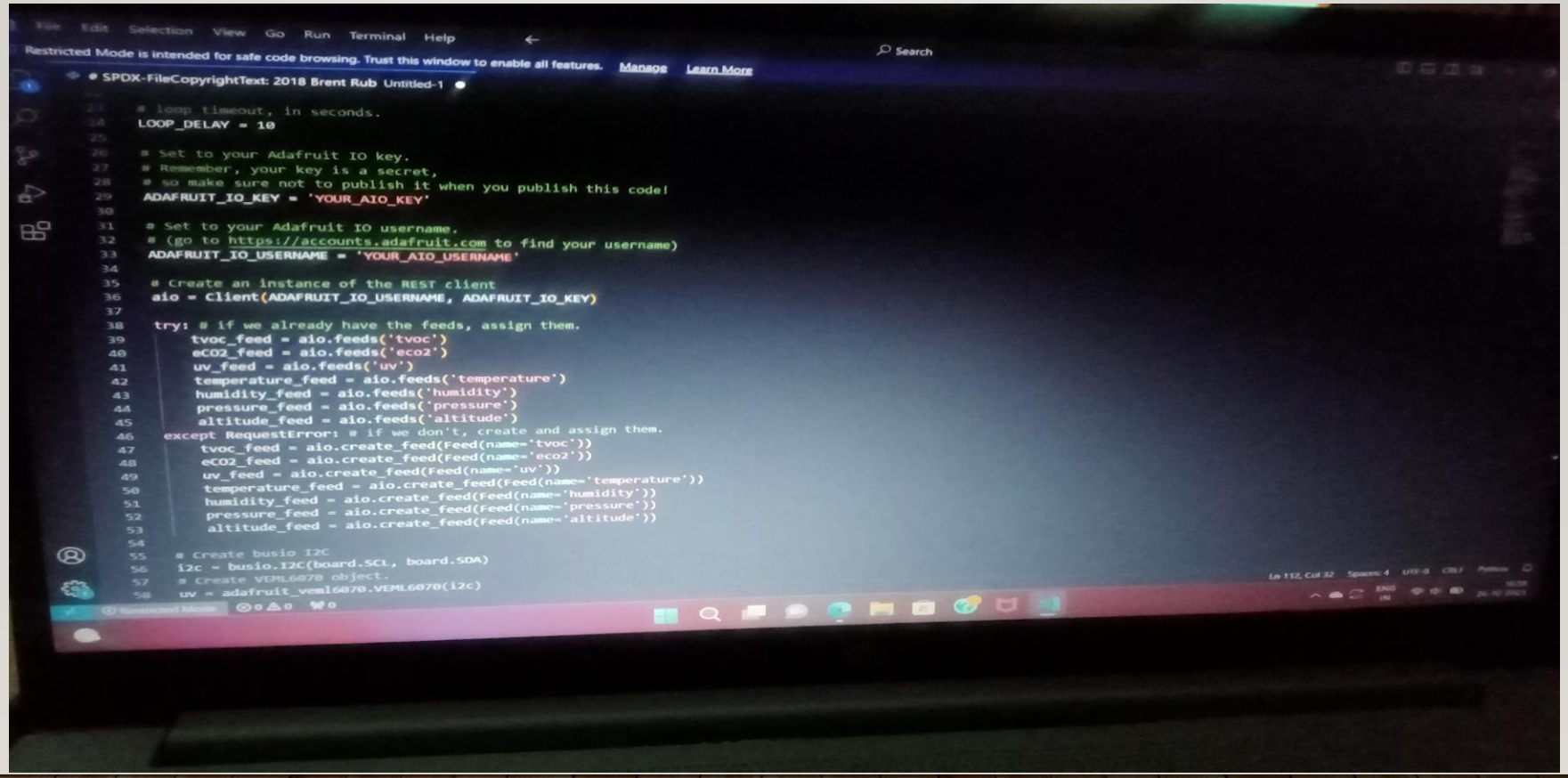
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LOOP_DELAY = 10
# Set to your Adafruit IO key.
# Remember, your key is a secret,
# so make sure not to publish it when you publish this code!
ADAFRUIT_IO_KEY = 'YOUR_AIO_KEY'
# Set to your Adafruit IO username.
# (go to https://accounts.adafruit.com to find your username)
ADAFRUIT_IO_USERNAME = 'YOUR_AIO_USERNAME'
# Create an instance of the REST client
aio = Client(ADAFRUIT_IO_USERNAME, ADAFRUIT_IO_KEY)
try: # if we already have the feeds, assign them.
tvoc_feed = aio.feeds('tvoc')
eCO2_feed = aio.feeds('eco2')
uv_feed = aio.feeds('uv')
temperature_feed = aio.feeds('temperature')
humidity_feed = aio.feeds('humidity')
pressure_feed = aio.feeds('pressure')
altitude_feed = aio.feeds('altitude')
except RequestError: # if we don't, create and assign them.
tvoc_feed = aio.create_feed(Feed(name='tvoc'))
eCO2_feed = aio.create_feed(Feed(name='eco2'))
uv_feed = aio.create_feed(Feed(name='uv'))
temperature_feed = aio.create_feed(Feed(name='temperature'))
humidity_feed = aio.create_feed(Feed(name='humidity'))
pressure_feed = aio.create_feed(Feed(name='pressure'))
altitude_feed = aio.create_feed(Feed(name='altitude'))
# Create busio I2C
i2c = busio.I2C(board.SCL, board.SDA)
# Create VEML6070 object.
uv = adafruit_veml6070.VEML6070(i2c)
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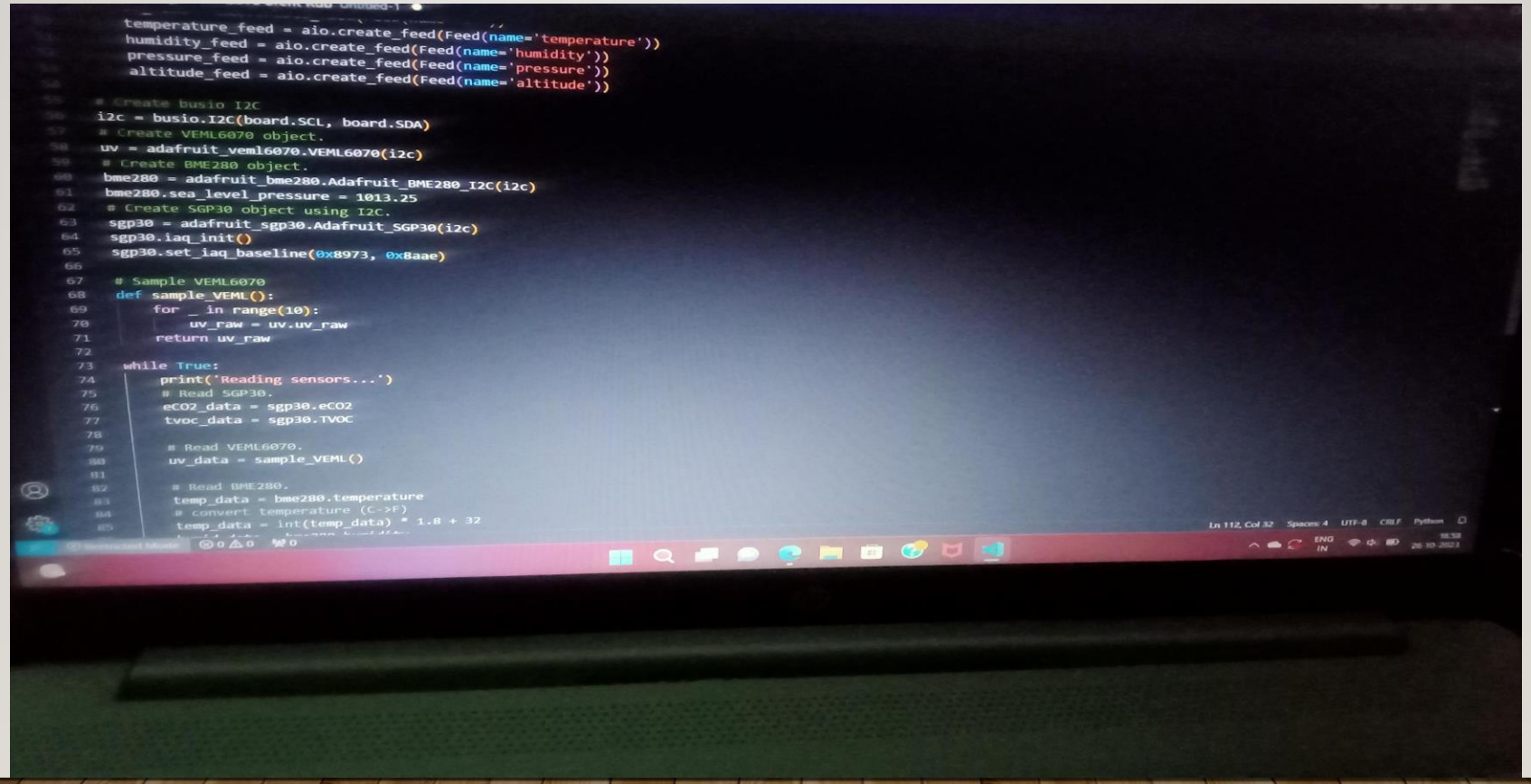
temperature_feed = aio.create_feed(Feed(name='temperature'))
humidity_feed = aio.create_feed(Feed(name='humidity'))
pressure_feed = aio.create_feed(Feed(name='pressure'))
altitude_feed = aio.create_feed(Feed(name='altitude'))
# Create busio I2C
i2c = busio.I2C(board.SCL, board.SDA)
# Create VEML6070 object.
uv = adafruit_veml6070.VEML6070(i2c)
# Create BME280 object.
bme280 = adafruit_bme280.Adafruit_BME280_I2C(i2c)
bme280.sea_level_pressure = 1013.25
# Create SGP30 object using I2C.
sgp30 = adafruit_sgp30.Adafruit_SGP30(i2c)
sgp30.iaq_init()
sgp30.set_iaq_baseline(0x8973, 0x8aae)
# Sample VEML6070
def sample_VEML():
for _ in range(10):
uv_raw = uv.uv_raw
return uv_raw
while True:
print('Reading sensors...')
# Read SGP30.
eCO2_data = sgp30.eCO2
tvoc_data = sgp30.TVOC
# Read VEML6070.
uv_data = sample_VEML()
# Read BME280.
temp_data = bme280.temperature
# convert temperature (C->F)
temp_data = int(temp_data) * 1.8 + 32
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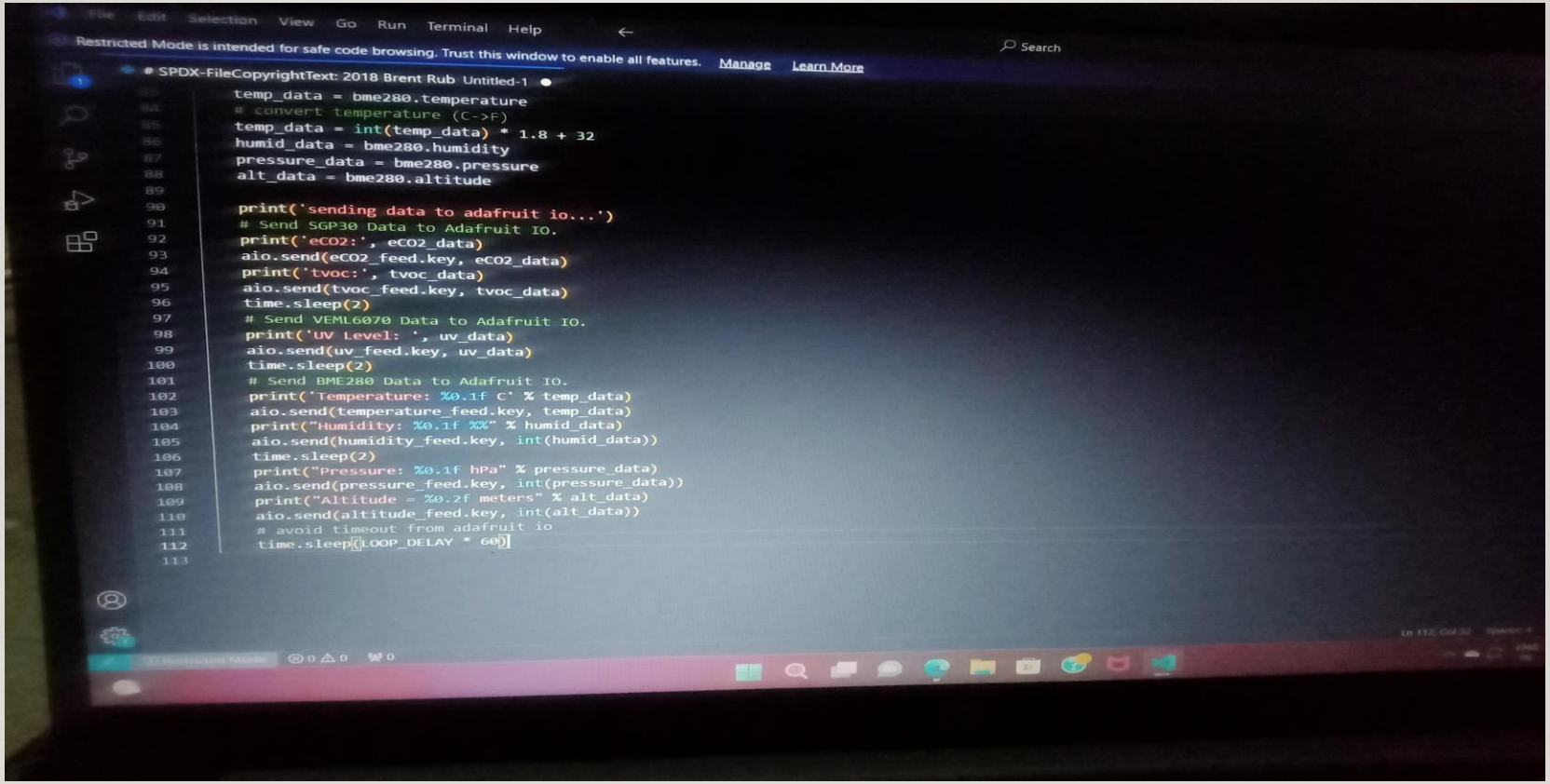
Python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# SPDX-FileCopyrightText: 2018 Brent Rub Untitled-1
temp_data = bme280.temperature
# convert temperature (C->F)
temp_data = int(temp_data) * 1.8 + 32
humid_data = bme280.humidity
pressure_data = bme280.pressure
alt_data = bme280.altitude
print('sending data to adafruit io...')
# Send SGP30 Data to Adafruit IO.
print('eCO2:', eCO2_data)
aio.send(eCO2_feed.key, eCO2_data)
print('tvoc:', tvoc_data)
aio.send(tvoc_feed.key, tvoc_data)
time.sleep(2)
# Send VEML6070 Data to Adafruit IO.
print('UV Level: ', uv_data)
aio.send(uv_feed.key, uv_data)
time.sleep(2)
# Send BME280 Data to Adafruit IO.
print('Temperature: %0.1f C' % temp_data)
aio.send(temperature_feed.key, temp_data)
print("Humidity: %0.1f %%" % humid_data)
aio.send(humidity_feed.key, int(humid_data))
time.sleep(2)
print("Pressure: %0.1f hPa" % pressure_data)
aio.send(pressure_feed.key, int(pressure_data))
print("Altitude = %0.2f meters" % alt_data)
aio.send(altitude_feed.key, int(alt_data))
# avoid timeout from adafruit io
time.sleep(LOOP_DELAY * 60)

CONCLUSION:

The IOT based Environmental Monitoring System has been designed and implemented. The environmental parameters successfully transmitted via ESP 8266 Wi-Fi module .The density of the gases in the remote located area viewed through the Thing speak web server. This project will protect the people from the pollutant gases. It is more useful for the industries to control the air pollution in the surrounding area for the workers safety .


Thank you