

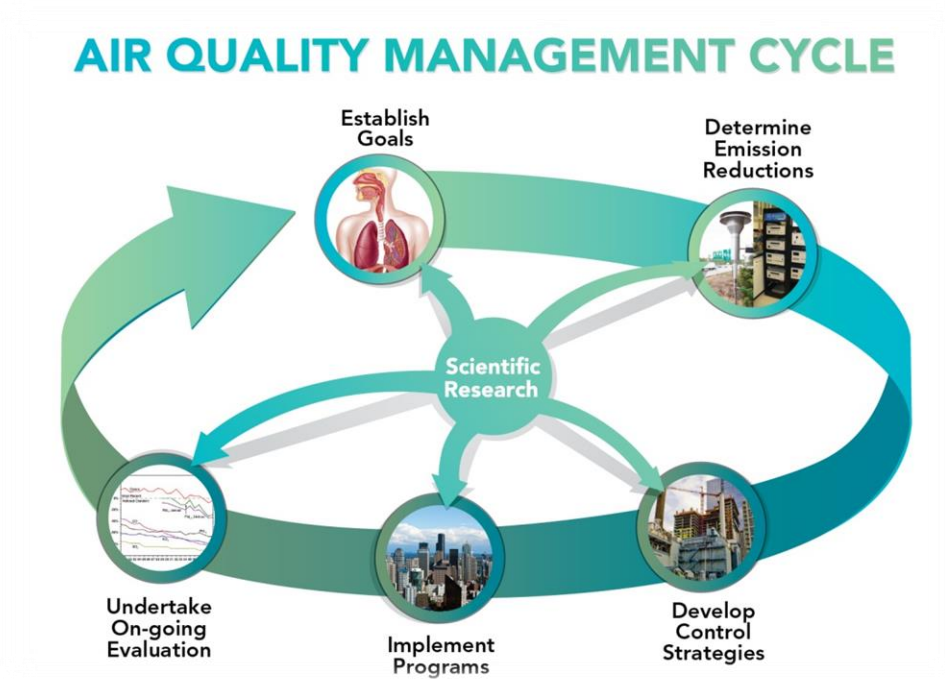
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PROJECT: AIR QUALITY MONITORING

Project Submission Part 2: Innovation

Air quality management has never been more important to the world than it is today. 20 years ago, one would have considered it improbable that Air quality management would be vital to accomplishing weighty goals like fighting climate change or achieving political equality.

innovative ideas for Air quality management ?



Top 8 Air quality management Trends in 2024

- Digital Air quality management .
- Wastewater Processing.
- Advanced Filtration.
- Flood Prevention.
- Water-saving Technology.
- Decentralized Infrastructure.
- Innovative Materials.
- Desalination.

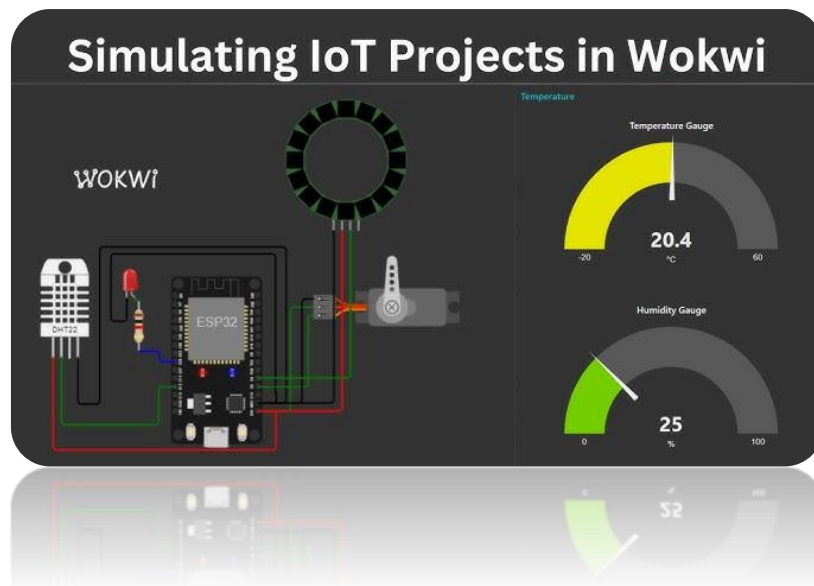
But with the capabilities that are increasingly being made available through smart Air quality management innovations, it's looking more likely that smart Air quality management may help save the world.

Air quality management refers to all the activities a regulatory authority undertakes to help protect human health and the environment from the harmful effects of air pollution.

These may include broad qualitative goals, such as to protect human health and the environment from the adverse effects of air pollution. Effective air quality management systems also include specific goals or standards that are quantified, measurable and have associated timelines for achievement.

Module 3:

Getting started with ESP32 and Wokwi Platform:



```

#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2); // Change the HEX address

#include <Servo.h>
Servo myservo1;

const int R1 = 2;
const int R2 = 4;
const int smokeDetectorPin = 6; // Digital pin for the smoke detector
const int buzzerPin = 7; // Digital pin for the buzzer

const int lot = 4; // Enter Total number of parking Slots

bool flag1 = false;
bool flag2 = false;

long lastLcdUpdate = 0; // Variable to track the time of the last LCD update
long lcdUpdateInterval = 1000; // Update the LCD every 1000 milliseconds

void setup() {
  lcd.begin(16, 2); // Initialize LCD with 16 columns and 2 rows
  lcd.backlight();
  pinMode(IR1, INPUT);
  pinMode(IR2, INPUT);
  pinMode(smokeDetectorPin, INPUT);
  pinMode(buzzerPin, OUTPUT);

  myservo1.attach(3);
  // ... (rest of the code)
}
```

The Sonoff devices uses the ESP8266 MC, which is basically the predecessor of the ESP32. But yes, the ESP32 is robust enough to be used in industrial applications

Look for ESP32 by Espressif Systems. Click on that entry, and then choose Install. After installing, restart your Arduino IDE and navigate to Tools > Board to ensure you have ESP32 boards available. Now select your board in the Tools > Board menu (in our case, it's the DOIT ESP32 DEVKIT V1).:

ESP32 proves to be a versatile and beginner-friendly microcontroller well-suited for IoT projects. It is capable of working with different IoT platforms and standards and works well with the two IoT platforms we selected for our experiments

The Arduino IDE works great for small applications. However, for advanced projects with more than 200 lines of code, multiple files, and other advanced features like auto completion and error checking, VS Code with the PlatformIO IDE extension is the best alternative.

Module 4:

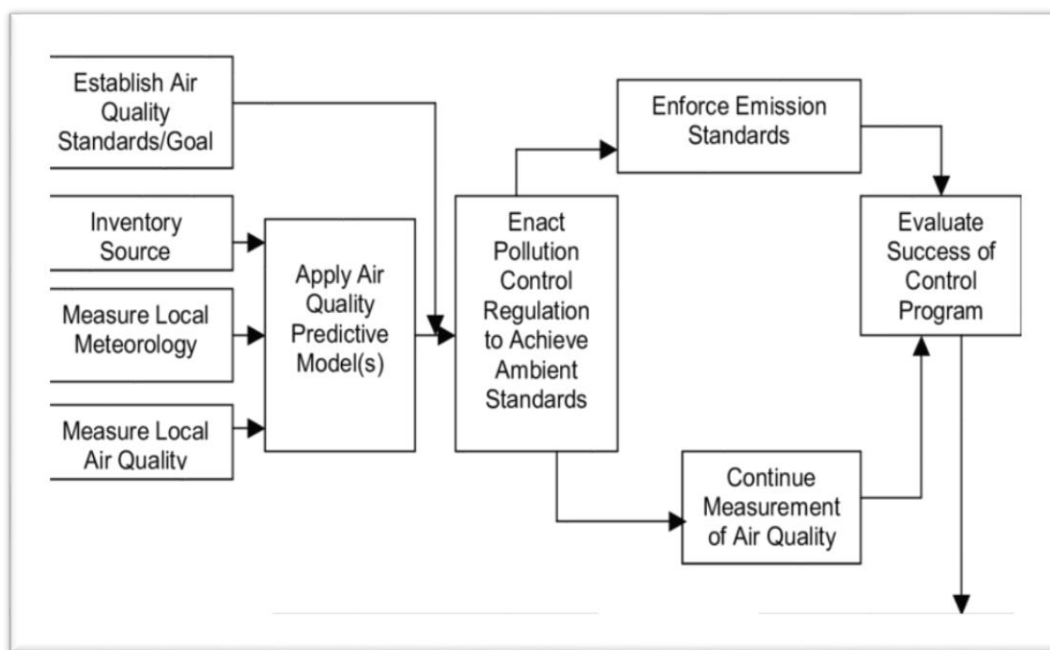
IoT Communication Technologies:

An IoT-based Air quality management system is a centralized management that enables drivers to search for and reserve a Air quality management spot remotely through their smartphones. It offers a convenient arrangement for drivers to park their cars when they are looking to avoid potential traffic congestion

Technologies such as machine vision, multi-agent systems are suitable for open Air quality management lots to acquire Air quality management occupancy information and GPS can be used to provide navigational directions.

Nwave IoT Based Smart Air quality management System:

The Nwave Air quality management management software and smart sensors power your wireless car Air quality management monitoring system providing all of the necessary tools to operate with minimal effort and no programming skills required.



However, the most widely adopted types of smart Air quality management IoT systems include:

- *cameras.*
- *overhead radars/lidars.*
- *ground sensors.*

Module 5:

IoT protocols:

A Air quality management system also requires protocols to ensure IoT devices' and sensors' connectivity in the Air quality management lot. These can be MQTT, LoRaWAN, Zigbee protocol for wireless IoT networks, or else. Such a system also requires video transmission protocols if it uses video surveillance.

IoT is used in smart Air quality management system?



An IoT-based Air quality management system is a centralized management that enables drivers to search for and reserve a Air quality management spot remotely through their smartphones. It offers a convenient arrangement for drivers to park their cars when they are looking to avoid potential traffic congestion.

An IoT-based smart water management system is a decent solution for businesses and consumers, providing real-time data on Air quality management space availability, pricing, payments, and more. It can positively impact the environment and traffic. Moreover, IoT solutions ensure efficient Air quality management reservation and management.