# CHAPTER 1

## INTRODUCTION

### 1.1. Background

Air pollution is not an issue that can be underestimated, air pollution has many negative impacts on human life including health. The sources of air pollution are motor vehicle exhaust, toxic waste, and forest fire fumes. Carbon dioxide, nitrogen oxide, sulfur oxide, chlorofluorocarbons, metane, carbon monoxide and hydrocarbons are some of the gases contained in air pollution. The gas is extremely hazardous to human health, particularly for children. Humans can be poisoned if they inhale the gas, which is extremely dangerous for human health, particularly for respiration. As a result, this journal was developed to determine if the condition of the ambient air is good or bad for human health.

A tool to detect the presence of these hazardous gases is needed to solve this issue. The sensitivity of the three gas sensors was determined using the MQ-135, MQ-2, and MQ-7 gas sensors, an Arduino ATMega 2560 microcontroller, and the Fuzzy Logic algorithm.

The author uses three sensors (MQ-135, MQ-2, and MQ-7) as inputs to detect pollutant gases in the ambient air, then processes the data using fuzzy logic algorithms, with the output being a 16x2 LCD, buzzer, and three LEDs (red, yellow , green). The air quality threshold in ppm is based on the Air Pollution Standard Index (ISPU) Table, Clean Air Composition Table, Clean Air and Polluted Air Tables.

### 1.2. Problem Formulation

In this project, only a few issues will be explored.

1. Can the tool detect the gas that has been determined?

2. Is it possible to view the results and receive notification if the ambient air quality has surpassed the measurement limit that has an effect on living things?

3. What is the technique for determining the category of the fuzzy algorithm based on ppm concentration?

**1.3.    Scope**

This research uses:

1.  Microcontroller: Arduino ATMega 2560

2.  Using 3 sensor input:

    (-) MQ-135 to detect CO2 gas(Carbon Dioxide).

    (-) MQ-2 to detect LPG gas(Liquefied Petroleum Gas/ Metane).

    (-) MQ-7 to detect CO gas(Carbon Monoxide).

3.  Output using: LCD 16x2, 3-color LED (red, yellow, green), Buzzer Active.

4.  Using library fuzzy algorithm to process input data and map it to output.

5.  Using the MQUnifiedSensor library for gas sensor calibration.

**1.4.    Objective**

Detects ambient air quality, displays the results to tell whether the surrounding air is good or bad for the health of living things.