

CHAPTER I INTRODUCTION

I.1 Background

Based on the Law of The Republic of Indonesia Number 36 Year 2009 Concerning Health [1], Health is a healthy condition, both physically, mentally, spiritually and socially, which enables everyone to live productively socially and economically. It will usually have an impact on the quality of one's work, and its problems have been growing at faster rate especially in urban areas of developing countries where industrialization leads to release of lot of gaseous pollutants.

For example, in car factory is shown in Figure 1.1, there is a process which needs make the car's machine must be start. When it is starting, it emits pollution gas in the form of carbon monoxide [2]. The starting machine also makes the surrounding environment become hot and the humidity become decrease. Inhaling too much carbon monoxide can cause nausea, dizziness, and lack of oxygen in the brain. Improper temperatures can cause the body become tired faster. Meanwhile, if the air humidity is too low it causes coughing or flu and if the humidity is too high it causes breathing problems [3].



Figure 1. 1 The Example of Line Production in Car Factory

Based on Decree of the Minister of health of the Republic of Indonesia Number 1405 / MENKES / SK / XI / 2002 [4], the threshold value for temperature, humidity, and carbon monoxide in the industrial work environment shown in Table 1.1.

Table 1. 1 Threshold Value in Industry [4]

Parameters	Threshold Value
Temperature	18 °C – 30 °C
Humidity	65 % - 95 %
CO	100 ppm

Seeing these problems, the authors are interested in making research to produce air quality monitoring systems on the production line. Previous research with the title "Air Quality Monitoring System based on Arduino Microcontroller" conducted by Kaur [5], the microcontroller using Arduino Uno, and Zigbee module as the Wi-Fi module.

And on the previous research with title "Implementation of Monitoring System for Air Quality using Raspberry PI: Experimental Study" conducted by Alkandari [6], the microcontroller using Raspberry Pi, and using DHT22 as the sensor for detecting temperature and humidity and using MiCS-5525 as the sensor for detecting carbon monoxide.

In this research, the authors designed an air quality monitoring system using wireless communication by sending information data using the Blynk application which acts as a server. the temperature and humidity sensor used is DHT11, the sensor used for carbon monoxide is MQ-7. Using microcontroller Raspberry Pi 3B as the processing unit. To access the data that has been sent by Raspberry to Blynk, it needs a smartphone that is connected to the internet network.

I.2 Formulation of the Problem

The formulations of the problem are:

1. How the criteria of air quality that is good?
2. How to construct air quality monitoring system?
3. How to test the system?

I.3 Research Objective

The objectives of the research are:

1. To construct the air quality monitoring system based on the selected framework.

2. To assembly the system based on the selected framework.
3. To test the system.

I.4 Research Boundaries

The boundaries of the research are:

1. Air quality monitoring system is a system for detecting temperature, humidity, and carbon monoxide, these parameters are selected based on the selected framework. Selected framework is a framework chosen based on the lowest budget but has the same function.
2. This system is assembled using several components such as Raspberry Pi 3B, MQ-7 sensor, DHT11 sensors, mockup, jumper wire, and breadboard. The system is assembled with a wiring system that is plugged into a breadboard and a raspberry.
3. The system is run using a python program that has been made to test the system's function which is working or not in a mockup. Testing is carried out for one hour. This test is only to see whether a system is working or not, does not up to the validation stage.

I.5 Benefit of Research

With this tool, we can determine the air quality of a room, so that the room can be categorized as healthy or not based on the threshold value of temperature, humidity, and carbon monoxide.

I.6 Systematic Writing

Chapter I Introduction

In this chapter contains a description of the background, formulation of the problem, research objective, research boundaries, the benefits of research, and systematic writing.

Chapter II Literature Review

This chapter contains literature which relevant to the research problems. Theoretical studies include theories of hardware, software, and method.

Chapter III Research Methodology

In this chapter contains a description of the steps that will be done to explain the problems taken in this research. This chapter contains block diagram, flow chart, and schematic diagram.

Chapter IV Data Collecting

This chapter contains of data collecting for temperature, data collecting for humidity, and data collecting for carbon monoxide.

Chapter V Data Analyze

In this chapter contains of data analysis for temperature, data analysis for humidity, and data analysis for carbon monoxide.

Chapter VI Conclusions and Suggestions

This chapter contains of conclusions and suggestions.