UNIVERSITI TEKNOLOGI MARA

WEATHER STATION FOR HOMES AND OFFICES USING THINGSPEAK APPLICATION

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ABSTRACT

The Internet of Things (IoTs) has greatly diminished power usage, enhanced connectivity, and streamlined data access for networked devices. It is commonly acknowledged as a dependable technique for increasing diverse industrial sectors. The primary objective of the article is the utilisation of IoT in the development of a weather monitoring system. The system utilises many sensors that are integrated with an Arduino Uno microcontroller board. The study seeks to collect, assess, and analyse the execution and depiction of data. The Arduino Uno functions as the primary server, facilitating internet connectivity to retrieve data for analysis and scrutiny. A weather station is an apparatus that offers precise information regarding the current weather conditions in a specific area, encompassing factors such as temperature, air pressure, and gas detection. The prototype relies on the ESP8266-based Wi-Fi module Nodemcu (12E) as its central component. The NodeMCU is connected to four sensors: the DHT11 temperature and humidity sensor, the BMP180 pressure sensor, and the MQ-135 air quality sensor. The hardware configuration incorporates an LCD 20X2 display for the purpose of displaying the sensor readings. Whenever the measured values surpass predetermined criteria, the system dispatches notifications via a web-based application to prompt users to undertake requisite actions.

***Keyword** – IoT, Arduino Uno, Wi-Fi Module, Weather Monitoring System, Air Quality*

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CHAPTER 1

INTRODUCTION

1.1   Research Background

The climate has seen alterations over extended periods of time, and the methodology for assessing these changes has advanced through different phases throughout history. The advent of contemporary meteorological instruments did not begin until the 1400s. Previously, weather observation relied mostly on visual indicators such as the appearance of the sky and the sensory perception of the air. The development of meteorological instruments was motivated not alone by the requirements of agriculture, but also by the growing significance of maritime transportation. Given the inherent hazards of storms at sea and the dependence on wind for propulsion, the capacity to predict meteorological conditions that are pertinent to sailing has become essential[1].

Climate change poses the most significant peril to both the environment and humanity in the twenty-first century. The Earth's annual temperature has fluctuated by several degrees Celsius over millions of years. In the last three to five decades, some regions, such as Malaysia, have experienced a rise in temperature. Consequently, there has been an increase in the frequency and intensity of extreme weather events such as storms, floods, and droughts. The El Nino-Southern Oscillation (ENSO), a significant climatic phenomenon, exerts a considerable influence on Malaysia's climate via impacting rainfall patterns. Malaysia is significantly impacted by El Nino compared to other Southeast Asian nations, both in terms of regional climate anomalies and the socioeconomic well-being of its population [2].

Human activities can lead to air pollution occurring at any time. In Malaysia, air pollution is primarily contributed by three main sources: automobiles, industries, and combustion processes. The air pollution index serves as an indicator to assess the state of air quality. The average concentration of various air pollutants, including sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and fine particles or dust (PM_{10}), is used to calculate the air pollution index value. Air pollution can have detrimental effects on respiratory health, causing issues such as respiratory tract inflammation, narrowing of airways, lung diseases, and breathing difficulties. Conditions like emphysema, asthma, chronic