

I. INTRODUCTION

The temperature and humidity within a room environment play a crucial role in determining the efficiency and comfort of various activities, including work. Temperature, measured in degrees Celsius ($^{\circ}\text{C}$), represents the degree of hotness or coldness and is typically gauged using a thermometer. Sunlight duration stands out as a significant factor influencing air temperature, resulting in immediate fluctuations in the surrounding atmosphere.

Air humidity, on the other hand, refers to the humidity content in the air due to the presence of water vapor. Various terms are associated with air humidity, such as absolute humidity, specific humidity, and relative humidity. The level of humidity in a particular location is influenced by multiple factors, including temperature, air pressure, wind movement, lighting conditions, and vegetation.

Temperature and humidity hold particular significance for individuals occupying rooms or buildings, particularly students and lecturers. It is worth noting that air temperature decreases with increasing altitude, consequently leading to higher humidity levels in elevated areas.

In the realm of predictive modeling, Gaussian Process Regression (GPR) has proven its utility in diverse applications. Mukid and Sugito [1] explored the use of GPR to predict rainfall by employing a stochastic approach based on the assumption that rainfall amounts are random. They identified the Quadratic Exponential ARD (Automatic Relevance Determination) covariance function as the most effective for rainfall prediction, yielding a Root Mean Square Error Prediction (RMSEP) value of 123.63.

Mukid [2] further elaborated on the implementation of the Markov Chain Monte Carlo method to estimate the hyperparameters of Gaussian processes. The Metropolis-Hastings (MH) algorithm was employed to generate random samples from the posterior distribution, an approach necessary for cases where direct simulation methods are not feasible. In this study, a uniform distribution was chosen for generating proposal points.

In another study by the same author [3], Gaussian processes were utilized to predict the production volume of a clothing company based on factors such as the number of employees, overtime work, damaged machines, and raw material usage. Gaussian processes rely on the mean and covariance function for their definition, with the exponential square covariance function being a popular choice and equipped with two hyperparameters.

Putri et al. [4] focused on predicting the number of passengers and estimating the required number of carriages for the Argo Parahyangan train. They developed a web-based system employing Gaussian process regression, which proved capable of handling limited data and providing a measure of uncertainty in predictions. The regression process employed the Radial Basis Function (RBF) kernel.

Additionally, Salim et al. [5] proposed a website-based system for predicting the transmission of Dengue Hemorrhagic Fever (DHF) in Indonesia, where DHF remains a significant public health concern. By leveraging classification and regression methods, the system employed Support Vector Regression (SVR) and Gaussian Process Regression (GPR) algorithms implemented using the Python programming language.

These previous works illustrate the wide-ranging applications of Gaussian Process Regression and its relevance in different domains, showcasing its ability to handle small datasets while offering valuable uncertainty metrics in prediction tasks.