

## ABSTRACT

### ANALYSIS OF BAYESIAN OPTIMIZATION HYPERPARAMETER TUNING PERFORMANCE ON THE PROPHET MODEL FOR FORECASTING THE INDONESIA COMPOSITE STOCK PRICE INDEX (IHSG)

By

**M. Farhan Aboeruslan M**

The Indonesia Composite Stock Price Index (IHSG) is an important indicator that reflects the condition of the Indonesian stock market and tends to exhibit fluctuating movements. The ability to accurately forecast IHSG movements is essential to support investment decision-making. This study employs the Prophet method because of its capability to flexibly model time series data with trend and seasonal patterns. The data used consist of secondary data in the form of daily IHSG closing prices from January 2020 to December 2025 obtained from Investing.com. The research stages include data preprocessing, data visualization, splitting the data into training data (80%) and testing data (20%), developing the baseline Prophet model, hyperparameter optimization using Bayesian Optimization, and evaluating the forecasting results. The results show that the implementation of Bayesian Optimization improves the performance of the Prophet model by producing lower prediction error rates. In addition, the best model is used to forecast the IHSG for the next 30 days. The forecasting results are expected to provide useful insights for investors in making investment decisions in the capital market.

**Kata-kata kunci:** Indonesia Composite Stock Price Index, Prophet, Forecasting, Bayesian Optimization, Hyperparameter Tuning, Time Series.

## ABSTRAK

### ANALISIS KINERJA METODE *HYPERPARAMETER TUNING BAYESIAN OPTIMIZATION* PADA MODEL *PROPHET* UNTUK PREDIKSI INDEKS HARGA SAHAM GABUNGAN (IHSG)

Oleh

**M. Farhan Aboeruslan M**

Indeks Harga Saham Gabungan (IHSG) merupakan indikator penting yang menggambarkan kondisi pasar saham di Indonesia dan memiliki pergerakan yang cenderung fluktuatif. Kemampuan dalam memprediksi pergerakan IHSG secara tepat sangat diperlukan untuk mendukung pengambilan keputusan investasi. Penelitian ini menggunakan metode *Prophet* karena mampu memodelkan data deret waktu dengan pola tren dan musiman secara fleksibel. Data yang digunakan berupa data sekunder harga penutupan harian IHSG periode Januari 2020 hingga Desember 2025 yang diperoleh dari situs Investing.com. Tahapan penelitian meliputi *preprocessing* data, visualisasi data, pembagian data menjadi data latih (80%) dan data uji (20%), pembangunan model *Prophet baseline*, optimisasi hyperparameter menggunakan *Bayesian Optimization*, serta evaluasi hasil prediksi. Hasil penelitian menunjukkan bahwa penerapan *Bayesian Optimization* dapat meningkatkan kinerja model *Prophet* dengan menghasilkan tingkat kesalahan prediksi yang lebih rendah. Selain itu, model terbaik digunakan untuk melakukan prediksi IHSG selama 30 hari ke depan. Hasil prediksi tersebut diharapkan dapat menjadi bahan pertimbangan bagi investor dalam menentukan keputusan investasi di pasar modal.

**Kata-kata kunci:** Indeks Harga Saham, *Prophet*, Peramalan, *Bayesian Optimization*, *Hyperparameter Tuning*, Deret Waktu.