Research Proposal

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Analyzing GDP and Unemployment Trends in Malaysia: A Descriptive and Time Series Approach

PRESENTATION OUTLINE

1 - INTRODUCTION

2 - LITERATURE REVIEW

3 - METHODOLOGY

4 - EDA / INITIAL FINDINGS

INTRODUCTION

- **Introduction**
  - Importance of labor market conditions and economic performance.
  - Key economic indicators: GDP and unemployment rate.
  - Malaysia's shift from agriculture to manufacturing and services.

- **Problem Statement**
  - How do GDP and unemployment rates interact over time?
  - What are the underlying trends, seasonal patterns, and residuals in the unemployment rates?
  - Can we accurately forecast future unemployment rates based on historical GDP data and other economic indicators?

INTRODUCTION

- **Objectives**
  - **To perform descriptive analysis** on the GDP and unemployment rates of Malaysia to identify the trends of the two variables in the country. This involves reducing the data and making an attempt of finding out the essentials which relate or link various economic factors.
  - **To decompose time series** data in order to analyse trends or seasonal unemployment rates, and other components which are irregular. These aid in studying the natural trends with a view of identifying the contribution made by seasonal fluctuations and others.
  - **To leverage time series analysis** techniques using ARIMA and Prophet models to predict future unemployment rates. This entails development of models from data gathered from past performance.

INTRODUCTION

- **Scope**
  - Datasets from Data.gov.my.
    - Monthly Unemployment Data
    - Seasonally Adjusted Monthly Unemployment Data
    - Monthly Youth Unemployment Data
    - Monthly Unemployment Duration Data
    - Monthly Unemployment Status Data
    - Annual Real GDP Data
    - Annual Nominal GDP Data
    - GDP Lookup Data
    - GDP Nominal Supply Data
    - Malaysia Economic Indicator Data
  - Methods: descriptive statistics, ARIMA, and Prophet models.

LITERATURE REVIEW

- **GDP and Economic Growth**
  - GDP as a measure of economic performance and its significance. (Danlami et al., 2021)
- **Unemployment and Its Impact on Economic Growth**
  - Effects of unemployment on economic growth and its measurement. (Impin & Kok, 2021)
- **Okun's Law**
  - The inverse relationship between unemployment and GDP growth. (Danlami et al., 2021)
- **Youth Unemployment and Economic Implications**
  - Impact of youth unemployment on economic and social development. (Impin & Kok, 2021)

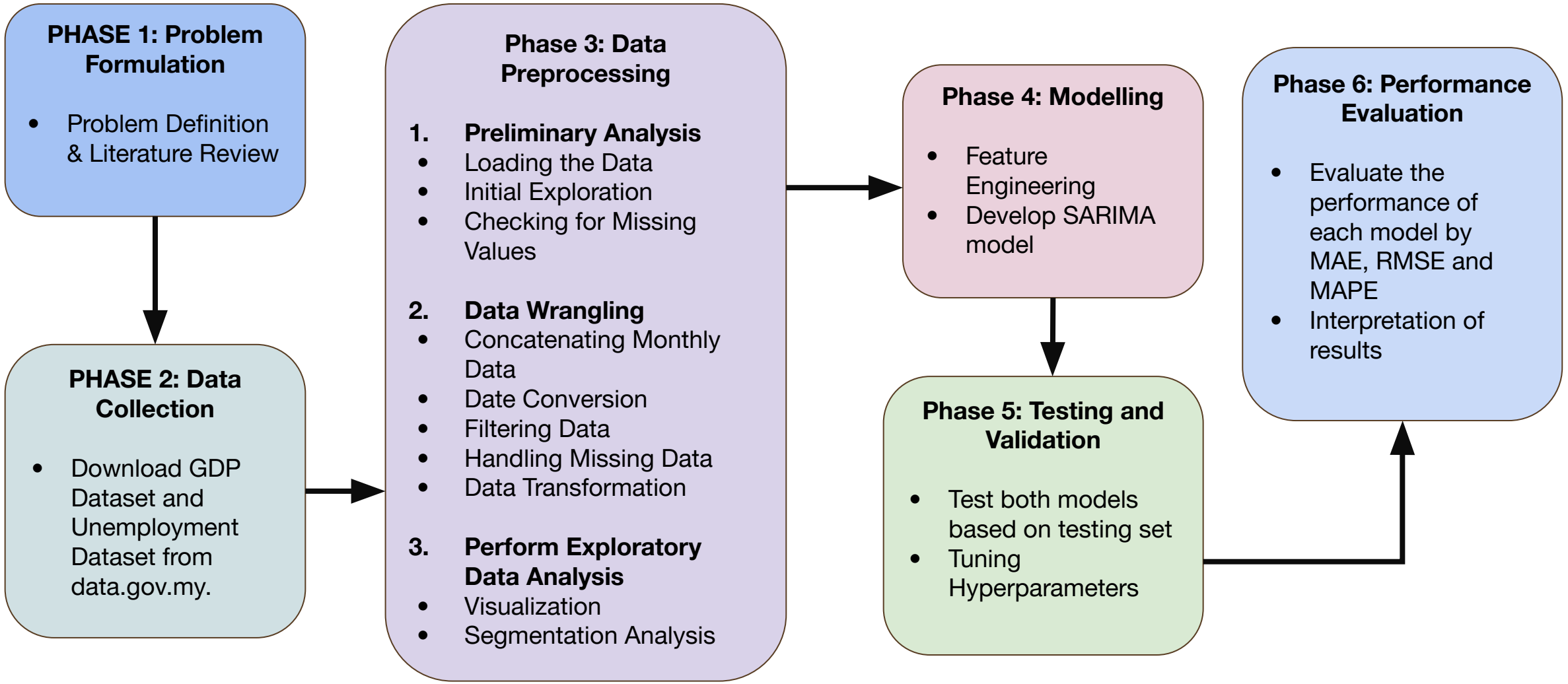
LITERATURE REVIEW

- **Time Series Models: ARIMA and Prophet for Forecasting Unemployment**
  - Use of ARIMA and Prophet models for predicting unemployment rates. (Selvarani et al., 2023)
- **Comparative Performance of ARIMA, SARIMA, and GARCH**
  - Comparison of different time series models for unemployment forecasting. (Kuang Yong Ng et al., 2023)
- **Empirical Evidence in Malaysia**
  - Studies examining the relationship between GDP and unemployment in Malaysia. (Danlami et al., 2021)

METHODOLOGY

- **Data Science Project Life Cycle**
  - Research Framework Stages: Data Collection, Data Pre-processing, EDA, Model Building, Evaluation, and Deployment.
- **Data Sources and Collection Methods**
  - Comprehensive datasets from Data.gov.my.
- **Data Pre-processing**
  - Steps: Data cleaning, transformation, feature engineering, and merging.
- **Exploratory Data Analysis (EDA)**
  - Descriptive statistics and visualizations to understand data patterns.
- **Time Series Analysis**
  - Techniques: ARIMA and Prophet models.

RESEARCH FRAMEWORK



EDA / INITIAL FINDINGS

- **Descriptive Statistics**
  - Summary statistics for key variables.
- **Data Visualization**
  - Histograms, box plots, and time series plots for data distribution and trends.
- **Correlation Analysis**
  - Correlation matrix between GDP and unemployment rates.
- **Initial Insights and Hypotheses**
  - Trends, patterns, anomalies, and hypotheses on the relationship between GDP and unemployment.

DISCUSSION

- **Summary**
  - Key findings from descriptive statistics, data visualization, correlation analysis, and time series analysis.

- **Future Work**
  - Incorporating additional variables (inflation, interest rates, trade data).
  - Advanced analytical techniques (neural networks, ensemble methods).
  - Sectoral analysis (sector-specific trends, resilience factors).

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