I1.01 – Demand Planning / Forecasting

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TEXAS STATE INGRAM SCHOOL OF ENGINEERING

Polímeros Ópticos™

Company Background

- **Polímeros Ópticos:** A company based in Monterrey, Mexico.
- **Specialization:** Designs, develops, distributes, and markets optical products.
- **Product Range:** Offers ophthalmic frames, solar frames, and contact lenses for vision correction and eye care.
- **Project Focus:** We are specifically focused on their ophthalmic frames for this project.
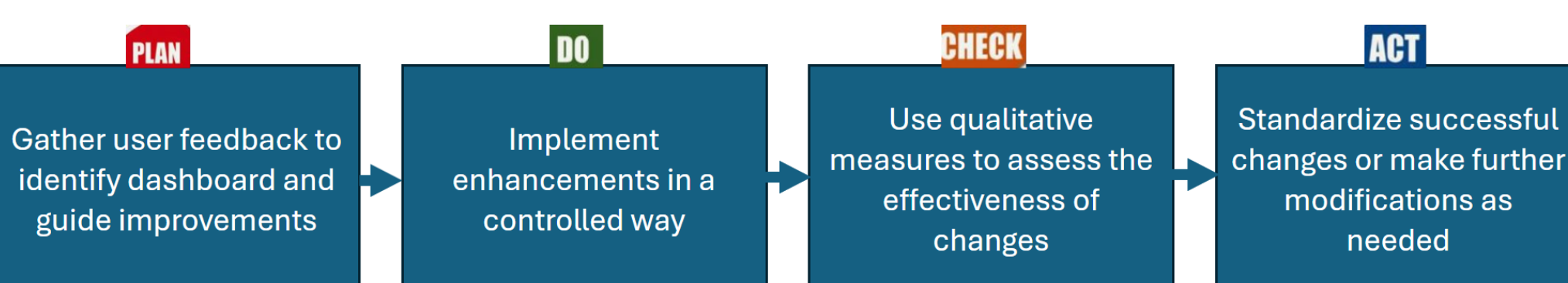
Problem Statement

- **Lack of Interactive Dashboard:** No existing dashboard for demand forecasting and comparison.
- **Absence of user-friendly manual:** No manual to guide new users in using the forecasting code and dashboard.
- **Overall Impact:** These issues hinder nontechnical users from making well-informed decisions in supply chain management and demand planning.
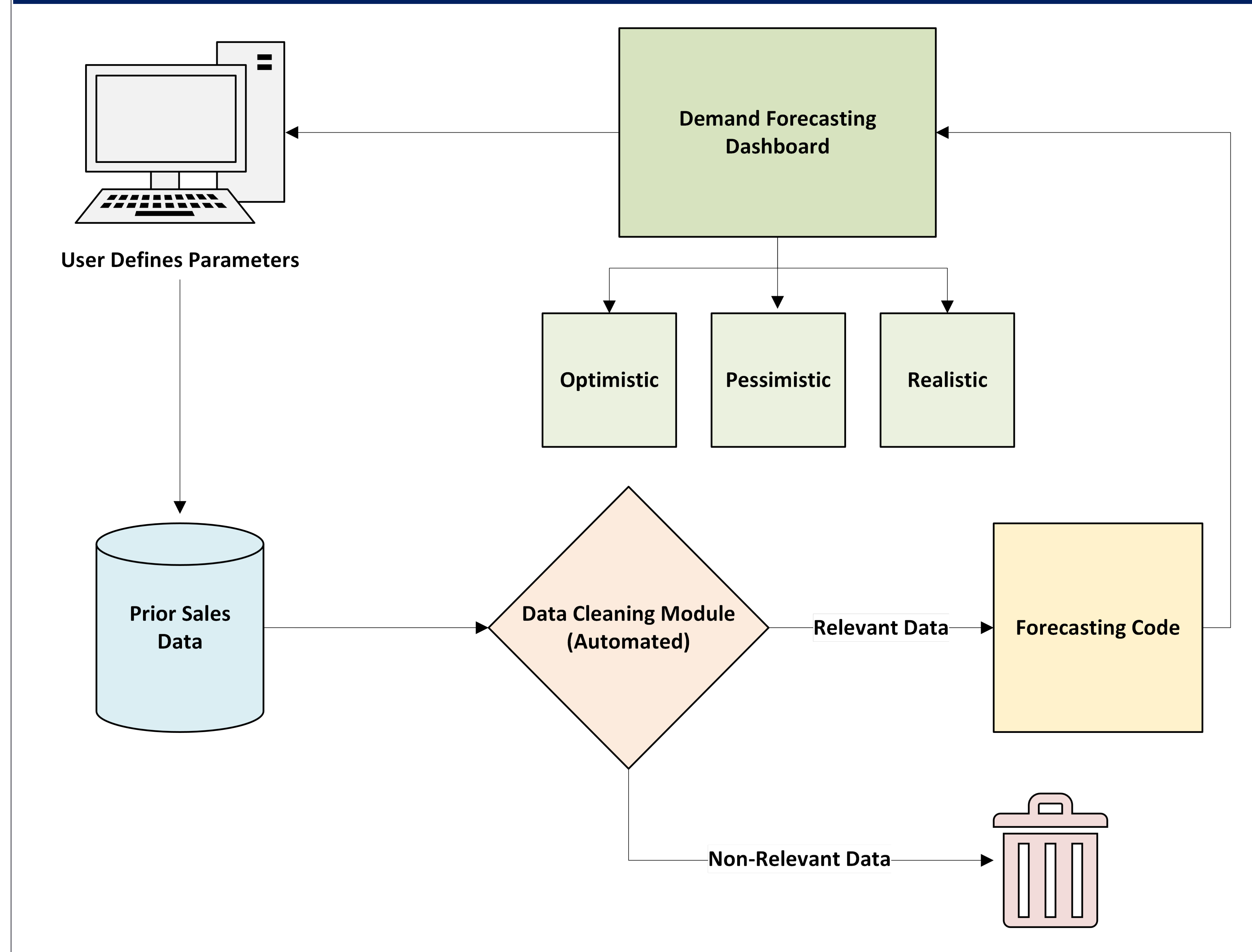
Project Deliverables

- **Dynamic Dashboard:** Develop a dashboard that displays various forecast scenarios.
- **Integrated Interface:** Combine data cleaning, forecasting code, and dashboard into a single, standalone interface.
- **User Manual:** Create a clear manual to guide nontechnical users in understanding and using the dashboard.

Improvement Method

- **Continuous Improvement Method:** PDCA (Plan Do Check Act) is selected for this project.
- **Structured Framework:** PDCA provides a structured approach for iterative improvements.
- **Application:** Ideal for refining dashboards and manuals through user feedback and qualitative analysis.

PLAN — Gather user feedback to identify dashboard and guide improvements

DO — Implement enhancements in a controlled way

CHECK — Use qualitative measures to assess the effectiveness of changes

ACT — Standardize successful changes or make further modifications as needed

Dynamic Dashboard Process Map

Demand Forecasting Dashboard

- Optimistic
- Pessimistic
- Realistic

User Defines Parameters

Prior Sales Data → **Data Cleaning Module (Automated)** → Relevant Data → **Forecasting Code**

Non-Relevant Data →
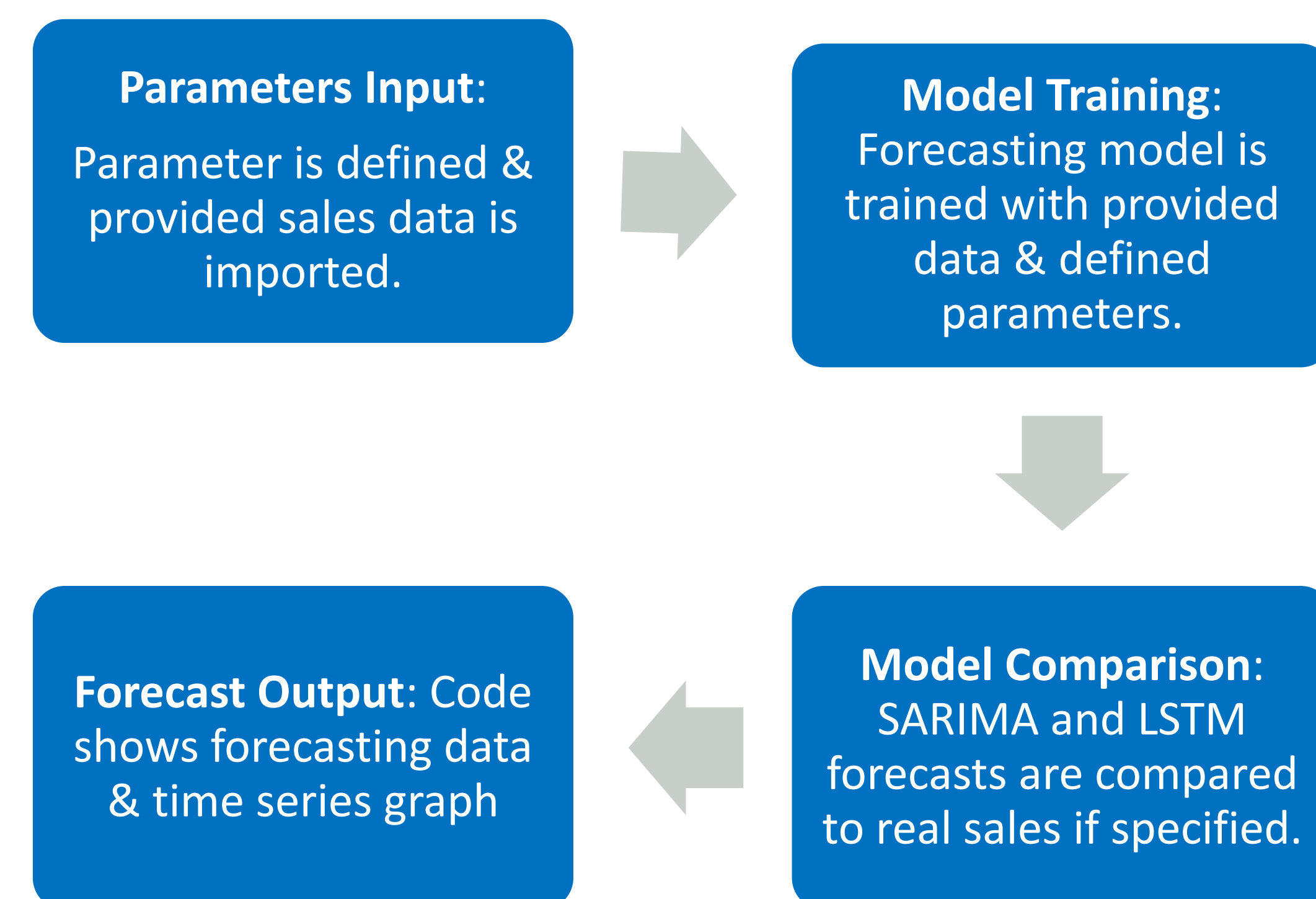
Current Situation

generar pronosticos.ipynb

File Edit View Insert Runtime Tools Help
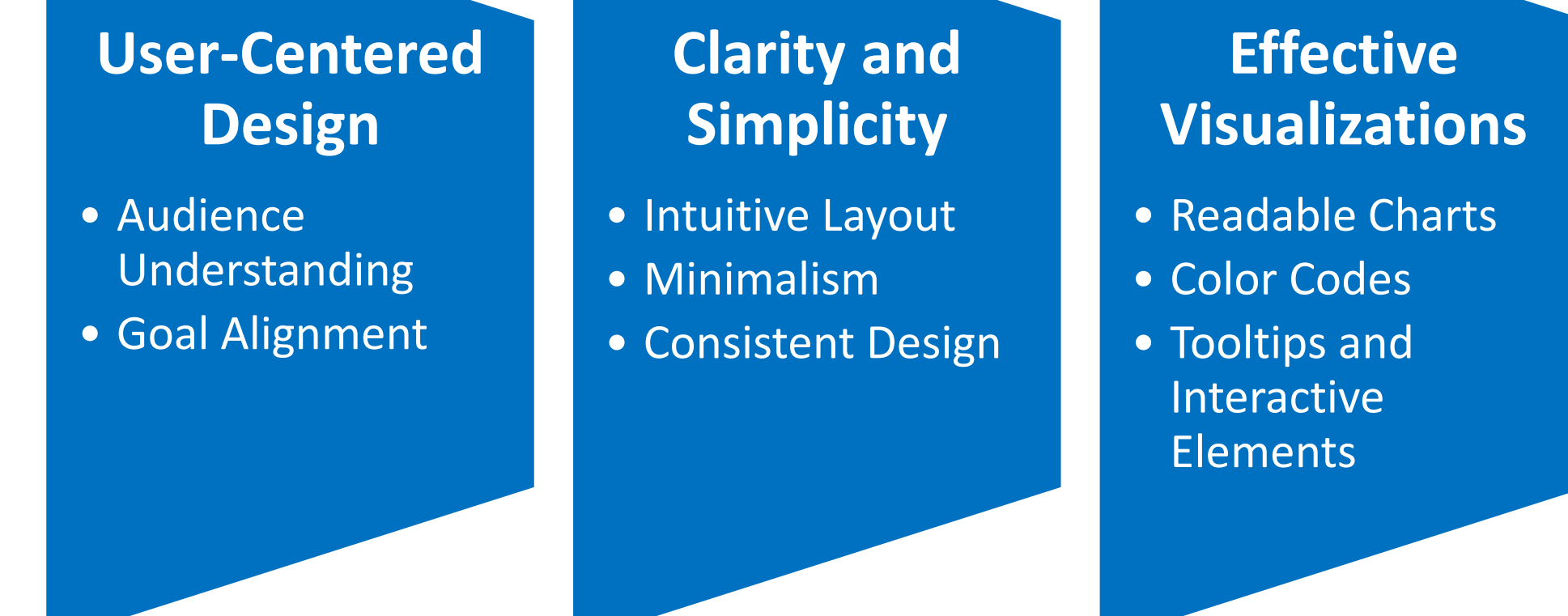
+ Code   + Text

Librerias (Libraries)

```
1  # Imports
2  import pandas as pd
3  import numpy as np
4  import matplotlib.pyplot as plt
5  import tensorflow as tf
6
7  import os
8  import csv
9  import math
10 import sys
11 import time
```

Current Process Map

Parameters Input: Parameter is defined & provided sales data is imported.

Model Training: Forecasting model is trained with provided data & defined parameters.

Model Comparison: SARIMA and LSTM forecasts are compared to real sales if specified.

Forecast Output: Code shows forecasting data & time series graph

Human Factors

User-Centered Design
- Audience Understanding
- Goal Alignment

Clarity and Simplicity
- Intuitive Layout
- Minimalism
- Consistent Design

Effective Visualizations
- Readable Charts
- Color Codes
- Tooltips and Interactive Elements

How does forecasting data assist team I1.02?

- **Improved Inventory Planning**: Our Forecasting data will provide insights into expected demand, helping the team optimize inventory levels to prevent stockouts and minimize excess stock.
- **Informs Supplier and Logistics Planning**: Forecast data guides supplier allocation and logistics scheduling, ensuring resources align with demand needs under lead time and cost constraints.
- **Enables Scenario Planning**: By offering forecast scenarios (e.g., high, low, or stable demand), our data allows the team to prepare for fluctuations, improving supply chain resilience and flexibility.

Team 1: Creates forecast data and dashboard visualization → **Sponsor**: Approves Scenarios or sends back to Team 1 for reiteration → **Team 2**: Uses approved forecast data to optimize the supply chain

Team Members

Prabin Dhital (left), Abigail Baldwin (middle), Isaiah Rodriguez (right)