P1 | A1- SMART
Klysman Rezende Alves Vieira
230353014

Instructions:
1. Identify a DS project objective using the SMART methodology

2. Design your project using the SPAP methodology (Identify the DV and IVs)

Optimizing Berth Planning for Container Ships Using Machine Learning

SMART Framework:

S - Specific

Goal is to optimize berth planning and assignment for container ships to improve port efficiency and reduce fuel costs and emissions from ships waiting to dock.

M - Measurable

Improve berth utilization by at least 15%, reduce waiting times by 20%, and increase overall throughput by 10% within six months

A - Attainable

Utilize advanced data science techniques, predictive analytics, and optimization algorithms to improve current berth planning processes.

R - Relevant

Berth planning is critical for ports to operate efficiently and minimize costs and environmental impact.

T - Timely

Aim to develop a working optimization prototype within 6 months.

SPAP Methodology:

Structured

Key phases - data collection, data exploration & cleaning, feature engineering, model development, model evaluation and refinement, deployment.

Pyramid

Collecting historical arrival, departure and berth parameter data. Explore relationships in data. Develop optimization models incrementally from simple to complex.

Analysis

Statistical analysis of arrival data patterns. Analysis and selection of appropriate optimization algorithms. Evaluation of model efficiency using test datasets.

Plan

6 month plan with timeline for completing key tasks in each project phase outlined above.

Dependent Variables: Berth utilization rate, average wait times, fuel consumption. Independent Variables: Arrival time distributions, berth parameters (length, draft limits etc.), ship parameters (size class, draft etc.).