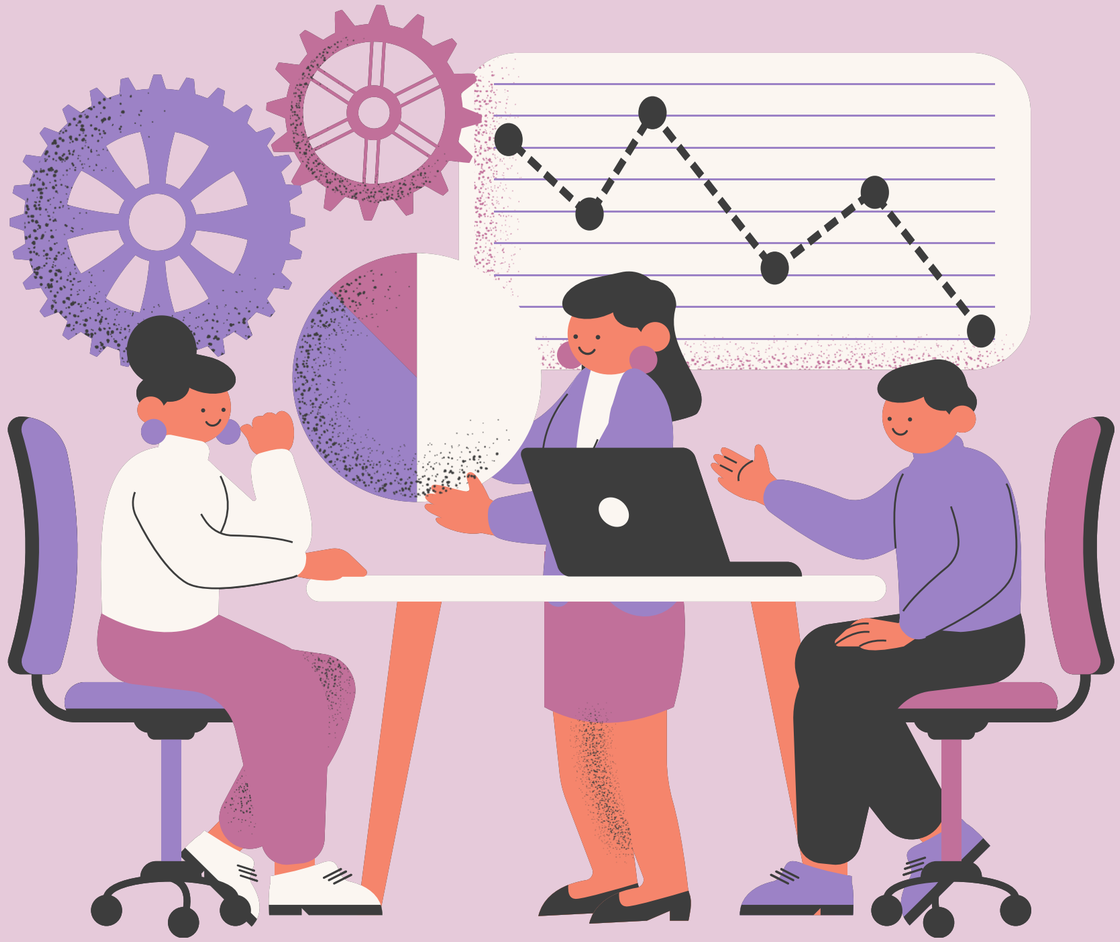
HackFest 2024

OPTI Log

at strategic locations to enable efficient inter-modal freight movement



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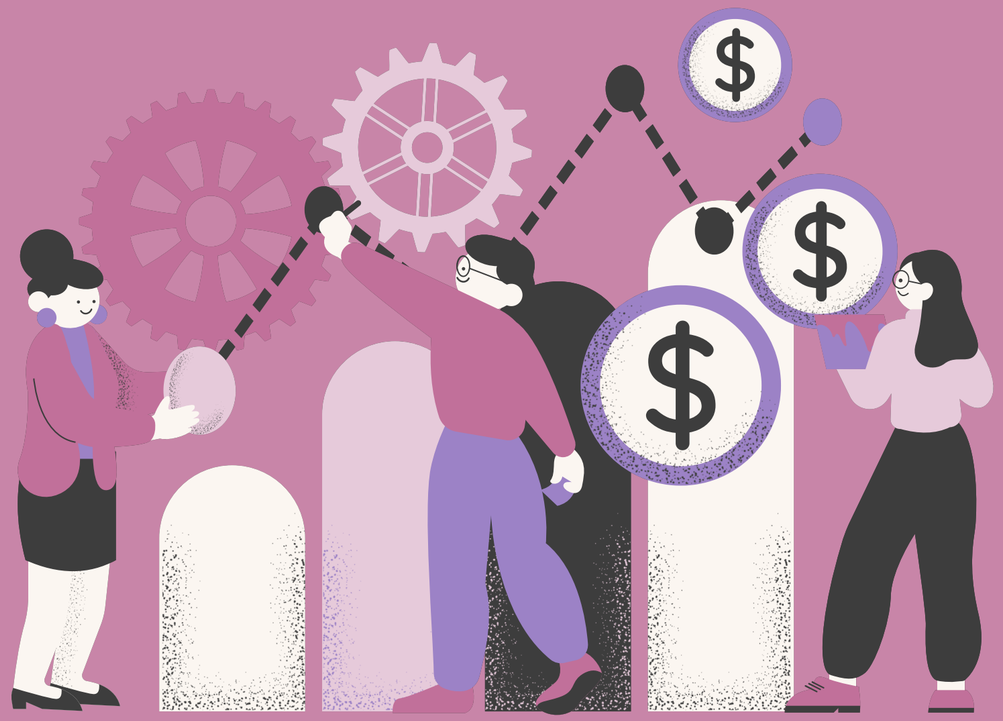

Problem Statement

- India's logistics sector struggles with inefficiencies such as high costs.
- Existing infrastructure, like ports and logistic parks, is often underutilized due to planning issues.
- The development of a model is imperative to attain an optimal flow network for goods transfer within India's transportation infrastructure.

Problem Formulation

Objective

Reduce the Sum of transportation costs associated with the movement of freight across the network

Constraints

Supply at a port is limited. Total Freight out of a port cannot exceed the available supply

Demand at cities should be met. Total Freight into a city cannot be lower than the demand.

Solving the problem:

Assumptions

- There is no time component to the supply – i.e. Freight is readily available for transport.
- There are no intermediary hubs.
- There is no cost associated with the storage.
- Storage space is not limited by demand (i.e. cities can store more freight than their demand).
- The cost incurred between different modes of transport is uniform (Rs. 35/km).

Approach

- Consider all routes from Ports to Cities.
- Set the flow as a variable parameter.
- Set the Supply and Demand constraints.
- Optimize the network by varying the flow, and minimizing the objective while obeying the constraints.

Solving the problem

01.

- **Problem approached as a linear programming problem**
  - Methods/Algorithms to solve this particular type of problem exist and can be leveraged.
  - Optimize the model to require lower computational power.

02.

- **Solution Execution Interface**
  - Used User-friendly GUI for streamlined operation
  - Integration of user inputs with API interaction for efficient response retrieval

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Thank you very much!

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