SADIQ SADIQ ABUBAKAR.pdf

by Umar Babagana

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UTM UNIVERSITI TEKNOLOGI MALAYSIA
SCHOOL OF COMPUTING
Faculty of Engineering

Project Proposal Form MCST 1043
Sem: Semester 1 Session: 2024/2025

SECTION A: Project Information.

Program Name: **Masters of Science (Data Science)**

Subject Name: **Project 1 (MCST 1043)**

Student Name: Sadiq Sadiq Abubakr

Metric Number: MCS241001

Student Email & Phone: sadiqsadiq@graduate.utm.my +60 0196719178

Project Title: Optimizing Delivery Routes For E-commerce Using Linear Programming

Supervisor 1:

Supervisor 2 / Industry Advisor(if any):

SECTION B: Project Proposal

Introduction:

A key component of e-commerce operations is effective logistics. Delivery route optimization has become essential to cutting costs, speeding up deliveries, and increasing customer happiness as online shopping keeps growing. In order to optimize delivery routes and save operating costs while guaranteeing on-time delivery, this project will make use of linear programming (LP). By reducing the overall cost or distance while meeting limitations like delivery windows and vehicle capacities, LP offers a methodical way to solve routing issues.

Problem Background:

obstacles, including:

High delivery expenses as a result of poor routing.

There is growing pressure to fulfill delivery deadlines of the same or next day.

Effects of inefficient transportation on the environment.

Manual planning and other traditional routing techniques frequently fall short in the face of complicated real-world restrictions. Higher fuel use, needless delays, and higher operating expenses are the outcomes of this.

By offering an ideal resource allocation, linear programming provides a mathematical answer to these problems.

Problem Statement:

The intricacy of taking into account numerous factors, including truck capacity, delivery windows, and traffic conditions, makes it difficult for e-commerce logistics operations to identify delivery routes that are both economical and timely. A strong and scalable solution is required because this inefficiency results in higher expenses and unhappy clients.

Aim of the Project:

In order to minimize operating costs and delivery times while meeting constraints like vehicle capacity, delivery time windows, and route limits, the project intends to create a linear programming-based model for e-commerce delivery route optimization.

Objectives of the Project:

To determine the main elements affecting the optimization of delivery routes in e-commerce logistics.

To create a linear programming model that takes these elements into account. should use Python and solver libraries such as Gurobi or PuLP to implement the model.

To use a dataset of delivery locations and limitations in order to test the model.

To assess the model's effectiveness in terms of scalability, delivery efficiency, and cost savings.

Scopes of the Project:

Included:

Optimization of delivery routes for a single e-commerce center or warehouse.

Factors include distances, truck capacity, and delivery window times.

Application to a real-world or simulated dataset.

Excluded:

Traffic updated in real time.

operations for multi-depot logistics.

Integration with logistical systems that are already in place.

Project Operational Efficiency's Anticipated Contribution: a considerable decrease in delivery times and expenses.

A model that can be modified to fit different logistics situations is known as a scalable solution.

Environmental Impact: Lower carbon emissions and fuel use.

Academic Contribution: Illustrating how linear programming may be used practically to address actual logistics issues.

Expected Contribution of the Project:

This project will show how effective linear programming is at resolving practical e-commerce logistics issues. The suggested model will improve the overall effectiveness of e-commerce logistics operations by offering a scalable, economical, and ecologically friendly solution for delivery route optimization.

Project Requirements:

Software:	Programming Languages: Python. Solver Libraries: PuLP, Gurobi, or GLPK. Visualization Tools: Matplotlib or Tableau for result representation.
Hardware:	1 standard computer with: Processor: Intel i5 or equivalent. RAM: 16 GB or higher. Storage: 500 GB SSD.
Technology/Technique/ Methodology/Algorithm:	Linear Programming for route optimization. Graph Theory for modeling delivery networks. Distance Metrics: Euclidean or geospatial distances between delivery points. Data Collection: Gather data on delivery points, distances, vehicle capacities, and time windows.

Type of Project (Focusing on Data Science):

[ ] Data Preparation and Modeling

✓ [ ] Data Analysis and Visualization

[ ] Business Intelligence and Analytics

[ ] Machine Learning and Prediction

[ ] Data Science Application in Business Domain

Status of Project:

✓ [ ] New

[ ] Continued

If continued, what is the previous title?

SECTION C: Declaration

I declare that this project is proposed by:

✓ [ ] Myself

[ ] Supervisor/Industry Advisor ( )

Student Name: Sadiq Sadiq Abubakar

30/11/2024

Signature **Date**

SECTION D: Supervisor Acknowledgement

The Supervisor(s) shall complete this section.

I/We agree to become the supervisor(s) for this student under aforesaid proposed title.

2

Name of Supervisor 1:

Signature **Date**

Name of Supervisor 2 (if any):

Signature **Date**

SECTION E: Evaluation Panel Approval

The Evaluator(s) shall complete this section.

Result:

[ ] FULL APPROVAL
[ ] CONDITIONAL APPROVAL (Major)*
[ ] CONDITIONAL APPROVAL (Minor)
[ ] FAIL*

***** Student has to submit new proposal form considering the evaluators' comments.

Comments:

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Name of Evaluator 1: .....

Signature ..... **Date** .....

Name of Evaluator 2: .....

Signature ..... **Date** .....

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