

# ROUTE OPTIMIZATION FOR RICE DELIVERY USING ANT COLONY OPTIMIZATION ALGORITHM

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## Introduction

3.5 billion people relying on rice as a primary source of nutrition (Chapter 1 - Rice in the World, n.d.). However, the efficient and effective delivery of rice products to end-users, particularly in urban areas, presents significant logistical challenges. Last mile delivery, or the final leg of the delivery process from the retailer or distributor to the end-user, is often the most complex and costly part of the delivery process. This study aims to optimize the last mile delivery of rice products using the Ant Colony Optimization (ACO) algorithm.



## Objective

I. To identify the factors that influence rice product delivery route.

II. To develop an optimal route for customers to reach the nearest rice retailer using Ant Colony Optimization algorithm.



## Result

Three case studies were conducted in Seksyen 7, Shah Alam, each with 400 instances, to test the effectiveness of our proposed ACO model. Our results demonstrate that we were able to identify an optimal path for rice delivery with the shortest possible distance.



## Methodology

### Preliminary Study

- Research Question
- Objectives
- Problem Statement
- Research Significance
- Project Scope
- Factor Identified (Distance)

### Knowledge Acquisition

- Literature Review

### Data Collection

- Street Network using OSMNx and OpenStreetMap.
- Rice Retailer Inventory Dataset.

- Problem Formulation
- Objective Function
- Testing Dataset
- Testing Parameter

- ACO model
- Prototype

### Design

### Development



## Problem Statement

- Hochfelder, 2017) said that inefficient route planning could be considered as an additional hidden cost in the last mile delivery.



## Significance

- By developing more efficient routes through minimum distance, delivery costs can be reduced, delivery times can be faster, and resource utilization can be improved, leading to enhanced efficiency.
- Improve the accessibility and affordability of rice, a staple food crucial for food security in Malaysia.

