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3C's Algorithm for finding shortest path in LogisticsManagement

Sujanthi K, Department of Information Technology, KCG College of Technology, Chennai, India,

Sushmitha R S, Department of Information Technology, KCG College of Technology, Chennai, India,

Swetha M, Department of Information Technology, KCG College of Technology, Chennai, India,

Ms. Ezhilarasi K, Department of Information Technology, KCG College of Technology, Chennai, India,

Abstract: *The shortest path problem is to determine the shortest path between the source and the destination. The shortest route to the delivery person and assign the date and time within the specifiedtime frame. Simulation results show that this method improves the accuracy of single-source surface optimization paths using multi-target path planning tasks compared to traditional Dijkstra algorithms. To improve the effectiveness of these algorithms in dynamic road network we have proposed an algorithmic approach. This route is an optimal planning algorithm that allows you to effectively plan the shortest route to a delivery person and select the optimal route to deliver goods and services to your customers on time. In this way, for each product delivery to the exact customer location, you can determine a simple shipping option to the courier. The result is that the multipath routing mechanism creates more overhead compared to common single-pass routing protocols, but in terms of congestion and capacity when the route length is within certain derivable limits. It shows that it provides better performance. It is dedicated to minimizing the number of paths in the representation.*

Keywords: *Dijkstra's algorithm, 3 C's algorithm, Schedules - shortest route-source and destination.*

I. INTRODUCTION:

During trade, there is an objective logistics process for commodities from manufacturers to end consumers. There are several steps in handling the logistics cycle, product selection, quantification, inventory management, and logistics management information systems that serve customers. The most important indicators of logistics efficiency include warehouse storage, on time delivery, order accuracy, shipping costs, damaged products, and inventory turnover. Transportation is a logistics activity related to the movement of goods inside and outside an organization. By deliveringthe goods at the right time and in the right order, you can benefit fromtime. Logistics personnel select the right source by analysing them interms of cost, speed, reliability, safety, and number. The logistics management process focuses on timely delivery to customers to buildcustomer trust. The transportation method is selected by appropriate planning, the required materials are quickly transported to the manufacturing site, and the project is completed on time. Delivering goods to consumers in the right places faster will increase consumer satisfaction. Calculating the optimal path between two locations on aroad network is a difficult task in the areas of vehicle guidance and related transportation, distribution, and logistics industries. Choosingthe correct route planning algorithm from the 3C algorithms is basedon customer preferences, the closest path service, and calculations without accessing the visited node. Therefore, these algorithms needto be extended to take into account these dynamic parameters and update the shortest path chosen accordingly. Finding the shortest path(SP) in a large network analysis between any two nodes is a difficultbut very important task. Therefore, the algorithm applied to this network must respond to network changes by updating the previouslyselected route under the new conditions. It is difficult to track the exact location of a customer in order to deliver the product to the customer on time. Therefore, this document contains a plan for the shortest route to the courier, allowing the customer to choose the dateand time the service will assign to the product order date.

II. RELATED WORK:

In [3] the shortest course trouble is a traditional set of rules trouble ingraph theory, which pursuits to discover the shortest course among nodes in a graph (composed of nodes and paths). Many realistic troubles may be converted into shortest course troubles. In [8] the aggregate of priori reinforcement gaining knowledge of era andsearching-top of the line shortest course set of rules to discover satisfactory course for wise riding vehicle. In [7] this answer becameused to resolve the growth making plans trouble, and its purpose became to discover a layout answer with minimal fee. This approachapplied the Dijkstra`s shortest course set of rules to optimize the course and calculate the overall fee from the supply node to the vacation spot node. The outcomes confirmed that this approach has a decrease layout fee than the authentic course. In [9] the new approach extends the traditional Dijkstra approach with a view to gain a methodto a trouble given inside a specific time, along with course search. In [11] Distance is calculated the usage of the coordinates of the nodes that compose the section and to calculate the shipping time, it's far vital to apply the situations of motion for the factor bodies. In [2] It is proposed become aware of the shortest course the usage of Dijkstra`s set of rules. For the glide of most modern-day with excessive Power with inside the complicated circuit the usage of Mesh modern-day analysis. Dijkstra`s Algorithm is applied to determine the shortest modern-day glide among hubs in a circuit of every Edge.

III. PROBLEM DEFINTION:

The current system has a problem with product delivery to customersbeing late. It could result in the consumer not receiving the merchandise on time. Another issue with the current system is that itis unable to track the precise location of the things being delivered tothe consumer. Pick-up, which allows you to collect packages from nearby joint delivery facilities, is also becoming more popular. Choosing a vehicle route that simultaneously meets each customer's pickup and delivery needs. If home delivery and customer attraction are performed at the same time, location management becomes difficult. Customer behavior and the potential for delivery failures affect delivery capabilities. Most people believe that online shoppingwill continue to grow in popularity.

IV. METHODOLOGY:

The Fig 1 explains the database contains customer and messenger information. Delivery begins in cities classified based on the direction and adjacency distance (adjacent matrix) calculated by the algorithm. By using the algorithm to find the distance from the city classified asa warehouse to the nearest delivery point, the shortest scheduled routeto the delivery person and the scheduled date and time (by the customer) are sent to the customer at the time of ordering a product.

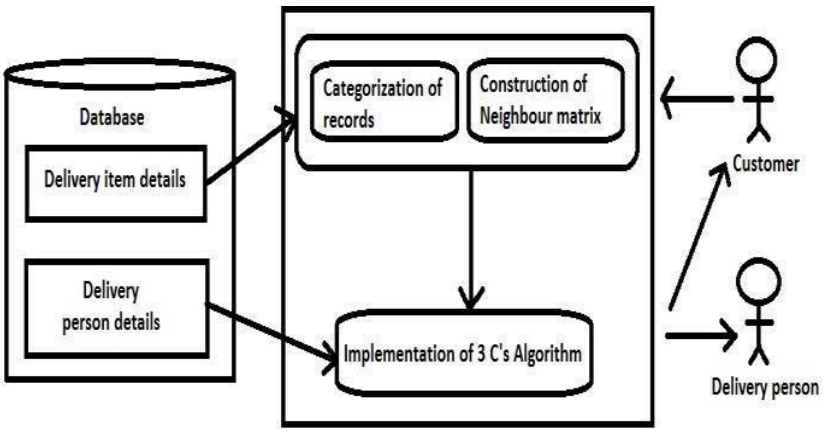

Fig 1: Architecture Diagram

4.1 Functional Flow Diagram:

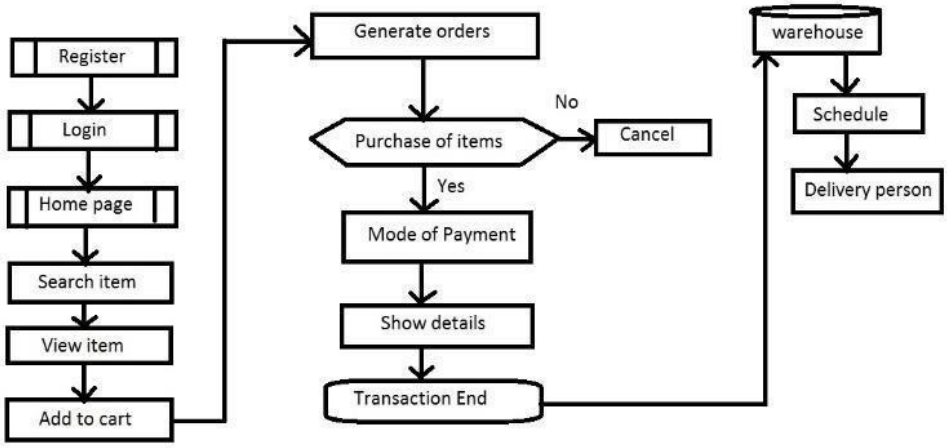

Fig 2: Functional Flow Diagram

The Fig 2 illustrates the entire flow so that users can use their credentials to register and login to the application. Once the customerenters their credentials, they are taken to the home page. Now users can search for and order items from the application. This process flowfollows payment confirmation, after which the user can select their date and time for delivery of the ordered product, and those orders arereported to a nearby warehouse. At this stage, the courier is scheduledon the shortest route shown on the map from the nearby warehouse tothe end user's delivery address.

4.2 Scheduling Module:

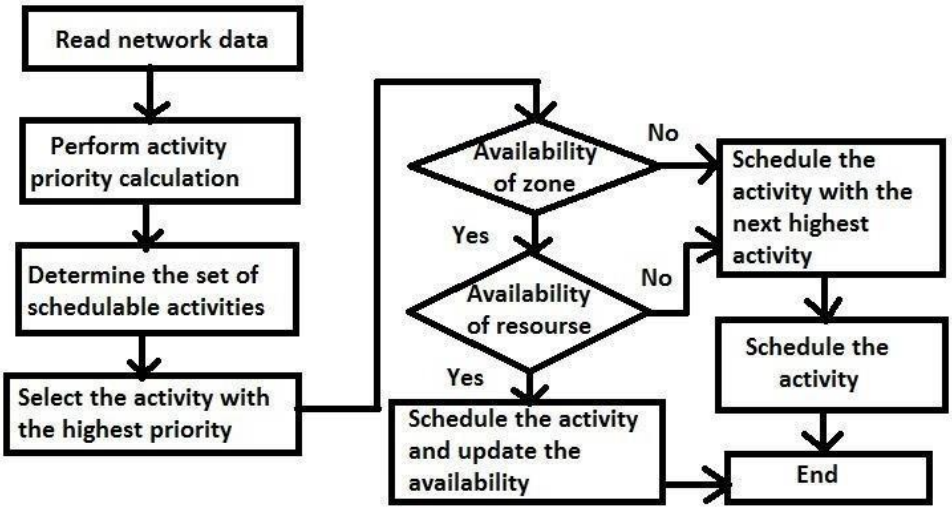

Fig 3: Scheduling Module

The Fig 3 illustrates the scheduling engine. Read the network data first, then perform the calculation on the higher priority activity. After the calculation, determine the activity planned to select the activity with the highest priority. After selecting the highest priority from the activities, the availability of zones and resources within the activity is checked, activities are scheduled, and the zone availabilityand resource availability are updated. If the activity does not have zone availability and resource availability, the activity is checked with the second highest priority and the activity is scheduled.

V. ALGORITHM: ALGORITHM 3C'S IMPLEMENTATION

INPUT: Delivery items considered as the set of nodes. **OUTPUT:** Scheduled optimal path for delivery items
BEGIN:

VI. RESULT ANALYSIS:

1. Fetch the delivery address from the database and create as nodes.

END:

2. Mark all vertices as unvisited initially. Mark all nodes with infinity distance initiallyexceptsource node.
3. Maintain a separate set for processed nodes.
4. Maintain a neighbour matrix nearby zones (U).
5. Calculate the path variation between zone (U) andvertex (V)
6. Repeat the following for (v-1) times: -

6.a) Pick the min value node which isunprocessed and verify the prime user.

6.b) Mark this node as processed (u--->v).

6.c) Update all adjacent vertices.

6.d) List of address where the item is goingdelivered today is considered as node.

7. If cost[u] +wt (uv)<cost[v]UPDATE

Fig 4: Working of 3 C's algorithm

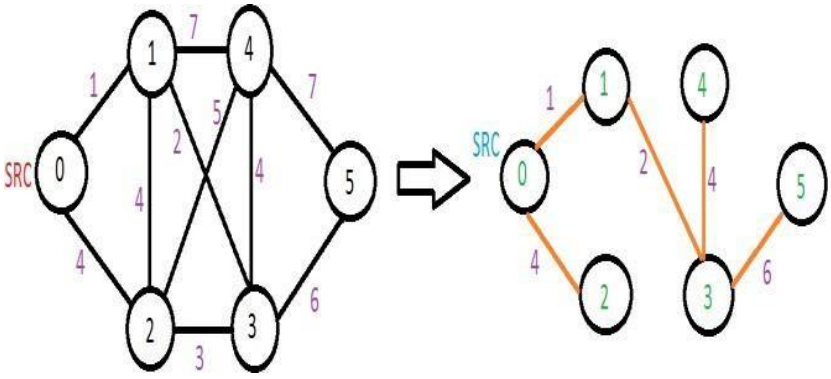

Fig 5: scheduling the delivery location

The Fig 5 schedules the shortest path is derived from the classification of cites and finding the shortest path shows the priority of the customer location to deliver the products on time to the customer. To evaluate the execution of the proposed algorithm, consider a sample dataset containing 100 delivery item datasets belonging to the city of Chennai. These records are categorized based on geographic area (location) and inventory location. The best route is calculated for these classified or grouped data records and assigned to the available distributors.

VII. CONCLUSION AND FUTUREWORK:

In this paper, we proposed an algorithm to find an optimal path planned by the courier. Customers can choose the date and time the service assigns to the product order date. Compared to other online services, it has the uniqueness of planning the shortest route to delivery personnel only. The smoother and shorter passes obtained with this white paper will take longer. In the future, pool work to reduce time costs. Route ad hoc changes based on current traffic after delivery has started.

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