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# Fast Track Food Delivery Using IoT

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**Abstract—** *With the continuous development of Internet of Things (IoT) and artificial intelligence there is an increase in services provided by the various online groceries. The existing system is used to distribute various products from the local groceries to the customer. The system does not include distribution of perishable products. The existing system uses automatic target detection tracking (ATDT). This algorithm gives the exact arrival time of the vehicle, but it requires updates of new location coordinates with respect to time of the vehicle. The proposed system will use message queuing telemetry transport (MQTT) which will update the current location of the vehicle through messages. This approach will use firefly algorithm which will not only find the most optimal path but also distribute the perishable products in an economical manner. The firefly algorithm fails to give an optimal path if the distance between the fireflies is more than standard distance. Therefore, khopca algorithm is used for dynamic network discovery which groups the nodes based on the distance between them. Using this alternative solution from the perspective of efficient algorithms, optimal path is achieved.*

**Keywords –** *ATDT, MQTT, firefly, Khopca, Firebase.*

## I. INTRODUCTION

With the recent advances in Internet of Things in our day to day life the need for automation has increased especially for the quality control of perishable grocery products.

We propose an innovative system that automates this task with ease. Our System provides an efficient solution which is based on the concept that the internet of things (IoT) is a computing concept that describes the idea of everyday physical objects being connected to the internet and being able to identify themselves to other devices. No longer does the object relate just to its user, but it is now connected to surrounding objects and database data. Our system uses various algorithms with which we can calculate the best path from source to a certain node and then it will deliver the products at that node if any and will further search for the next best node within a specified distance. This process will repeat itself unless the final destination node is reached. The customer is continuously informed about the status of his delivery through messages.

For our system to be able to function efficiently it is a prerequisite for all the users to have the application on their mobile phone. This system will not only be helpful for the vendors but also for the customers as they will get good quality products for cheaper price.

## II. EXSISTING SYSTEM

There are few weaknesses in the present system. The vendor first contacts the manufacturer and gives his order. The manufacturer then collects multiple such orders and delivers it to the vendors. It is often that the delivery may exceed the estimated time due to which half of the supply is no longer in good condition. The other problem is that once the middle man is involved the cost fluctuation increases manifold.

Also, the manufacturer does not know all the routes to a particular destination. He may use the route best known to him which maybe longer than the shortest possible path. The system assigns a truck to deliver the supply to two or three vendors and then takes the next order to deliver it to next set of vendors.

Moreover, in the system the manufacturer delivers the goods to a central point and all the vendors have to go to that point to get their order. This increases the efforts of the vendors and it also becomes chaotic for the center location to manage all the orders.

## III. DESCRIPTION OF COMPONENTS

### A. GOOGLE MAP API

Google Map is used to represent the conventional road map using satellite view. Google Map makes use of location service which is based on Global Positioning System (GPS). This service enables us to track the position and fetch the current status of the order to be delivered from cellular network.

**B. GOOGLE FIREBASE FOR BIGDATA**

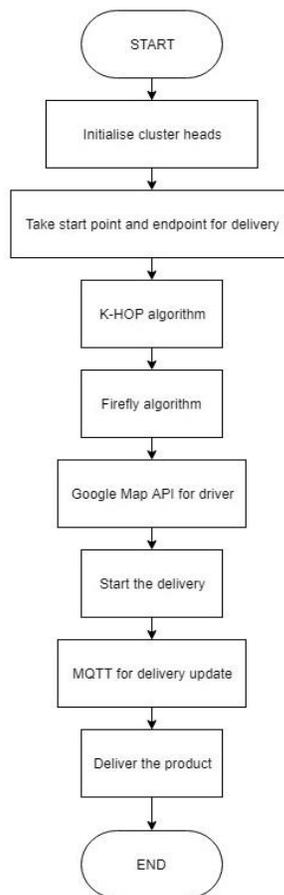
Firestore is a database provided by the Google for real-time data storage. The data is stored on the cloud where everyone who wants to use the data can easily access it. The changes made by one client in the data will automatically update the database. It provides better synchronization between clients who made changes to database at the same time. The turnaround time for reflection of database is very high.

**C. ANDROID PLATFORM**

Android is an open development platform. It uses modified Linux kernel. To create an application for the platform, a developer requires the Android SDK, which includes tools and API's. The applications should be written in java programming.

**IV. PROCEDURE**

First the user logs in the system to place an order. As soon as the order is placed the coordinates of the user are taken by the system. These coordinates are then attached to the nearest cluster heads using KHOP algorithm. The cluster heads are predefined. We then use the firefly algorithm to find the most optimal path. Once the path is defined, it is fed to the Google map API. The driver starts delivering the parcel. The customer gets notifications simultaneously.



## V. PROPOSED METHODOLOGY

The process consists of three main components

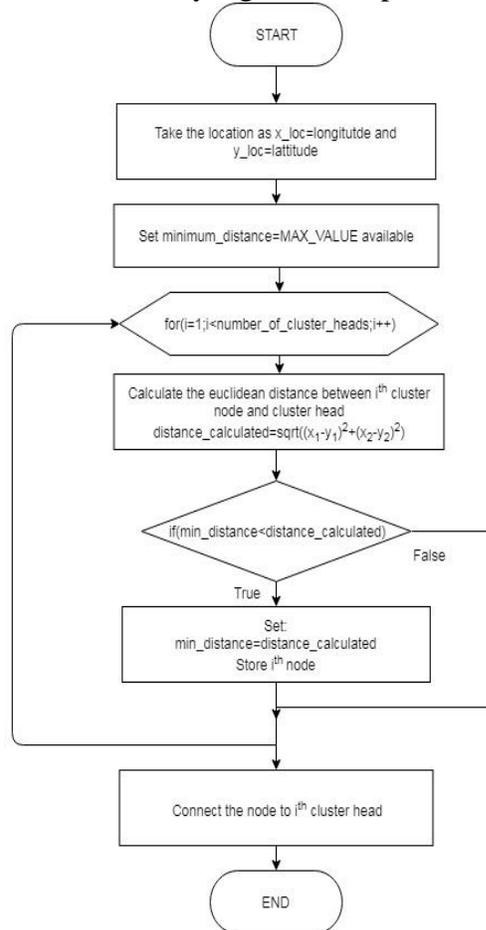
- A) Vendor
- B) Manufacturer
- C) Driver

A) Vendor:

The vendor first creates his account on the application. After registering, the vendor will then be directed to place and complete his order after which the coordinates of the vendor (end-point) will be fetched with the help of google map API. The end point of each user will help in determining the best route for delivery. Further as soon as the order is dispatched and is halfway through the path a message will be sent to the vendor about the delivery date and time through MQTT. Each vendor is connected to the cluster head using KHOP algorithm.

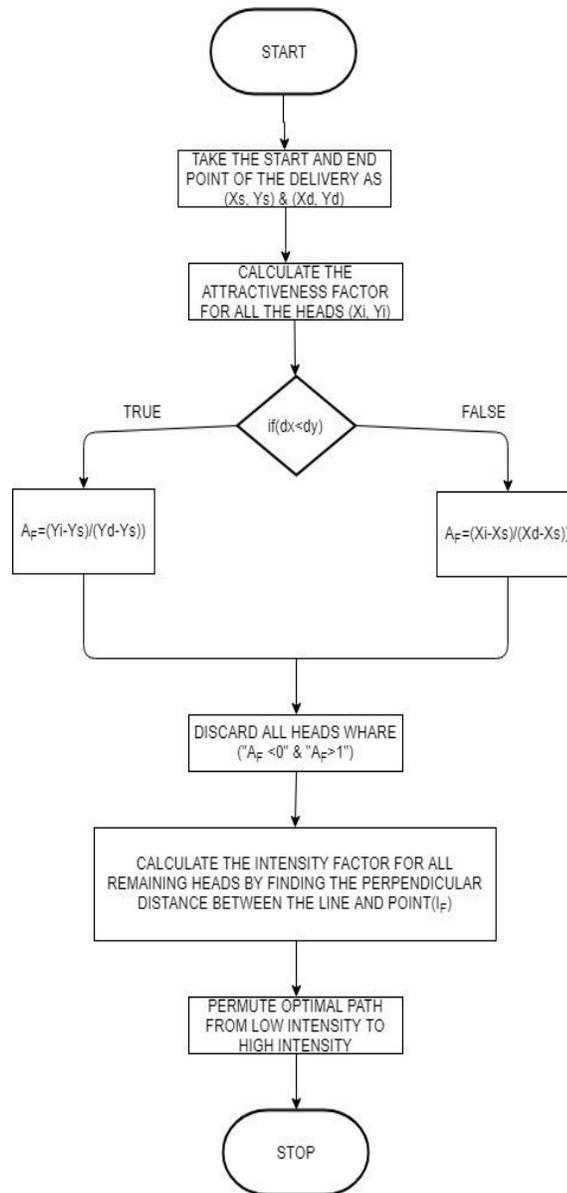
B) Manufacturer:

As soon as the vendors place the order it will be reflected in the firebase. Several such orders will help the khop algorithm to create the network most optimal path by fetching the coordinates of each order. The firefly algorithm implemented is as shown.



C) Driver:

The driver will be responsible for delivering all the orders assigned to him. Once an order is delivered the application assign another order that is nearest to the location of the driver within an radius of 7 kilometers. This can be implemented using Firefly algorithm. The algorithm is as shown below.



## VI. OTHER APPLICATIONS

The proposed method can be used for different range such as:

- Dynamic Routing
- Postal Tracking

## VII. FUTURE SCOPE

The proposed methodology of this paper can be used in future by enhancing the working of the system. Google Firebase can be implemented, for database which is connected to the cloud which helps to store real-time data. This will help to access the data faster and also maintains the security. We can also make the website for this in future. Also we can expand the modes of delivery. Apart from roadways we can also use airways and waterways for delivery.

## VIII. CONCLUSION

The quality of perishable products get deteriorates rapidly. To prevent it they should be delivered to vendors as early as possible which is the challenging task but can be achieved by the continuously working on the solutions. In this paper Fast Track Food Delivery using IoT is proposed. The various solutions regarding to the delivery of perishable products are studied such as Advanced Firefly Algorithm, K-Hop Clustering Algorithm (KHOCA) and Message Queuing Telemetry Transport (MQTT), Google Map API. In the proposed model the optimal path is obtained to deliver the product and Google Firebase database is used to store the orders of different vendors at the real-time. Also the vendors get all the information about their product by concept of IoT which is through an Android App in their smart phones such as tracking of product and arrival time of product.

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