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Low-Cost Real-Time Logistics Tracking System with Mobile Application

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Abstract: Along with the growth of our economic society, there has been rapid development in the logistics industry. In today's rapidly growing and complex logistics system, managing the logistics procedure, minimizing the cost and providing real-time data for users is very important. This project uses a geolocation-based tracking model to keep track of the logistics goods which is carried out by an internet application and notifies the customer with requested information. Our low-cost real-time tracking system is applied within the logistics industry to increase the efficiency in operation for small scale industries. Our real-time tracking system is not dependent on any hardware components for its operation so it provides easy handling of products in the logistics industry.

Keywords: Tracking System, Google geolocation, GPS Location, Real-Time Monitoring, Logistics system.

I. INTRODUCTION

The significance of tracing of shipments is a defining feature in today's manufacturing firms and is instrumental for controlling logistics networks adequately. The complications regarding the coordination of the logistics shipments have dwindled the total throughput of global industries in today's urbanizing era. The difficulties in tracking the shipments have been a thorn in logistics chain from source to destination as it implements transparency among the customer peers. The tracking system deals with the location of the shipment and notifies the customer about his shipment location. The tracking system provides an explicit position of the product that incorporates trust among the dealer-customer relationship. This system might provide the solution to mapping the tracking process from tackling this grueling problem. In today's practice, there are multiple tracking systems available through GTIN, RFID, Barcode, etc; however, all these systems are not fully compatible with small scale industry as the cost is high. The usual approach for all these tracking systems are usually confined among the customer to access the tracking information within the area of tracing the shipments through manual queries such as using a telephone call, e-mailing, fax or which uses expensive hardware machinery. The available tracking systems have a narrow approach to the logistics chain. Customers avail of their ordered goods information by calling or e-mailing. Hence, we opted for GPS tracking systems with google maps service which can be imported from the delivery's location and sent to the user. When user requests for his/her product location, a notification is sent to the delivery agent who can forward his location through our mobile APP. The APP is built on the underlying application of geolocation services. The active location of the delivery agent is sent to the user who requested the location. Hence, it is a cheaper option for a small-scale logistics industry to provide tracking of the goods. It incorporates transparency between the services of the industry and the users. As a cheaper option, it dwindles the strain on the financial aspects of the industry and provides a competitive edge in the industry sector.

II. LITERATURE REVIEW

The tracking system is taken into account because the basic industrial norm to produce customer services which in result triggers a competitive edge for the logistics service providers too. The requirement for logistics tracking has been disclosed by the individual industries. Some notable works are:

A. Logistics Tracking System by Lee H.J. and Oh R.D.

This tracking system plays a vital role in industrial logistics management and for satisfying the increasing demand of consumers. Organizational managers noticed the tracking system as a way of strengthening their overall demand rate through improved customer satisfaction specified they may deal with lower productivity. This technique covers globally both physical and data logistics networks more transparency with effectively and efficiently in today's rapid market environments. However, most of the prevailing tracking of shipments is intended for one organization and so there's a scarcity of tracking and tracing for multi-organization environments. Many logistics companies concentrate on the delivery of products in a short duration, which offers easy maintenance of the tracking codes and data. Independent providers of tracking service offer the event underline the principle of consumers having the ability to locate shipments in-transit when planning and monitoring their operations.

B. "Smart Integrated Multiple Tracking System" by Claesson F. and Hilletoft P.

The existing tracking systems are suitable to be used when goods are handled by one company and aren't suitable for multi-company networks. These company-specific tracking services make use of service provider-specific coding for consignments which increase convolution.

In the past, many papers & projects utilized the standard display of several parameters using GPS data for real-time monitoring but there's no progress observed for the efficient transmission of coordinates by making use of single-board embedded systems and managing the accuracy by the modem technology cooperation. Kai Qin et al.'s proposed system is about the whole system using the prevailing GPRS network to transmit information collected from the GPS module to the IP-fixed control Centre on the net.

He gave some good answers associated with Long-distance wireless transmission in his article but in highly dense urban areas, the proposed system seems powerless enough to produce the facilities. Thus the past works clearly describe that within the vast areas of the inertial guidance system; the key issues are the consistent monitoring System with reliable error compensation using maximum faultless techniques and real-time solutions for framework designing. This paper focuses on developing a replacement bus monitoring system supported GPS and intelligent systems for its location transmission. Lau proposed a straightforward bus tracking system at UCSI University, the national capital, Malaysia. The tracking system provides the coed with the situation information of a bus within a hard and fast route.

III. OBJECTIVE

The main objective of this web application is to provide the precise location of the products to the user directly from the employee. This system provides a cheaper alternative to other logistics measures used in today's small scale industries. It enables the user to have the location through the mobile application which has an easy to use interface. The user sends the notification to the employee from the web interface and the delivery agent can direct the location through the application to the user.

IV. PROPOSED SYSTEM

The proposed system automatically gathers location information from GSM enabled devices and GPS accustomed locate this location of the vehicle. System equipped with GPS, which can help monitor the real-time incidences.

The delivery employee includes a Mobile Application where he has all the small print of consignment he needs to deliver. When he gets the request from the user, who wants the situation of his product, the delivery employee accepts the request immediately and briefs the user along with his location. the situation is distributed to the user through a notification within the style of a message on the user registered mobile number. Since the generated link is large but our idea is reducing traffic and price by making a light-weight and simple to use a tracking system. So to realize this goal, We are shrinking the link by using an API by **"Tinyurl.com"**. The shrunk link is the one that carries the situation. Hence, the situation is distributed within the style of a link generated by API supported by **Fast2Sms.com**. Once the position and therefore the product ID information is captured through GPS the delivery man can send the messages to the logistics monitoring center through App. The system operation process contains three basic levels. Firstly, when the products leave the warehouse and are handed over to the transport company. the merchandise identification data is found by the Barcode reader. Meanwhile, the product's departure and arrival information are automatically registered likewise.

The shipping information of the merchandise will be sent to the logistics company parallelly, the GPS module receives the message (latitude, longitude, and altitude) of the position. together with this the merchandise information and therefore the combined GPS position information is going to be sent in real-time.

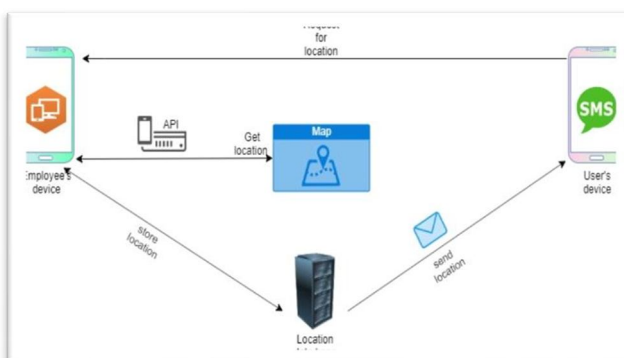


Fig 4.1: App Architecture

V. PROPOSED ALGORITHM

```
//initiates the function when clicked on  
geolocation function getLocation() {  
if (navigator.geolocation) { navigator.geolocation.getCurrentPosition(redirect ToPosition); //function 2  
}  
//calls second function  
function redirectToPosition(position) { var cn= document.getElementById("url");  
cn.value='https://www.google.com/maps?q='+position.coords.latitude+', '+position.coords.longitude+ '&z=17&hl=en';  
}  
//function 2 is responsible for getting the location through the gps.
```

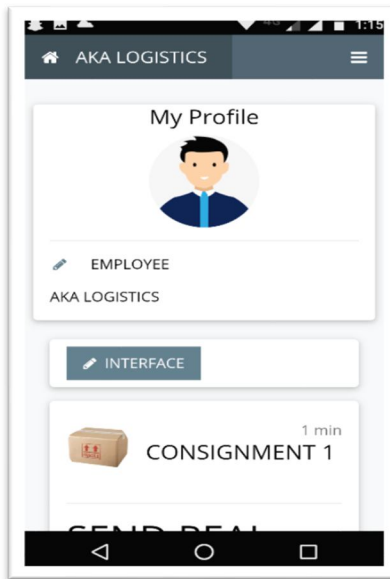


Fig 5.1: App Interface

The figure shows a simple user interface of the App.

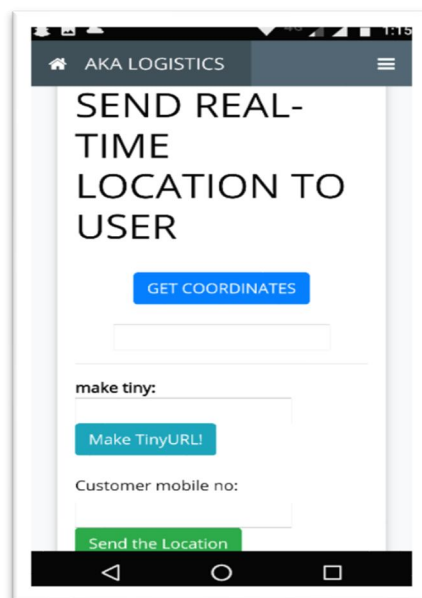


Fig 5.2: Getting the coordinates

The user can get the location through getting the coordinates button and after shrinking it can be sent through to the customer mobile no.



Fig 5.3: Status of the message

The coordinates of the location of the delivery agent are sent to the customer when requested.

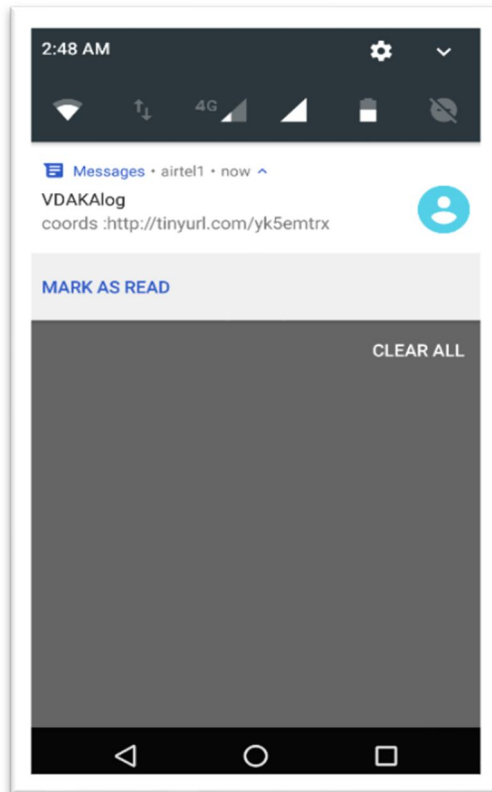


Fig 5.4: Message received by the customer

The coordinates of the location of the delivery agent are received by the customer. The user can view the location on the map by clicking the link.

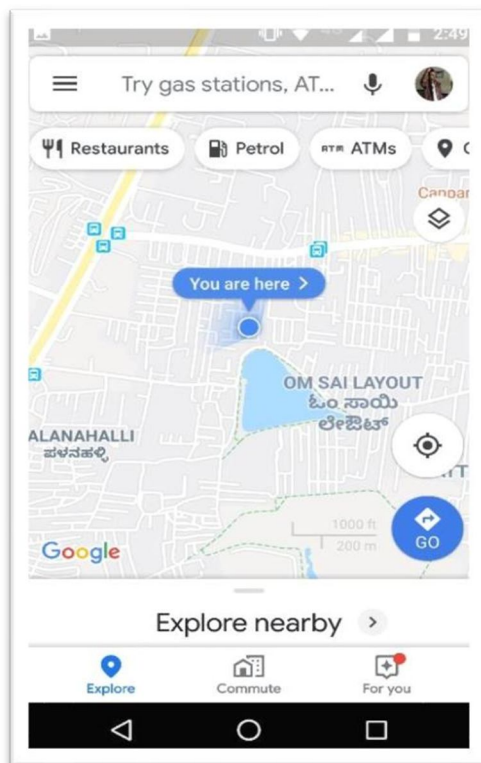


Fig 5.5: Viewing location on the map

By clicking the link, the customer can view the location of the delivery agent on the map.

VI. CONCLUSION AND FUTURE ENHANCEMENT

This project implements the Real-Time location of the product, the customers are satisfied with the live location of the product. The app is easy to use and the notification provided through the message has a link that is being shrunk by an API thus reducing cost and physical documentation work.

The location is very precise and it can be validated by opening it through a web browser. The location is sent in the GPS enabled devices. The transparency and easy to use interface incorporate trust among the peers in the industrial sector.

A. Future Enhancement

In this project work, only the location coordinates of the product are obtained through an SMS service. More important elements can be put on in the existing collection of data to boost up the efficiency of the proposed model. Hence the customer satisfaction is the utmost priority so the precise location of the product will be provided for the making a better model with greater accuracy to boost the efficiency of the service's different parameters like the condition of goods can be added and the message service can be added depending on the demand.

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