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IOT APPLIED TO LOGISTICS USING INTELLIGENT CARGO

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Abstract - *The transport logistics sector is no exception, the main issue in this domain is for industrial applications that allow to tag, monitor and transmit information about the freight along the whole transport chain, thus guaranteeing an efficient communication among the supply chain for a prompt intervention and resolution in case of problems and in general to increase the transport efficiency.*

In an interconnected world, the need to exchange information across domain's boundaries is increasingly common, the concern is rapidly moving towards defining the content that needs to be consumed by numerous and different actors using different platforms and/or software solutions, since the internal processes have been consolidated and optimized. The transport logistics sector is no exception, the main issue in this domain is for industrial applications that allow to tag, monitor and transmit information about the freight along the whole transport chain, thus guaranteeing an efficient communication among the supply chain for a prompt intervention and resolution in case of problems and in general to increase the transport efficiency.

1. INTRODUCTION

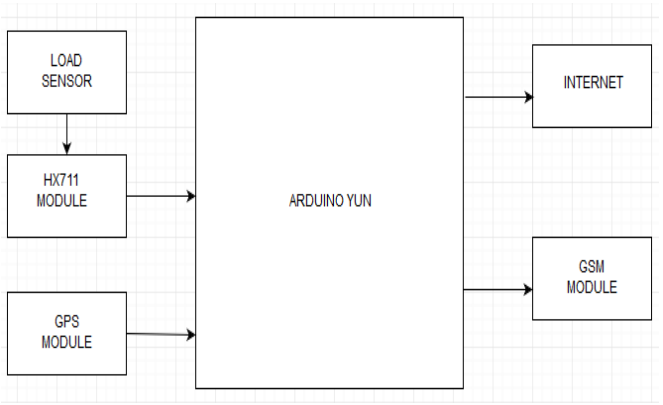
Transport and logistics act in a worldwide distributed business world as an aorta of the economic system. The Logistics area has seen a huge growth in the last few years. This growth is on the one hand a result of the globalization which has led to international supply chains requiring sophisticate logistics concepts. The exponential growth of ecommerce has additionally boosted the need for logistics concept. While the overall consignment number has increased the consignment size has decreased, leading to more and smaller consignments that need to be transported to different locations. The smaller consignments pose a huge problem to the logistics services providers and their goal to keep the bundling of the consignments as long as possible in order to enable the best usage of the transport vehicles with as much consignments as possible. This goal hasn't been reached so far and thus e.g. the utilization of trucks is in some countries lower than 70%.This rather weak utilization of the transport vehicles does not only pose an economic problem to the logistics services providers as well as forwarders, but also poses a substantial problem to our environment. The emissions caused by transport are still very high, as for example within the transport sector accounted for 23% of total CO2 emissions, with road transport generating 71% of total transport emissions in 2006, and are expected to increase until 2030. The ultimate goal therefore has to be to increase the utilization of the transport vehicles.

2. LITERATURE SURVEY

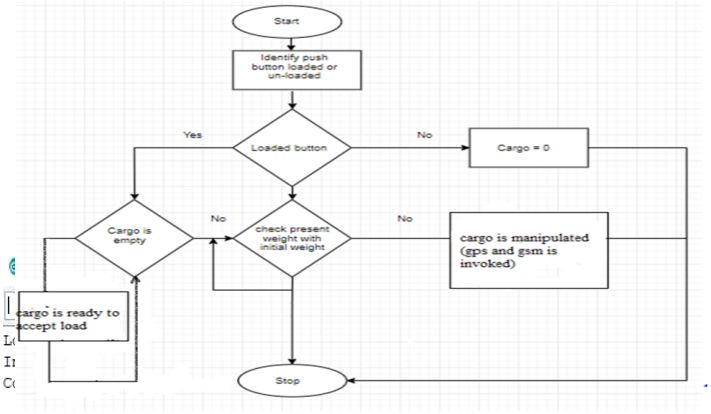
There are many contributions taking the "public transportation" perspective (i.e. the viewpoint of public stakeholders), papers focusing on the "private transportation" perspective (i.e. the viewpoint of the private companies offering logistics and transportation services) are fewer and relatively more recent. Additionally, even though in recent years researchers have also started to examine the decision-making process of, many themes are under-represented in literature, such as the subject of integration among different application types, empirical research on the role of technology providers in the adoption process. As far as the methodology is concerned, the review revealed that many of the papers examined are either conceptual papers or empirical studies (i.e. mostly based on surveys, or else on case studies or interviews), while simulation and modeling are rarely present.

While efforts were made to be all-inclusive, significant research efforts may have been inadvertently omitted. However, the authors believe that this review is an accurate representation of the body of research on logistics and transportation companies published during the specified timeframe, and feel that confidence may be placed on the resulting assessments.

3. BLOCK DIAGRAM



4. FLOWCHART



5. WORKING PRINCIPLE

An initiation of our project we will check and tear weight of a weighing panel using load cell & HX711 module. Identify exact weight of cargo or package which is placed above weighing panel using load cell &hx711 module. The identified weight of cargo is stored in database which is present remotely through internet. Speed of cargo movement is detected using gps module. As and when the cargo is in movement with a minimum speed limit, the weight of cargo will be recursively checked with exact value stored in database through programming logic. As the speed exceeds minimum limit we consider weight values as noisy data since g-forces and other forces will act on cargo. Recursively we keep on detecting speed using gps module. As on when the speed gets into minimum limit, we keep tracking the weight of cargo. From the above scenario if we found any manipulation of cargo weight, we will obtain longitude, latitude, altitude & time using gps module. The monitored values are sent in 2 forms:-

- Sms using gsm module.
- Database which is present remotely using internet
-

6. ADVANTAGES

Manipulation of cargo can be easily tracked.
Cargo will be in surveillance during the transition between source and destination.

7. DISADVANTAGE

Internet connectivity is mandatory.

8. RESULTS

Fig.1 When cargo is empty

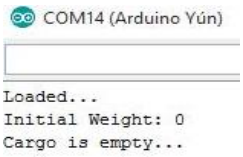


Fig.2 Checking initial weight

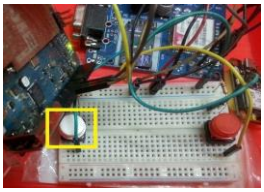


Fig.3 When loaded button is pressed

Fig.4 When cargo is loaded

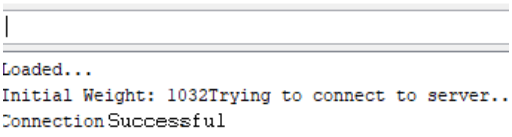


Fig.5 When cargo is loaded checking the weight

id	truck_no	date_time	initial_weight ▲ 1
36	AP13L290	Thu Mar 8 09:57:44 UTC 2018	189
37	AP13L290	Thu Mar 8 10:08:59 UTC 2018	1269
38	AP13L290	Thu Mar 8 10:14:24 UTC 2018	1032

Fig.6 Start record

Fig.7 Cargo is manipulated

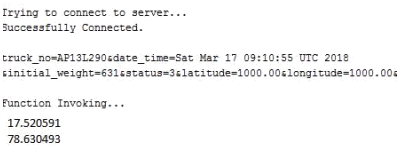


Fig.8 GPS is invoked when cargo is manipulated

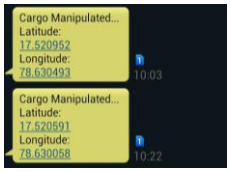


Fig.9 Message invoked through gsm latitude & longitude is displayed

id	truck_no	date_time	final_weight
1	AP13L290	Thu Mar 8 09:44:03 UTC 2018	1032
2	AP13L290	Thu Mar 8 09:58:07 UTC 2018	189

Fig.10 Manipulated Record

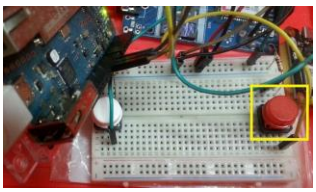


Fig.11 When unloaded button is pressed

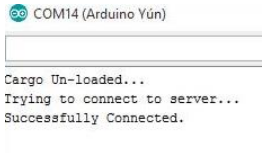


Fig.12 Printing when cargo is unloaded

54	AP13L290	Sat Mar 17 09:10:21 UTC 2018	17.5212	78.6301	303.00
55	AP13L290	Sat Mar 17 09:10:24 UTC 2018	17.5212	78.6301	315.00
56	AP13L290	Sat Mar 17 09:10:28 UTC 2018	17.5212	78.6301	305.00
57	AP13L290	Sat Mar 17 09:10:32 UTC 2018	17.5212	78.6301	300.00
58	AP13L290	Sat Mar 17 09:10:36 UTC 2018	17.5212	78.6301	313.00

Fig.13 End record

9. CONCLUSION

In this project we have implemented an intelligent cargo system for efficient transportation of goods from a given source to destination. The sensors are simulated using the route map. The most preferential route is taken in order to effectively maintain the state of the product in the desirable state. Simulation is used to generate the trajectories of a route. As future work real time situations like traffic, truck breakdown and catastrophic effects can be considered in order to improve the results. In this paper we have implemented an intelligent cargo system for efficient transportation of goods from a given source to destination. The most preferential route is taken in order to effectively maintain the state of the product in the desirable state. The machine learning algorithms like decision tree, K-Nearest Neighbors are used to learn from the past experiences and decide on the best possible route to maintain the freshness of the products. We use a training set to learn and the results obtained from them are used to decide future predictions. These predictions are applied to a test set. In addition to finding the optimized route, the vehicles are tracked based on the GPS trajectories. Simulation is used to generate the trajectories of a route. As future work real time situations like traffic, truck breakdown and catastrophic effects can be considered in order to improve the results. Real time sensor data could be obtained using various routing protocols over the wireless medium.

10. REFERENCES

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