

GPS-based System for School Bus Tracking with Safety Enhancement using RFID

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Abstract : This system presents a system to monitor of school children to enhance the safety of children during the daily transportation from and to school. The system have two main units, a bus unit and a school unit. The bus unit the system is used to detect when a bus come to near the stop. Bus stop updates continuously send to the school unit or child parents through SMS. This information is communicated to the school unit that identifies issues an alert message accordingly. The system has a developed web-based application that facilities its management and provides useful information about the children to authorized personal. A complete prototype of the proposed system was implemented using Microcontroller, Sensors, RFID, and GPS. The results show that the system is promising for daily transportation safety.

KEYWORDS: Bus Safety System, Children Security, RFID, Reader, Microcontroller

I. INTRODUCTION

In this study, a smart bus stop-passenger information system was developed in order to enable administrators effectively monitor the public transportation system and also enable the people who utilize this system simultaneously observe the information about the location and status of those vehicles. In the designed system, the embedded mini-computer based systems and digital monitors were used in order to instantly present the information related to the travel and transportation in the public transportation vehicles. The instant movement information of the vehicle was transferred to the central server through a GPS module which functions integrated to the embedded computer systems and web services.

Moreover, the embedded mini-computer based systems and digital monitors were installed to the bus stops in order to present the information related to the movements of the public transportation vehicle and their approach to the related bus-stop. The mini-computers embedded on the bus stops provide communication with the central server through web services and the bus stops, public transportation vehicles and central server formed information network of the transportation.

The software developed to manage the system provided the authorities the advantages of instant status observation, remote-informing and updating related to the management of the status and travel of the public transportation vehicles.

II. PROBLEM STATEMENT

Millions of children need to commute between homes to school every day. Safer transportation of school children has been a critical issue as it is often observed that, kids find themselves locked in the school bus at the bus stop after going to school, they miss the bus, or ride the wrong bus with no way to track them.

This project intends to find yet another solution to solve this problem by developing a bus safety system that will control the live location of the bus as well as security to the school bus using RFID Reader.

III. LITERATURE SURVEY

Khaleed shaban adopted RFID Technology to safeguard the children from wrong identification of their destination location, method to curtail the students sleeping in the bus its self without leaving to classes. This paper also focused to provide the security to the children from starting location to the destination point with applied RF technology [1].

Seong Shaban described the security of the children at school Zone premises. This paper adopted a wireless sensor network methodology to identify the vehicle license plate number while moving with high speed. This paper also focused to trace the unauthorized parking vehicles at the school zone premises to safe guard the children from the accidents from the hidden zone areas [2].

G. Bharathi, L.Ramurthy proposed a mechanism to trace the missed student using GSM- GPS technology. An ARM 7 is used to process the given information and to send the appropriate location of the missed student by adopting the GSm technology. The Missed student Latitute and Altitude locations are determined by adopting the GPS Technolgy [3][6][7].

V. Sivasankaran et.al proposed a RFID –GSM technology to provide the security to the school children. The RFID tags are attached to the children bags for tracking and GSM is used to send the messages to the parents [4].

M. Navya et.al Proposed GSM-GPS technology to track the children students. GPS is used for identifying the student location. GSM is used to send the information to the parent android mobile. Monitoring database is provided at the control room of the school [5].

IV. METHODOLOGY

The main objective of proposed system is to implement RFID tags are placed into the individual buses and RFID readers are attached to children. Whenever children is moved reader communication will perform and automatically SMS will be sent to their parents, principal and gives the alerting system. It also identifies the children's cry and it will send the message to the parents and principal.

Architecture:

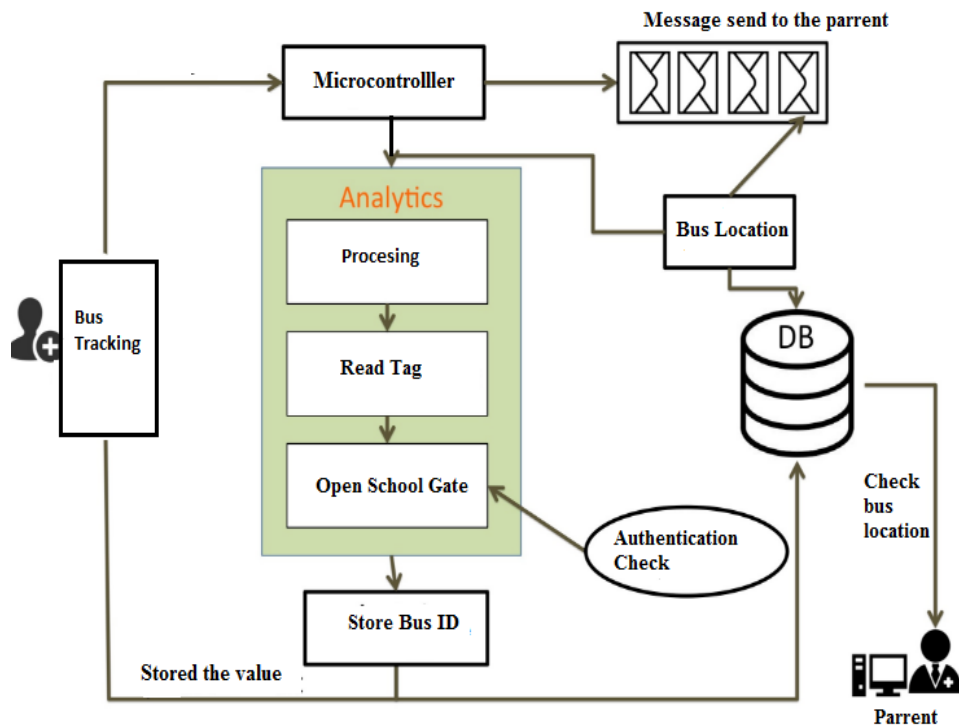


Fig 1. System architecture

- BUS Driver Module: Here bus driver is the person to drive the school bus. Bus driver set the GPS module to send the current location to the parent and principle.
- Parents Module: Parent check the live location of bus or ride the wrong way then parent to track them. Send the notification of location to the parent.
- Security Module: Here Reader check the RFID tag for maintain the track record. If valid id get to the server then open the school gate.

Objectives:

- Enhancing the safety of children during the daily bus trip.
- Monitor pickup/drop-off of school children.
- The notification or SMS like the students whose next stop is, that is sent to the parent unit who stays on the next stop.
- The motivation for Multi-Tracking System.
- The system should be easy to re-configure.
- The communication should be reliable.

V. CONCLUSION

The intelligence implemented in the bus monitoring system can be achieved by compiling and feeding all the proposed theories and algorithms for RFID and other sensing technologies into the system. The ability of the system to act on its own can reduce the manpower required at the monitoring center.

REFERENCES

- [1] AREBEY, M., M. A. HANNAN, BASRI, H., R. A. BEGUM, ABDULLAH, H. Integrated technologies for solid waste bin monitoring system. *Environmental Monitoring and Assessment*. 2011, vol. 177, no. 1-4, p. 399-408.
- [2] ALIAGA, C., FERREIRA, B., HORTAL, M., PANCORBO, M. A., LOPEZ, J. M., NAVAS, F. J. Influence of RFID tags on recyclability of plastic packaging. *Waste Management*. 2011, vol. 31, no. 6, p. 1133-1138.
- [3] CANGIALOSI, A., MONALY, J. E., YANG, S. C. Leveraging RFID in hospitals: patient life cycle and mobility perspectives. *IEEE Communications Mag.* 27, vol. 40, no. 9, p. 18-23.
- [4] MIN CHEN, GONZALEZ, S., LEUNG, V., QIAN ZHANG, MING LI. A 2G-RFID-based e-healthcare system. *IEEE Wireless Communications*. 2010, vol. 17, no. 1, p. 37-43.
- [5] TAKIHIRO, F., TERUAKI, N. Monitoring system for farming operations with wearable devices utilized sensor networks. *Sensors*. 2009, vol. 9, no. 8, p. 6171-6184.
- [6] YU, S. C. RFID implementation and benefits in libraries. *The Electronic Library*. 2007, vol. 25, no. 1, p. 54-64.
- [7] LEE, C. H., CHUNG, C. W. RFID data processing in Supply Chain Management using a path encoding scheme. *IEEE Transactions on Knowledge and Data Engineering*. 2011, vol. 23, no. 5, p. 742-758.
- [8] KIM, E. M., PYEON, M. W., KANG, M. S., PARK, J. S. A management system of street trees by using RFID. In *Web and Wireless Geographical Information Systems*, Hong Kong, China, December 2006, p. 66-75.
- [9] POON, T. C., CHOY K. L., HENRY LAU C. W., FELIX CHAN T. S., HO K. C. A RFID case-based logistics resources management system for managing order-picking operations in warehouses. *Expert Systems with Applications*. 2009, vol. 36, no. 4, p. 8277-8301.
- [10] DOBROVOLNY, M., BEZOUSEK, P., HAJEK M. Application of a cumulative method for car borders specification in image. *Radioengineering*. 2008, vol. 17, no. 4, p. 75-79.
- [11] BELLOS, C., PAPADOPOULOS, A., FOTIADIS, D. I., ROSSO, R. An intelligent system for classification of patients suffering from chronic diseases. In *32nd Annual International Conference of the IEEE Engineering in Medicine and Biology*, Argentina, August-September 2010, p. 2890-2893.
- [12] CHAO, H. P. The non-specific intelligent guided-view system based on RFID technology. In *Proceedings of the 19th International Conference on Advanced Information Networking and Applications*, Taipei, Taiwan, March 2005, p. 580-585.