

VEHICULAR CHILD TRAP SYSTEM

¹Simran Kaul, ²Anuja Talekar, ³Vaishnavi Dhamdhare, ⁴Shailesh Gawai

¹B.E Student, ² B.E Student, ³B.E Student, ⁴Professor

¹Department of Computer Department

Indira College of Engineering and Management, Pune, India

Abstract: Integration of computational and physical elements into cyber-physical systems is increasingly finding application in a number of different domains, including smart power grids, medical technologies, and building automation. In this paper, we study how the notion of cyber-physical integration can be applied to the design of the next generation of safety devices for saving the life of children inadvertently left into parked vehicles. In the United States alone, an average 38 children die from heatstroke after being left into parked vehicles by their caregivers. To be effective, next-generation safety devices will need to have the capability of sensing the environment in and around the vehicle by using sensor like temp sensor, PIR Sensor and gas Sensor, integrating and processing data from an array of different sensors, assessing the risk in real time, and triggering appropriate corrective actions like after detection system send alert message or call with the help of GSM. Also get a location by using GPS and also buzzer is on.

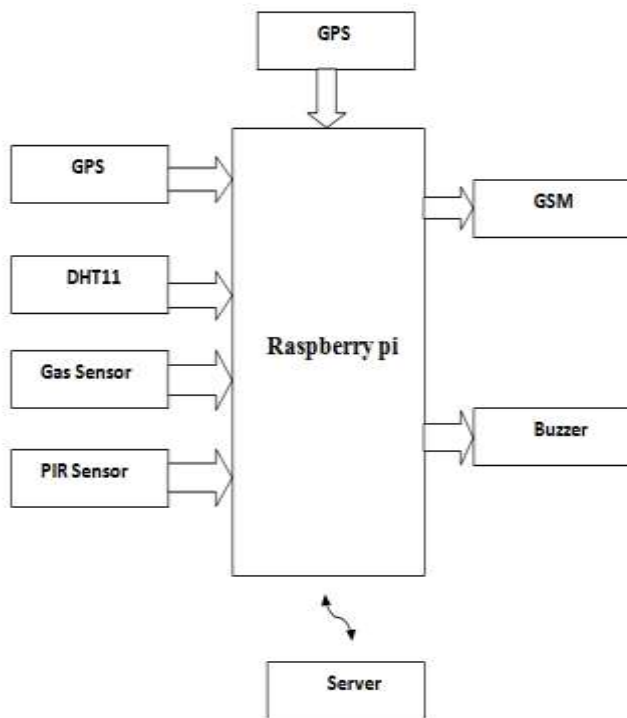
IndexTerms: Child Safety Devices, Automotive, Social Impact, Hyperthermia Prevention.

1. INTRODUCTION

According to the Department of Earth and Climate Sciences, San Francisco State University, each year, an average 38 children in the United States alone die from hyperthermia as a result of being left unattended in locked vehicles. Hyperthermia is an acute condition that occurs when the body absorbs more heat than it can dissipate. While the atmosphere and the windows of a vehicle are relatively “transparent” to the sun’s shortwave rays and do not excessively absorb heat, objects in the vehicle (e.g. dashboards, child seats, etc.), stricken by this shortwave radiation, are significantly warmed. For example, a dark dashboard or seat can easily reach temperatures in the range of 180 to more than 200 degrees Fahrenheit. These objects heat the adjacent air by conduction and convection and emit long wave radiation, which rapidly warms the air trapped inside a vehicle. As a result and contrarily to what is commonly believed, the external temperature does not need to be high to cause overheating inside a vehicle. Deaths from hyperthermia can and do occur even on days as mild as 70°F (21°C). Thus, the risk of hyperthermia for children trapped in locked vehicles is not limited to the summer months but is indeed very high also during the spring and the fall. Car temperatures can rise 50 to 60°F (10 to 15°C) every 15 minutes and leaving windows slightly open does not significantly decrease the heating rate. While hyperthermia is a dangerous condition for any individual or pet who remains trapped into an overheated vehicle, the effects of hyperthermia are more severe on children since their body temperature rises 3 to 5 times faster than an adult due to lower water reserves. In this paper we analyze current technologies for detecting the presence of children left unattended in locked vehicles and alerting caregivers, and propose a new approach inspired to the principle of cyber physical systems: sensing the physical environment, processing sensed data, and taking actions on the physical world accordingly. The proposed approach can overcome the limitations of current devices and addresses the root cause of the problem: raising temperature.

We have implemented a preliminary prototype of the proposed family of safety devices. The prototype, consists of a number of sensors to collect data from the environment (e.g., temperature, gas, and child), a raspberry pi microcontroller implementing the internal logic, and a number electronic components like camera capture image of child. The prototype also includes a GSM that is used to send messages or call and location of child using GPS – emulating warnings that may be sent to different parties – and diagnostic information. It continually monitor on server.

II SYSTEM IMPLEMENTATION



II. LITERATURE REVIEW

Fairuz R. et al., reported about the cases that involving the death of a child in a vehicle [1]. It happens almost every year because of negligence committed by parents who often abandons their children alone in a car. The tragic events happen frequently and it makes every person feel scared and worried. When a driver has safely arrived to their destination, they sometimes forget and overlook the presence of children in the car because of his hasty exit from the vehicle. A baby is susceptible to dehydration and this can cause them to become coma or something worse that will cause succumb to death. So, to avoid incidents like this from ever happen, a vehicle must be equipped with an alarm or sensor that can be placed under or on the seat. If an alarm is success to detect the presence of a human body or any movement, it will produce a sound to tell the parents about it.

Greg C. Kautz proposed a system to detect presence of occupants of an automobile [2]. In particular, the invention relates to systems that detect the presence of a child in a child's seat without other passengers and the automobile is not in an operational mode. In this case, to minimize injuries to the child, corrective action is need to be taken. This system is generate the control signals that can activate an alarm, open the doors of the car, and roll down the windows if there is a child in a car that had left. The system used Radio Frequency Identification or RFID technology in order to detect the presence of the children in a car. The RFID is packaged into a RFID tag that is including an antenna coupled by a switch to the tag electronics. The RFID tag is attached to the child's seat and the tag reader is placed inside the cabin of the vehicle. The communication between the tag reader and the tag is wireless.

Marc A. Rossi reported that child safety seats are required by law when transporting young children in motor vehicles [3]. Typically, the child seat is securely positioned in a back seat of the vehicle and the child secured in the child seat via a child seat safety belt. These laws have been established and strictly enforced to protect children from injury when being transported in motor vehicles. However, there have been instances where children have been left behind in unattended vehicles due to various circumstances. Unfortunately, some of these children have suffered serious injuries and in some cases even death, particularly during extreme temperature conditions in the summer and winter. Figure-3 below is about block diagram of an alarm system that used and can be implementing in this system. Fred Mesina discussed the method that is using can help parent or driver in order to always remember that there is a child or pet in their vehicle [4]. There have been many unfortunate cases that always happen every year where people have forgotten that there is a child or pet in the vehicle. The forgotten child or pet will be in extreme danger because of the temperatures inside a parked vehicle can become extremely hot or cold in just a few minutes placing. According to San Francisco State University, there were 49 cases of child deaths due to being left in the car in 2010 alone.

III. CONCLUSION

As the paper has highlighted, there is currently a significant need for a new generation of effective security devices to prevent children from being left in locked vehicles. The discussion has willingly focused on the importance of such devices to prevent the risk of hyperthermia in children, since deaths from hyperthermia in children represent the most recurrent type of reported incidents in the U.S. However, it is important to highlight that the use and benefits of the proposed safety devices would not be limited to children.

REFERENCES

- [1] J. Null, "Heatstroke Deaths of Children in Vehicles", Dept. of Earth & Climate Sciences, San Francisco State University, <http://www.ggweather.com/heat/>, retrieved June 12, 2014.
- [2] G. Weingarten, "The baffling tragedy of babies who are accidentally left to die", The Washington Post Magazine, March 8, 2008, <http://www.kidsandcars.org/upload/pdfs/articles/2009/2009-03-08-WP-Mag-Fatal-Distractio.pdf>.
- [3] N. M. Z. Hashim, H. H. Basri, A. Jaafar, M. Z. A. A. Aziz, A. Salleh and A. S. Jaafar, "Child In Car Alarm System Using Various Sensors", Asian Research Publishing Network, pp. 1653- 1658,2014.
- [4] C Rajesh , K Kranthi , P Kishore, K Sireesha, "Intelligent Vehicle Security and SOS Messaging System with Embedded GSM Module", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, vol. 4, pp. 5435-5439, 2015.
- [5] By CSN Infographic. Heatstroke Deaths of Children in Vehicles.<http://www.childrensafetynetwork.org/infographics/heat-strokeinfographic>
- [6] Russell Manning and John Enning, "Temperature in Cars Survey", RACQ Vehicle Technologies Department, 2009.
- [7] Ryan Jaslow, "Study modules that alert parents when they left a child in car", CBS News, 2012.
- [6] C. McLaren, J. Null, and J. Quinn, "Heat stress from enclosed vehicles: moderate ambient temperatures cause significant temperature rise in enclosed vehicles," Paediatrics, vol. 116(1), pp. 109–112,2005.
- [8] J. Booth, G. Davis, J. Waterbor, and G. McGwin, "Hyperthermia deaths among children in parked vehicles: an analysis of 231 fatalities in the United States, 1999 to 2007," Forensic Science, Medicine, and Pathology, vol. 6, pp. 99–105, 2010.
- [9] Bill Fleming, "Automotive electronics", IEEE vehicular technology magazine, pp. 49-52, 2006.

