Car-dian Angel: Feasibility Prototype Reducing Risk of Vehicular Hyperthermic Death

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Annually, 37 children die from vehicular hyperthermia in the United States. Analysis of deaths indicated 80% of the incidents could have been prevented if parents could be notified of the situation. This research prototyped the feasibility of Car-dian Angel, a notification alert system for potential hyperthermia of children or pets in unattended vehicles. The system requirements of the system were determined through hyperthermia literature review and risk analysis. To meet the requirements, a microcontroller provided with suitable input sensors to child safety-seats or attached to pet collars, was used for detecting and raising alerts. For threat classification, child seat pressure, interior temperature, ignition status and RFID tag presence served as inputs for maximizing alerting potential threats, while minimizing false alerts. The threat classifier was optimized by its Receiver Operating Characteristics. Car-dian Angel dispatches alerts to caretakers or emergency responders via email to smartphones, supplying GPS location and interior images of the vehicle. It is also capable of drawing bystanders' attention to a potential threat via an onboard audio-visual alarm. This solution leveraged an inexpensive open microcontroller, coupled with a thermometer, a camera, RFID, onboard computer and GPS. This will likely lower adoption barriers of automobile/child safety-seat manufacturers as these components are commonly installed in modern vehicles. Results demonstrate the feasibility of this prototype to provide the basis of an early warning system for life-saving intervention. The technology can potentially be extended as an alert system to detect other hazardous conditions, such as hypothermia and carbon monoxide threats.

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