



Hardware Design and Realization for Blind Spot Detection via Bluetooth Low Energy

Nick De Raeve^{*(1)}, Matthias De Schepper⁽¹⁾, Patrick Van Torre⁽¹⁾, Jo Verhaevert⁽¹⁾ and Hendrik Rogier⁽¹⁾

(1) IDLAB, Department of Information Technology at Ghent University – imec, Belgium, e-mail:
nick.deraeve@ugent.be, matthias.deschepper@ugent.be, patrick.vantorre@ugent.be, jo.verhaevert@ugent.be,
hendrik.rogier@ugent.be

Blind spot accidents are unfortunately a frequent news item. Governments invest a lot in the prevention of these accidents, and more importantly, they increase the awareness of this phenomenon. In Belgium more than 100 people are annually involved in blind spot accidents, which sometimes have a lethal ending. There are several camera and radar-based systems on the market, but none of these systems can prevent such accidents from happening. A high detection rate is possible in a post-processing algorithm but, when the system has to operate in real-time, it fails due to many false detections. To solve this problem, a prototype system based on Bluetooth Low Energy (BLE) was designed, in order to detect and warn the vulnerable road user and truck driver of a blind spot condition.

In this paper, we will present a critical overview of the current systems and outline how BLE in combination with Received Signal Strength Indicator (RSSI) can be a more reliable solution. Our proposed system consists of a central node in the truck cabin, together with different detection nodes wirelessly connected via BLE with the central node. The vulnerable road user advertises his/her presence via a wearable node or a smartphone. This results in warnings of possible danger for both the truck driver and the vulnerable road user. In this paper, the hardware for the detection node and the wearable node is extensively documented and the selection of the different components is explained. The wearable node is finally integrated in a fluorescent and reflective armband and for the detection node, a small fluorescent case with magnets for easy assembly on the truck drive is realized by means of 3D printing.

J. Verhaevert, "Detection of vulnerable road users in blind spots through Bluetooth Low Energy," 2017 Progress In Electromagnetics Research Symposium - Spring (PIERS), St. Petersburg, 2017, pp. 227-231.
doi: 10.1109/PIERS.2017.8261738