A BLE and GPS Motorcycle Anti-Theft Prototype

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***Abstract*—This thesis designs and builds a motorcycle anti-theft prototype combining Bluetooth Low Energy (BLE) and GPS positioning. The report reviews wireless communication and microcontroller interfaces, then describes controller programming, board assembly, and location-related functions. The author states that the physical model was completed and demonstrates the selected connection and positioning workflow. The conclusion also identifies missing features: locating a motorcycle within a parking area and preventing it from being pushed away. The source does not provide a field theft-prevention trial, positioning-error measurements, or battery-life results. Its contribution is an educational embedded-system implementation rather than proof that the device can prevent theft in ordinary use. Further development would need to address the stated gaps and test reliability outdoors.**

***Index Terms*—BLE, GPS, motorcycle security, Arduino, embedded system**

I. Introduction

Motorcycle protection can combine a nearby wireless link with location information. The thesis explores this combination through BLE and GPS. It reviews wireless concepts, common microcontroller communication interfaces, and a proposed device architecture. The aim is to make a working model and document its hardware and software. The report does not establish a commercial anti-theft product or measure actual theft deterrence [1]. Related published studies provide context for the subject and methods [7], [8], [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

II. Methods

The author designs an embedded circuit, programs Arduino-compatible boards, and connects BLE and GPS components to the controller. The manuscript describes UART and SPI interfaces, printed-circuit-board work, control logic, and the user-facing location workflow. Photographs, diagrams, and source code document construction. The method is prototype design and demonstration; no systematic positioning benchmark, security attack test, or long-duration vehicle trial is specified [1].

III. Results

The thesis reports that the BLE and GPS motorcycle-protection model was built and that the intended basic functions were demonstrated. The author gained experience with microcontroller programming and PCB construction. The conclusion explicitly says that parking-lot vehicle finding and protection against pushing the motorcycle away were not implemented. The report does not quantify location accuracy, alert delivery, power consumption, or prevention of theft [1].

IV. Discussion

BLE and GPS serve different ranges and can complement each other, but an effective theft-protection device requires dependable alerts, power management, and resistance to tampering. The source does not verify those properties. Its missing parking-lot and anti-push functions limit practical coverage. A field test should examine positioning error, communication interruption, battery use, and user response before any stronger security claim is made [1].

V. Conclusion

The thesis documents a completed student model for BLE and GPS motorcycle monitoring. Circuit and implementation descriptions support the reported prototype. The author recognizes two unimplemented protection features and does not provide measured field performance. The work is a foundation for further design, not a validated theft-prevention product. Reliability and security would require additional testing on actual motorcycles. In particular, the source leaves parking-area finding and protection against pushing the vehicle away for later development [1].

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