DEVELOPMENT OF COMMERCIAL VEHICLE SPEED WARNING SYSTEM

By

NGO CHON CHET

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

March 2006

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Master of Science

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Chairman : Professor Sudhanshu Shekhar Jamuar, PhD

Faculty : Engineering

The use of commercial road vehicles has grown with the recent rapid economic growth in the world, but reckless speeding of these heavy vehicles has resulted in fatal accidents leading to loss of innocent road users lives. Although it is generally recognized that the majority of the heavy vehicle drivers on the road are law biding citizens, there is, however, a small but highly conspicuous percentage that persist in speeding and operating their vehicles in an unsafe and reckless manner. Due to these reasons, the commercial vehicle speed warning system is designed and developed to monitor the commercial vehicle speed and determine if the vehicle has exceeded the preset speed limit.

This warning system consists of two subsystems, the in-vehicle subsystem and the peripheral interface subsystem and both subsystems are designed by using the MC68HC11E9 microcontroller in conjunction with the AxIDE program. The in-vehicle subsystem is fitted into the vehicle for speed monitoring, whereas the peripheral interface subsystem, which is connected to the host computer, allows the proper

calibration of the in-vehicle subsystem as well as the data downloading. A toothed wheel is built as the vehicle engine model to test the warning system in the laboratory and the radio frequency serial communication module is used to establish communication link between these subsystems and both subsystems will support the same communication protocol.

The basic concepts of in-vehicle speed detection is developed and achieved, and the wireless data setting and retrieving system is designed, which provides control over the in-vehicle subsystem functions.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PEREKAAN SISTEM AMARAN KELAJUAN KENDERAAN KOMERSIAL

Oleh

NGO CHON CHET

Mac 2006

Pengerusi : Professor Sudhanshu Shekhar Jamuar, PhD

Fakulti : Kejuruteraan

Penggunaan kenderaan komersial telah bertambah dengan peningkatan ekonomi dunia yang kini semakin pantas, tetapi kenderaan tersebut yang dipandu melebihi had kelajuan telah mengakibatkan kemalangan maut yang menyebabkan kehilangan nyawa pengguna jalanraya yang tidak berdosa. Walaupun pada kebiasaannya kebanyakan pemandu kenderaan berat diketahui umum sebagai golongan yang mematuhi undang-undang jalanraya, tetapi sebahagian kecil pemandu dengan peratusan yang agak nyata tetap memandu kenderaan mereka melebihi had kelajuan dan secara merbahaya. Oleh sebab itu, sistem amaran kelajuan kenderaan telah direka untuk memerhatikan kelajuan kenderaan komersial dan menentukan sama ada kenderaan tersebut bergerak melebihi had kelajuan.

Sistem amaran ini terdiri daripada dua subsistem, iaitu subsistem kenderaan dalaman dan subsistem perhubungan luaran dan kedua-dua subsistem direka dengan menggunakan pengawalmikro MC68HC11E9 bersama-sama dengan program AxIDE. Subsistem kenderaan dalaman tersebut akan dipasang di dalam kenderaan untuk pemerhatian kelajuan, manakala subsistem perhubungan luaran yang disambungkan kepada komputer

membenarkan penyelarasan terhadap subsistem kenderaan dalaman selain daripada pengeluaran data. Sebuah roda bergear telah dibina sebagai model enjin kenderaan untuk mencuba sistem amaran tersebut di dalam makmal dan modul komunikasi bersiri frekuensi radio digunakan untuk membina rangkaian komunikasi di antara subsistem-subsistem dan kedua-dua subsistem ini akan menggunakan protokol komunikasi yang sama.

Konsep asas penentuan kelajuan kenderaan dalaman telah dibina dan dicapai, dan sistem penyelarasan data tanpa wayar yang memberikan kawalan terhadap fungsi subsistem kenderaan dalaman telah direka.

ACKNOWLEDGEMENTS

Completion of this project would not have been possible without the assistance and encouragement of numerous people. The author would first like to express his appreciation and deepest respect to his supervisor, Prof. S.S. Jamuar for his contributions in improving the features of the project and in suggesting the potential references books as well as his valuable guidance and encouragement. The author wishes to thank him who gave of his valuable time to spend many days with author in laboratory, discussing improvements and modifications to the project.

The author had benefited significantly from constructive comments given by the members of the supervisory committee, Mr. Rahman Wagiran and Dr. Roslina Sidek. The continued support and concern through all phases of this project by the supervisory committee was invaluable in helping author to complete the project. Their mastery of electrical and electronic theory and attention to detail led to many helpful suggestions and improvements.

The author is further indebted to a number of staffs for their patience, constant support and assistance to carry out this project. Sincere appreciation goes to Mr. Muzamil and Ms. Azura for the equipment provided and their valuable aids to complete the project. The author wishes also to acknowledge his friends and housemates for their encouragement, enthusiasm and effort made to ensure that the project was successful. To his family, the author owes special thanks for their unfailing support and understanding.

I certify that an Examination Committee has met on 31 March 2006 to conduct the final examination of Ngo Chon Chet on his Master of Science thesis entitled "Development of Commercial Vehicle Speed Warning System" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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NGO CHON CHET

Date:

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