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Development of vehicle driver fatigue monitoring and prevention system

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Hardware and software to monitor and detect vehicle drivers dozing off have been designed and implemented in this research. Driver fatigue is one of the major causes of road accident. Driver fatigue monitoring systems are designed to detect signs of fatigue onset of the driver and warn the driver in order to prevent accident. Current research in this field focuses on video processing methods which demands high computational power. In this research, two other less computational intensive possibilities of fatigue detection methods are explored and their feasibility is evaluated. The evaluated methods are the steering grip force and the electrooculogram (EOG) signal of the driver. The feasibility tests involve offline processing of both the mentioned signals to detect sleep onsets from recorded signals. Change detection algorithm in the form of cumulative sum (CUSUM) of log-likelihood ratio is used to detect signs of fatigue in steering grip force signal. Digital signal differentiation and information fusion method are used to detect fatigue onset in the EOG signal. Steering grip force signal is found to be inconsistent and very difficult to relate with fatigue occurrence. On the other had, EOG signal is found to be more suitable as fatigue detector, with detection rate of more than 80%. Based on the feasibility test findings, an online fatigue monitoring system prototype based on a Personal Digital Assistant (PDA) has been designed to detect driver dozing off through EOG signal.