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पेटेंट कार्यालय का एक प्रकाशन
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(54) Title of the invention : A SYSTEM AND METHOD TO PREVENT UNCONSCIOUS DRIVING BEHAVIOURS

(51) International classification :H04W 4/80 (31) Priority Document No :NA (32) Priority Date :NA (33) Name of priority country :NA (86) International Application No :NA Filing Date :NA (87) International Publication No : NA (61) Patent of Addition to Application Number :NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA	(71)Name of Applicant : 1)V. NAGARAJ Address of Applicant :S/o. G.VARATHARAJ, HOUSE NO : 1/351, BACKSIDE OF CANARA BANK, SANDAIPETTAI, VAIKUNTHAM(PO) SANGAGIRI(TK), SALEM(DT) 637103, TAMIL NADU, INDIA Tamil Nadu India 2)Dr. S. SENTHILKUMAR 3)PRADEEP BEDI 4)P. RAMYA 5)Dr. M. UMAMAHESWARI 6)Dr. CHITRA PASUPATHI 7)SREEDEVI S 8)NEERAJ CHANDNANI 9)Dr. JANARDAN PANDURANG BHOSALE 10)M. SARAVANAN 11)M. PAVITHRA 12)Dr. MAHESH BHALAKRISHNAN 13)Dr. S. SUBHASHINI 14)B. PRABAKARAN (72)Name of Inventor : 1)V. NAGARAJ 2)Dr. S. SENTHILKUMAR 3)PRADEEP BEDI 4)P. RAMYA 5)Dr. M. UMAMAHESWARI 6)Dr. CHITRA PASUPATHI 7)SREEDEVI S 8)NEERAJ CHANDNANI 9)Dr. JANARDAN PANDURANG BHOSALE 10)M. SARAVANAN 11)M. PAVITHRA 12)Dr. MAHESH BHALAKRISHNAN 13)Dr. S. SUBHASHINI 14)B. PRABAKARAN
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(57) Abstract :

Vehicle security and accident prevention are more challenging. This project is to provide security to the vehicles by engine locking system which prevents the vehicle from unauthorized access. This technique helps to find out the exact location of the accident and with the help of a server, an emergency vehicle can be sent to the exact location to reduce the human life loss. It also detects the behavior of the driver through sensors whether he/she is drowsy Drowsiness, as well as Tiredness of motorists, is amongst the considerable root causes of road crashes. The Anti-Theft Vehicle Security System is designed to solve the surge in the number of robbery cases in vehicles. The secure system comprises of AI-based techniques like face recognition. The existing system doesn't have any communication with the owner other than alerting using alarms. Our proposed model provides a communication facility and this communication technique is used in face recognition to make an interaction between humans and machines. Drowsiness, as well as Tiredness of motorists, is amongst the considerable root causes of road crashes.

No. of Pages : 15 No. of Claims : 5

FORM 2 THE PATENTS ACT, 1970 (39 of 1970) & The Patent Rules, 2003 COMPLETE SPECIFICATION (See sections 10 & rule 13)		
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3. PREAMBLE TO THE DESCRIPTION

COMPLETE SPECIFICATION

The following specification particularly describes the invention and the manner in which it is to be performed

A SYSTEM AND METHOD TO PREVENT UNCONSCIOUS DRIVING BEHAVIOURS

FIELD OF INVENTION

[001] The present invention relates to the vehicle's security system with integrated
5 multiple security features to protect the vehicle as well as driver/passengers. More
particularly the invention novels the intelligent vehicle security system is an
integrated multiple featured device which consists of GPS, communication, AI-
based lock/unlock and imaging module to make the vehicle to fully secured and
safe vehicle.

10

BACKGROUND OF INVENTION

[002] Background description includes information that may be useful in understanding
the present invention. It is not an admission that any of the information provided
herein is prior art or relevant to the presently claimed invention, or that any
15 publication specifically or implicitly referenced is prior art.

[003] A vehicle is a primary mode of transportation and is required to perform various
functions of our day-to-day activities. Due to which, motor vehicle theft has
become one of the most common crime and the cost of stolen vehicles is
20 estimated to be a huge amount. Therefore, safeguarding vehicles against theft is
very essential.

[004] Drowsy driving is one of the major reasons for accidents on road. Human eyes play an important role in detecting whether a driver is getting dozy while driving. Continuous monitoring of eyes and recording the closing and opening pattern of eyes can help in developing an algorithm which can help in designing a
5 drowsiness detection system. Eyes are the most suitable indicator for finding whether a driver is getting drowsy while driving or not. The major issue while detecting eyes is that it is very hard to detect eyes in a dynamic environment where the object is continuously moving. Hence, we need to detect the whole face first and then take eyes out of the whole face and then perform our algorithm on
10 it.

[005] The patent application number EP1418082A1 discloses as Drowsiness detection system and method, Which is described as A low-cost system for detecting a drowsy condition of a driver (18) of a vehicle (10) includes a video imaging
15 camera (20) located in the vehicle (10) and oriented to generate images (30) of a driver (18) of the vehicle (10). The system also includes a processor (32) for processing the images (30) acquired by the video imaging camera (20). The processor (32) monitors an eye (22) and determines whether the eye (22) is in an open position or a closed state. The processor (32) further determines a time
20 proportion of eye closure (PT) as the proportion of a time interval that the eye (22) is in the closed position, and determines a driver drowsiness condition when the time proportion of eye closure (PT) exceeds a threshold value (T1).

[006] In another disclosure, the patent application number US20030034915A1 discloses as the Vehicle theft prevention device, which is described as There is provided with a vehicle theft prevention device including a navigation device to detect the position of a vehicle on the earth, a security device to detect that the vehicle has
5 been stolen, and an automobile telephone to transmit the position of the vehicle to a monitoring centre after the detection of the theft of the vehicle. When the security device does not detect the theft of the vehicle, a position of the vehicle periodically detected by the navigation device is stored in a memory of the security device. When the theft of the vehicle is detected by the security device,
10 the latest information of the vehicle stored in this memory is transmitted to the monitoring centre by the automobile telephone, and the monitoring centre can immediately determine the theft and the position of the stolen vehicle.

[007] However, in the present technology, the security and driver safety system only
15 based on traditional locks. So, the inventor decides to innovate new/additional innovative method for vehicle security and drowsiness detection system for vehicles.

[008] In this method, tracking of vehicle place easy and doors locked automatically,
20 thereby thief cannot get away from the car. • Accident location and vehicle theft identification involve vehicle tracking using GPS technology. Accident identification system provides the location at which accident occurs • Driver

fatigue system provides information about the driver's eye blink rate which prevent an accident because of the drowsiness.

[009] Further limitations and disadvantages of conventional and traditional approaches
5 will become apparent to one of skill in the art through comparison of described systems with some aspects of the present disclosure, as outlined in the remainder of the present application and concerning the drawings.

[0010] Groupings of alternative elements or embodiments of the invention disclosed
10 herein are not to be construed as limitations. Each group member can be referred to and claimed individually or in any or a combination with other members of the group or other elements found herein. One or more members of a group can be included in, or deleted from, a group for reasons of convenience and/or patentability. When any such inclusion or deletion occurs, the specification is
15 herein deemed to contain the group as modified thus fulfilling the written description of all groups used in the appended claims.

SUMMARY OF INVENTION

[0011] The present invention relates to security-related IoT integrated engine control system. the present invention relates to the vehicle's security system with integrated multiple security features to protect the vehicle as well as
5 driver/passengers. More particularly the invention novels the intelligent vehicle security system is an integrated multiple featured device which consists of GPS, communication, AI-based lock/unlock and imaging module to make the vehicle to fully secured and safe vehicle.

[0012]10 The system works through a combination Global Positioning System (GPS), Global system mobile communication (GSM), camera and sensors which constantly monitor the driver. It can accurately measure the place of the vehicle identified, blinking features, facial expressions, heat loss from the body and illuminance. This is combined with information gathered about the in-vehicle
15 environment. The sensor and environment data is then processed using artificial intelligence and a judgment made on how drowsy the driver is.

[0013] The key to keeping a driver awake is a thermal sensation. Typically, people get drowsy when they are too warm, and that is made worse when the environment is
20 dim. So by predicting the drowsiness state, I can adjust the thermal sensation of the driver using airflow within the vehicle. Changing the airflow and general temperature combined with adjusting the brightness of the environment can counteract the oncoming drowsiness. If a person is driving in a very tired state,

then no environment changes will maintain a wakeful state. This covered too, by detecting the higher levels of drowsiness. If such a detection is made, an alarm is sounded and a command to rest issued.

[0014]5 In embodiments of the invention, the system has at least one non-contact imaging/sensing device at least one communication module and main processing unit to scanning thumbs and making proper attendance to appropriate persons. This invention scans the thumbs when that person shows in front of the scanning device of the person.

10

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The accompanying drawings are included to provide a further understanding of the present disclosure and are incorporated in and constitute a part of this specification. The drawings illustrate exemplary embodiments of the present disclosure and, together with the description, serve to explain the principles of the present disclosure.

15

[0016] Figure.1 illustrates Overview the schematic view of the present invention; a block diagram explaining the process and workflow of the invention.

20

DETAILED DESCRIPTION

[0017] The following is a detailed description of embodiments of the disclosure depicted in the accompanying drawings. The embodiments are in such detail as to communicate the disclosure. However, the amount of detail offered is not intended to limit the anticipated variations of embodiments; on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present disclosure as defined by the appended claims.

[0018] In the following description, numerous specific details are outlined to provide a thorough understanding of embodiments of the present invention. It will be practised without some of these specific details.

[0019] Embodiments of the present invention include various steps, which will be described below. The steps may be performed by hardware components or may be embodied in machine-executable instructions, which may be used to cause a general-purpose or special-purpose processor programmed with the instructions to perform the steps. Alternatively, steps may be performed by a combination of hardware, software, and firmware and/or by human operators.

[0020] Figure.1 illustrates Overview the schematic view of the present invention; a block diagram explaining the process and workflow of the invention. Wherein the imaging device 105 used to recognize the face of the driver to find the drowsiness effect.

[0021] Typically passed by the complying with phases: 1) Face discovery; 2) Eyes Place; 3) Recognition of the eyes states; 4) Recognition of driver state; 5) Vehicle Tracking, Locking, Microcontroller, GPS, GSM.

5

[0022] Face Detection: The video camera in front of the driver was set to record parts of the participant's face. The subjective evaluation of their drowsiness levels was then processed offline by two evaluators in intervals of 10 s following predetermined criteria. The evaluation of drowsiness levels based on the features
10 of facial expressions; Drowsiness level based on facial expression a) Fast eye blinks, often reasonably regular; apparent focus on driving with occasional fast sideways glances; normal facial tone. b) Slightly Drowsy, Increase in duration of eye blinks and the possible increase in the rate of eye blinks; increase in duration and frequency of sideways glances; the appearance of "glazed-eye" look,
15 occasional yawning. c) Moderately Drowsy, Occasional disruption of eye focus; a significant increase in eye blink duration; the disappearance of eye blink patterns observed during the alert state; reduction in the degree of eye-opening; occasional disappearance of facial tone. d) Significantly Drowsy, Discernible episodes of almost complete eye closure; eyes are never fully open; significant disruption of
20 eye focus. e) Extremely Drowsy, Significant increase in the frequency of eye closure episodes; longer duration of episodes.

[0023] Eyes Localization: Since the eyes are always in a specified area in the face, we limit our research study in the location between the forehead and also the mouth (Eye Area of Passion 'eROI') We gain from the symmetrical characteristic of the eyes to spot them in the face. First, we sweep up and down the eROI by a rectangular mask with an approximated height of elevation of the eye and also a size equivalent to the size of the face, as well as we compute the symmetry. The eye area corresponds to the placement which has a high measurement of symmetry. Then, in this obtained area, we calculate the proportion once again in both left and ideal sides. The greatest value represents the centre of the eye.

10

[0024] Eyes States: The eye state determines to classify the eye into 2 states: open or closed. We make use of the Hough transform for circles (HTC) on the photo of the eye to spot the iris. For that, we use the HTC to the side image of the eye to discover the circles with specified rays, and we take at the end the circle which has the greatest worth in the accumulator of Hough for all the rays. Then, we apply the logical 'AND ALSO' logic in between sides photo and total circle acquired by the HTC by measuring the intersection level between them "S". Finally, the eye state.

15

[0025] Driver State: We establish the vehicle driver state by measuring PER-CLOS. If the vehicle driver shut his eyes in at least 5 successive structures several times over approximately 5 seconds, it is taken into consideration drowsy.

20

[0026] Vehicle Tracking, Locking, Microcontroller, GPS, GSM: This system puts into sleeping mode while the vehicle handled by the owner or authorized person otherwise goes to active mode, the mode of operation changed by in person or remotely. If any interruption occurred in any side of the door, then the IR sensor
5 senses the signals and SMS sends to the microcontroller. The controller issues the message about the place of the vehicle to the car owner or authorized person.

[0027] The above specific embodiments of the present invention only but are not intended to limit the present invention, any modifications within the principle of
10 the present invention, equivalent substitutions and improvements should be included in the scope of the present invention within.

[0028] Finally, it should be noted that the above embodiments are intended to illustrate the present invention, not to limit the scope of the present invention, although the
15 preferred embodiments are described in detail concerning the description of the present invention, those of ordinary skill in the art should be understood, may be made to the present invention modifications or equivalent replacements without departing from the scope of the technical solutions of the present invention.

[0029] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and

drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

[0030] While the foregoing describes various embodiments of the invention, other and
5 further embodiments of the invention may be devised without departing from the basic scope thereof. The scope of the invention is determined by the claims that follow. The invention is not limited to the described embodiments, versions or examples, which are included to enable a person having ordinary skill in the art to make and use the invention when combined with information and knowledge
10 available to the person.

A handwritten signature in blue ink, appearing to read 'Prem Charles I', with a stylized flourish extending to the right.

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CLAIMS

We claim,

1. The intelligent vehicle security system with integrated drowsiness detection feature, the system comprising,

5 The invention is to continuously detect the eyes of the driver and alert if it is unable to find the eyes.

The invention to live to detect the emotions of the driver and sound

AI controls the vehicle if the driver is angry or showing varying emotions.

10 The invention to mark the locations on a map from where the driver has travelled from.

A system connected GPS to get locations

A system has a facial recognition feature to lock/unlock vehicles.

A system interacts with the driver through UI.

15 A system over-controls the manual operations to take full control of the vehicle.

2. The system as claimed in claim 1, wherein the invention is to continuously detect the eyes of the driver and alert if it is unable to find the eyes.

5 3. The system as claimed in claim 1, the invention to live to detect the emotions of the driver and sound to ensure driver consciously.

4. The system as claimed in claim 1, A system connected internet and GPS to get locations of vehicles to enhanced vehicles.

10

5. The system as claimed in claim 1, a system has facial recognition feature to lock/unlock vehicles.

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ABSTRACT

A SYSTEM AND METHOD TO PREVENT UNCONSCIOUS DRIVING BEHAVIOURS

Vehicle security and accident prevention are more challenging. This project is to
5 provide security to the vehicles by engine locking system which prevents the
vehicle from unauthorized access. This technique helps to find out the exact
location of the accident and with the help of a server, an emergency vehicle can be
sent to the exact location to reduce the human life loss. It also detects the behavior
of the driver through sensors whether he/she is drowsy Drowsiness, as well as
10 Tiredness of motorists, is amongst the considerable root causes of road crashes.
The Anti-Theft Vehicle Security System is designed to solve the surge in the
number of robbery cases in vehicles. The secure system comprises of AI-based
techniques like face recognition. The existing system doesn't have any
communication with the owner other than alerting using alarms. Our proposed
15 model provides a communication facility and this communication technique is
used in face recognition to make an interaction
between humans and machines. Drowsiness, as
well as Tiredness of motorists, is amongst the
considerable root causes of road crashes.



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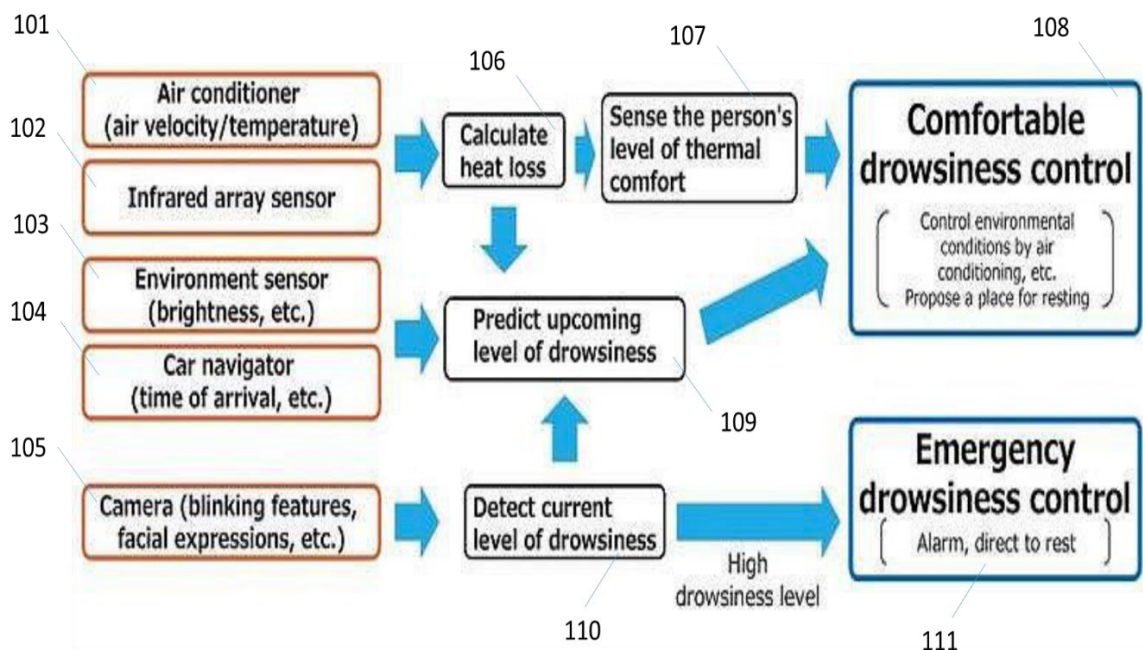


FIGURE 1

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