

RESPONSE TO FIRST EXAMINATION REPORT

Patent Application No. 202011020474

Via e-filing

Controller of Patents : Shri Roopak Jain

The Controller of Patents
Patent Office Branch
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Deadline to file response to First Examination Report:

May 09, 2022

Indian Patent Application No.	:	202011020474
Date of Filing	:	15/05/2020
Title	:	A DRIVER-ASSISTANCE SYSTEM AND METHOD FOR ASSISTING A DRIVER DURING NIGHT AND FOGGY WEATHER
Applicant	:	UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
<i>Date of FER</i>	:	09/11/2021

Respected Sir,

We write in response to your office letter dated November 09, 2021.

Our response to the objections raised is as follows:

Response to Objection Part II (1):

Applicant notes that the claims of the present application have been held to lack inventive step in view of D1: US8818042B2 and D2: US20160078305A1.

Applicant would like to traverse the Examiner's rejection below by pointing out several important differences between the present invention as claimed in the amended claims and those taught by the cited references. Applicant has amended the original independent Claim 1, to more clearly describe the present invention. The amended claims clearly distinguish the present invention from the cited references. In order to better illustrate some of the key elements of the present invention, amended claim 1 has been duplicated below,

1. A driver-assistance system (100) for a vehicle for assisting a driver of the vehicle, the system (100) comprising:

one or more camera sensors (118) mounted on the vehicle to capture a field of view of the vehicle;

a monitoring screen (120) embedded on a windshield of the vehicle, and operatively coupled to the one or more camera sensors (118), the monitoring screen (120) being configured to operate in a normal mode during a day when weather is clear to provide normal visibility of the field of view of the vehicle, and in a thermal mode to provide, in real-time, a thermal visualization of the field of view of the vehicle on the monitoring screen based on the captured field of view during night and in foggy weather, wherein the thermal visualization of the field of view of the vehicle on the monitoring screen (120) is based on execution of a second set of instructions being performed at one or more processors (102) to facilitate

clear visualization of the field of view of the vehicle on the monitor screen (120);

a control unit (108) operatively coupled to the one or more camera sensors (118) and the monitoring screen (120), the control unit (108) comprising a processor (102) coupled with a memory (104), the memory (104) storing a set of instructions executable by the processor (102) to:

receive, a set of input signals from the one or more camera sensors (118) based on the captured field of view of the vehicle;

in response to the received set of input signals, determine one or more parameters associated with position, size and velocity of one or more objects in the field of view of the vehicle and detect objects in the captured field of view of the vehicle based on the received set of input signals from the camera sensors (118);

estimate, a time duration for collision of the vehicle with the one or more objects based on the determined one or more parameters and one or more attributes of the vehicle comprising position, velocity and size of the vehicle;

generate, an alert signal if the determined time duration of collision is between a range of predefined threshold time duration to alert the driver to push a brake paddle/emergency brake of the vehicle for immediate speed reduction of the vehicle.

The applicant respectfully submits that claims have been amended in respect to the section 2(1)(ja) and section 59. Original filed claim 9 is merged with the original filed claim 1 and 10 to lead towards an inventive step. Further, No new matter has been added in the amended claims. Amendments in the claims have been done within scope of the original filed specification.

It is submitted that the cited documents D1 and D2 fail to disclose or suggest the technical portion of claim 1. None of the documents cited in the First Examination Report provide the solution of claim 1 to provide a driver-assistance system and method for a vehicle for assisting a driver of the vehicle. The cited documents fail to determine one or more parameters associated with position, size and velocity of one or more objects in the field of view of the vehicle and detect objects in the captured field of view of the vehicle based on the received set of input signals from the camera sensors; and estimate, a time duration for collision of the vehicle with the one or more objects based on the determined one or more parameters and one or more attributes of the vehicle comprising position, velocity and size of the vehicle as claimed in the present invention.

Further, Applicant traverse the Controller's statement "that it would have been obvious to a person skilled in the art to combine the teachings of D1 with D2 to arrive at the claimed invention". Applicant wishes to bring to the kind attention of the learned Controller that a rejection of lack of inventive step must be supported with a proper rationale and cannot be based on a simple statement. In this regard, the Office must specifically identify the teachings of each of the cited documents and the differences between the cited document and the claims at hand. Once the differences have been enumerated, the same should be tested on teaching-suggestion-motivation (TSM) rationale. If and only if the rationale satisfies, a rejection of "lack of inventive step" is tenable. In case, the Office is not following the TSM rationale, a rejection on the basis of lack of inventive step must still be based on:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;

- Use of known technique to improve similar devices (methods, or products) in the same way;
- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

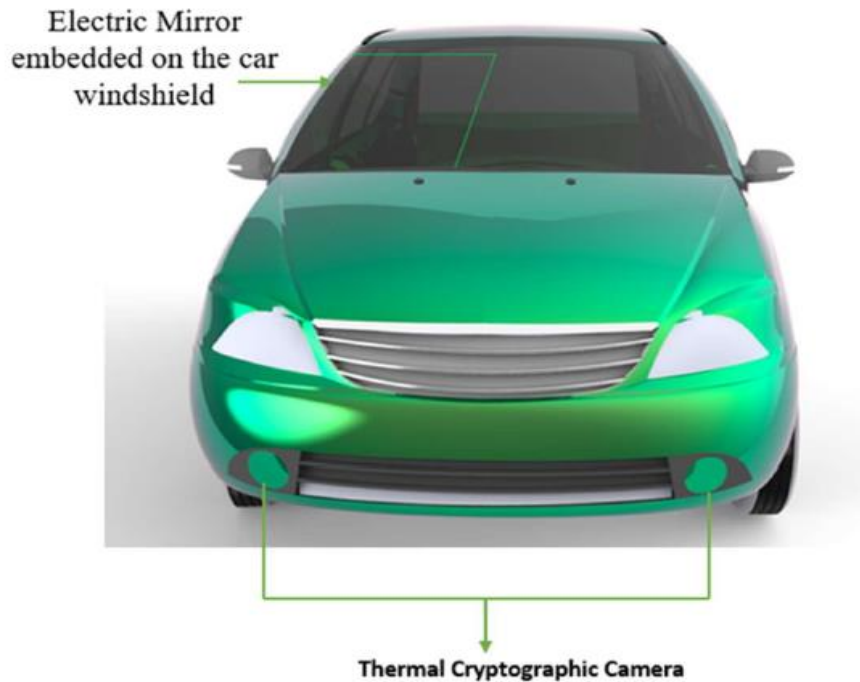
In this regard, since the First Examination report issued in the present instance fails to provide any rationale for objecting the claims as lacking inventive step over D1 and D2. Applicant humbly submits that a prima facie validity of the objection in itself has not been made and hence merely on this account, the objection may be waived.

Without prejudice to the above, it is submitted that the present invention provides a driver-assistance system and method for a vehicle for assisting a driver of the vehicle. The present invention minimizes the accident rate during fog by enhancing the driver's vision through dense fog. The claimed system allows driver compatible visualization mode with the smart orientation of monitoring screen in front of the driver, the monitoring screen used transparent electric mirror technology which allows normal vision during daytime and enable cryptographic thermal visualization during the night and dense fog environment. Thus, resolves the problem of the orientation of the monitor, which generally mounted on the central panel of the vehicle in front of the gearbox. Hence, with thermal visualization of road view, the system is capable of self-detecting the animal's instantaneous presence on-road setting up an alert signaling in the vehicle, which enables the driver to apply immediate braking.

Further, the present invention also resolves a few problems, which are currently present in vehicles i.e. unconventional visualization mode for monitoring data through LCD panels placed in the centre of the car dashboard replaced with transparent high-resolution electric mirrors with smart orientation in front of the driver. Also, allow auto-detection of instantaneous animal presence on the road by auto detection obstacles interface embedded in the controller, which will detect animals present on the road and will generate alert signals to notify the driver for immediate speed reduction.

Furthermore, the claimed system discovers thermal cryptography of image enhancement interface which serves multipurpose i.e. visualization in the Fog by protecting driver from accidents and during the night by reducing animal death rate due to unnoticeable road accidents.

Furthermore, smart orientation of the monitoring screen claimed in the present invention specifies the implementation of the transparent electric mirror in place of the windshield which will possess properties of the windshield and will act as a display screen during dense fog. Transparent Electric Mirror technology allows a normal front view across the car windshield mirror when the mirror technology is in normal mode and when the fog sensing sensors cameras turned on then the smart mirror turns into a screen. The Transparent Smart Electric Mirror used two types of technology for a better view of roads through drivers' vision. Further, the applicant has provided a reference figure below of car with Transparent Smart Electric Mirror to provide more clarity in the invention:



Furthermore, there are two cases of the claimed system in the present invention as follows:-

1. When the visibility is normal i.e. there is no fog, in this case, the electric mirror works as a normal windshield i.e. no visual road image appears on the windshield.
2. When the visibility reduces or there is zero visibility during intense fog, the thermal cryptographic camera is turned on by the driver which simultaneously will control electrochromic smart film on the windshield which will adjust the intensity of incoming light into the vehicle through the controller (raspberry pi 3) and thus the driver will be able to see the clear road view on the electric mirror.

Document D1 discloses a driver assistance system for a vehicle includes a forward facing camera and a processor operable to process image data captured by the camera. Responsive to processing of captured image data, the driver assistance system is operable to determine a lane along which the

vehicle is traveling and to detect oncoming vehicles approaching the vehicle in another lane that is to the right or left of the determined lane along which the vehicle is traveling. The driver assistance system is operable to control, at least in part, a light beam emanating from a headlamp of the vehicle and adjusts the light beam emanating from the headlamp to limit directing beam light towards the eyes of a driver of the detected oncoming vehicle. Responsive to processing of captured image data, the driver assistance system is operable to provide lane departure warning to a driver of the vehicle. D1 however fails to disclose a monitoring screen embedded on a windshield of the vehicle, and operatively coupled to the one or more camera sensors, the monitoring screen being configured to operate in a normal mode during a day when weather is clear to provide normal visibility of the field of view of the vehicle, and in a thermal mode to provide, in real-time, a thermal visualization of the field of view of the vehicle on the monitoring screen based on the captured field of view during night and in foggy weather, wherein the thermal visualization of the field of view of the vehicle on the monitoring screen is based on execution of a second set of instructions being performed at one or more processors to facilitate clear visualization of the field of view of the vehicle on the monitor screen.

In more particular, the document D1 only focuses on guiding a driver about the another vehicle, obstacles and traffic on the basis of light beam, whereas the present invention mainly focuses on providing clear view on monitoring screen in front of the driver. In the present invention, the monitoring screen used transparent electric mirror technology, which allows normal vision during daytime and enable cryptographic thermal visualization during the night and dense fog environment.

Further, the present invention also focuses on the development of an obstacle alert system with smart thermal visualization for cars and the

system is compatible with any vehicle the only requirement is replacing car windshields with transparent electric mirror technology. Hence, the subject matter described in the present invention is different as compared with the subject matter of document D1.

Furthermore, the document D1 is silent on auto-detection of instantaneous animal presence on the road by auto detection obstacles interface embedded in the controller, which will detect animals present on the road and will generate alert signals to notify the driver for immediate speed reduction.

Furthermore, the document D1 nowhere teaches about estimating, a time duration for collision of the vehicle with the one or more objects based on the determined one or more parameters and one or more attributes of the vehicle comprising position, velocity and size of the vehicle; and generating, an alert signal if the determined time duration of collision is between a range of predefined threshold time duration to alert the driver to push a brake paddle/emergency brake of the vehicle for immediate speed reduction of the vehicle.

Document D2 discloses a driver assistance system for a vehicle includes first and second cameras and a rear backup camera. A control processes image data captured by the first camera and determines that the first camera is misaligned when the first camera is disposed at the left side of the vehicle. The control, responsive to a determination of misalignment of the first camera, is operable to algorithmically at least partially compensate for misalignment of the first camera. At least in part responsive to processing of captured image data, a composite image is displayed that provides a view that approximates a view from a single virtual camera. Image data captured at least by the first camera is processed using an edge detection algorithm to detect edges of objects exterior of the vehicle. Responsive at least in part to processing of captured image data, an object of interest exterior of the

vehicle is determined. D2 however fails to disclose or suggest a monitoring screen embedded on a windshield of the vehicle, and operatively coupled to the one or more camera sensors, the monitoring screen being configured to operate in a normal mode during a day when weather is clear to provide normal visibility of the field of view of the vehicle, and in a thermal mode to provide, in real-time, a thermal visualization of the field of view of the vehicle on the monitoring screen based on the captured field of view during night and in foggy weather, wherein the thermal visualization of the field of view of the vehicle on the monitoring screen is based on execution of a second set of instructions being performed at one or more processors to facilitate clear visualization of the field of view of the vehicle on the monitor screen.

In more particular, the document D2 only focuses on guiding a driver about the another vehicle, obstacles and traffic on the basis of light beam, whereas the present invention mainly focuses on providing clear view on monitoring screen in front of the driver. In the present invention, the monitoring screen used transparent electric mirror technology, which allows normal vision during daytime and enable cryptographic thermal visualization during the night and dense fog environment.

Further, the present invention also focuses on the development of an obstacle alert system with smart thermal visualization for cars and the system is compatible with any vehicle the only requirement is replacing car windshields with transparent electric mirror technology. Hence, the subject matter described in the present invention is different as compared with the subject matter of document D2.

Furthermore, the document D2 nowhere teaches about estimating, a time duration for collision of the vehicle with the one or more objects based on the determined one or more parameters and one or more attributes of the

vehicle comprising position, velocity and size of the vehicle; and generating, an alert signal if the determined time duration of collision is between a range of predefined threshold time duration to alert the driver to push a brake paddle/emergency brake of the vehicle for immediate speed reduction of the vehicle.

Furthermore, the document D2 fail to discuss about determining at the control unit, one or more parameters associated with at least one of position, size and velocity of one or more objects in the field of view of the vehicle in response to the received set of input signal and detecting, at the control unit objects in the captured field of view of the vehicle based on the received set of input signals from the camera sensors.

As both D1 and D2 fail to disclose or suggest the amended features of claim 1, the subject matter as claimed cannot be held to lack inventive step in view of the cited documents. Thus, the subject matter as claimed in amended claim 1 is inventive over D1 and D2 either alone or in any combination thereof. Keeping in view the above, Applicant humbly requests for reconsideration and waiver of the aforesaid objection.

Response to Objection Part II (3):

Reference numerals have been provided in parenthesis in all independent and dependent claims for the enhancement of clarity, u/r 13(4) of The Patents rules, 2003. Keeping in view the above, Applicant humbly requests for reconsideration and waiver of the aforesaid objection.

Response to Objection Part II (4):

The phrases like "at least " has been removed from the claims. Independent claims begin with "'A/An" and dependent claims begin with "the". Keeping in view the above, Applicant humbly requests for reconsideration and waiver of the aforesaid objection.

Response to Objection Part II (5):

The applicant respectfully submits that claims have been amended in respect to the section 59 of the Indian Patent Act. No new matter has been added in the amended claims. Amendments in the claims have been done within scope of the original filed specification. Therefore, amendments of the claims are well supported by the original filed specification and drawings. Further, mark up copy of amended claims is being submitted herewith. Keeping in view the above, Applicant humbly requests for reconsideration and waiver of the aforesaid objection.

Response to Part III- Formal Requirements:

Applicant submits the following to comply with the above objection:

- 1) All as submitted forms and documents have been duly signed by the patent agent.
- 2) It is respectfully submitted that captioned application is an ordinary application and is only filed in India and thus there exists no corresponding foreign application filed for this matter. The Applicant humbly submits and undertakes that that they have not filed any foreign application corresponding to the instant patent application till date. Since, Form 3 was already filed on 21/05/2020 with indication of NO/NIL foreign filing declaration and subsequently till date there is no corresponding foreign filing. Further, we have re-submitted Form 3 with indication of NO/NIL foreign filing declaration. In the view of above submission, we request the Learned Controller of Patents to withdraw the Objection.

- 3) Copy of GPA shall be filed with proper stamp under Indian Stamp Act, 1899 (2 of 1899).
- 4) Necessary figure number has been inserted in the abstract u/r 13(7)(d) of The Patents Rules 2003. Amended abstract is being submitted herewith.
- 5) There is no blank space in the original filed specification. Application number and date of application has been mentioned in all submitted forms. Form 3 has been refiled with mention of Application number as well as date of Application.

In view of the above and the documents enclosed, it is requested that the Objections of Part III shall be waived.

With the above, the Applicant believes that all the objections contained in the FER are appropriately addressed and hence, humbly pray for early grant of the Application. In the event the decision of the learned Controller of Patents is adverse to the Applicant, we humbly request that the Applicant be given an opportunity to be heard as per the provisions of Section 14 of the Indian Patents Act, 1970.

With the above, the Applicant believes that all the objections contained in the FER are appropriately addressed and hence, humbly pray for early grant of the Application. In the event the decision of the learned Controller of Patents is adverse to the Applicant, we humbly request that the Applicant be given an opportunity to be heard as per the provisions of Section 14 of the Indian Patents Act, 1970.

We thank you in advance for your cooperation in this regard.

Yours faithfully,

Dated 14/04/2022



Vikas Asawat

Patent Agent

INPA 1407

On Behalf of Applicant

Digitally Signed

Enclosure:

- Amended Claims- Marked Copy and Clean Copy
- Amended Abstract - Marked Copy and Clean Copy