

IPR2013-00419, -00424

Toyota Motor Corp., Petitioner

v.

*American Vehicular Sciences LLC,
Patent Owner*

August 18, 2014

Grounds of Review

IPR2013-00419 ('057 Patent)*

1. Claims 1-4, 7-10, 40, 41, 46, 48, 49, 56, 59-61, and 64 under 35 U.S.C. 102 by Lemelson
2. Claims 30-34, 37-39, and 62 under 35 U.S.C. 103 over Lemelson and Borcherts
3. Claims 4, 43, and 59 under 35 U.S.C. 103 over Lemelson and Borcherts
4. Claim 34 under 35 U.S.C. 103 over Lemelson, Borcherts, and Yamamura
5. Claims 30, 32, and 37-39 under 35 U.S.C. 103 over Yamamura and Borcherts

*Claims 40, 43, 46, 48, and 49 have been conceded by Patent Owner

IPR2013-00424 ('000 Patent)

1. Claims 10, 11, 19, and 23 under 35 U.S.C. § 102 by Lemelson
2. Claims 10, 11, 19, and 23 under 35 U.S.C. § 103 over Lemelson and Borcherts
3. Claims 16, 17, and 20 under 35 U.S.C. § 103 over Lemelson and Borcherts

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ronment of the vehicle, in an A-pillar or B-pillar of the vehicle to obtain images of an interior environment of the vehicle, or in a roof, ceiling, B-pillar or C-pillar of the vehicle behind a front seat of the vehicle. These mounting locations are exemplary only and not limiting.

The determined characteristic can be used to enable optimal control of a reactive component, system or sub-

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described above to direct light into external and/or internal environments, relative to the vehicle.

Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the

1. A monitoring arrangement for monitoring an environment exterior of a vehicle, comprising:

at least one receiver arranged to receive waves from the environment exterior of the vehicle which contain information on any objects in the environment and generate a signal characteristic of the received waves; and

a processor coupled to said at least one receiver and comprising trained pattern recognition means for processing the signal to provide a classification, identification or location of the exterior object, said trained pattern recognition means being structured and arranged to apply a trained pattern recognition algorithm generated from data of possible exterior objects and patterns of received waves from the possible exterior objects to provide the classification, identification or location of the exterior object;

whereby a system in the vehicle is coupled to said processor such that the operation of the system is affected in response to the classification, identification or location of the exterior object.

10. In a motor vehicle having a monitoring system for monitoring an environment exterior to said vehicle comprising:

- a) transmitter means for transmitting electromagnetic waves to illuminate the at least one exterior object;
- b) reception means for receiving electromagnetic illumination from the at least one exterior object;
- c) processor means coupled to said transmitter and reception means for processing said received electromagnetic signal characteristic of the received waves based thereon;
- d) categorization means coupled to said processor for categorizing said electromagnetic signal based on said exterior object, said categorization means comprising trained pattern recognition means for processing said received electromagnetic signal based on said exterior object to provide a classification, identification or location of said exterior object based thereon, said categorization means being structured and arranged to apply a trained pattern recognition algorithm generated from data of possible exterior objects and patterns of received electromagnetic illumination from said exterior objects to provide the classification, identification or location of said exterior object;
- e) output means coupled to said processor for providing an output affecting another system in the vehicle in response to the identification of said exterior object.

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ronment of the vehicle, in an A-pillar or B-pillar of the vehicle to obtain images of an interior environment of the vehicle, or in a roof, ceiling, B-pillar or C-pillar of the vehicle to obtain images of an interior environment of the vehicle behind a front seat of the vehicle. These mounting locations are exemplary only and not limiting.

The determined characteristic can be used to enable optimal control of a reactive component, system or subsystem coupled to the processor. When the reactive component is an airbag assembly including at least one airbag, the processor can be designed to control at least one deployment parameter of the airbag(s).

Another monitoring arrangement comprises an imaging device for obtaining three-dimensional images of the environment (internal and/or external) and a processor embodying a pattern recognition technique for processing the three-dimensional images to determine at least one characteristic of an object in the environment based on the three-dimensional images obtained by the imaging device. The imaging device can be arranged at locations throughout the vehicle as described above. Control of a reactive component is enabled by the determination of the characteristic of the object.

Another arrangement for monitoring objects in or about a vehicle comprises a generating device for generating a first signal having a first frequency in a specific radio range, a wave transmitter arranged to receive the signal and transmit waves toward the objects, a wave-receiver arranged relative to the wave transmitter for receiving waves transmitted by the wave transmitter after the waves have interacted with an object, the wave receiver being arranged to generate a second signal based on the received waves at the same frequency as the first signal but shifted in phase, and a detector for detecting a phase difference between the first and second signals, whereby the phase difference is a measure of a property of the object. The phase difference is a measure of the distance between the object and the wave receiver and the wave transmitter. The wave transmitter may comprise an infrared driver and the receiver comprises an infrared diode.

A vehicle including an arrangement for measuring position of an object in an environment of or about the vehicle comprises a light source capable of directing modulated light into the environment, at least one light-receiving pixel arranged to receive the modulated light after reflection by any objects in the environment and a processor for determining the distance between any objects from which the modulated light is reflected and the light source based on the reception of the modulated light by the pixel(s). The pixels can constitute an array. Components for modulating a frequency of the light being directed by the light source into the environment and for providing a correlation pattern in a form of code division modulation of the light being directed by the light source into the environment can be provided. The pixel can also be a photo diode such as a PIN or avalanche diode.

Another measuring position arrangement comprises a light source capable of directing individual pulses of light into the environment, at least one array of light-receiving pixels arranged to receive light after reflection by any objects in the environment and a processor for determining the distance between any objects from which any pulse of light is reflected and the light source based on a difference in time between the emission of a pulse of light by the light source and the reception of light by the array. The light source can be arranged at various locations in the vehicle as

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described above to direct light into external and/or internal environments, relative to the vehicle.

Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the following claims.

What is claimed:

1. A monitoring arrangement for monitoring an environment exterior of a vehicle, comprising:
at least one receiver arranged to receive waves from the environment exterior of the vehicle which contain information on any objects in the environment and generate a signal characteristic of the received waves; and

a processor comprising:
a pattern recognition algorithm generated from data of possible exterior objects and patterns of received waves from the exterior objects to provide the classification of the exterior objects;

whereby the processor is arranged to apply the trained pattern recognition algorithm generated from data of possible exterior objects and patterns of received waves from the exterior objects to provide the classification of the exterior objects.

2. The arrangement of claim 1, wherein said pattern recognition means comprise a neural computer.

3. The arrangement of claim 1, wherein said pattern recognition means comprise a neural network.

4. The arrangement of claim 1, wherein said pattern recognition means comprise a neural network.

5. The arrangement of claim 1, wherein said pattern recognition means comprise a neural computer.

6. The arrangement of claim 1, wherein said pattern recognition means comprise a neural network.

7. The arrangement of claim 1, wherein the another system is a display viewable by the driver and arranged to show an image or icon of the exterior object.

8. The arrangement of claim 1, wherein said at least one receiver is a CCD array.

9. The arrangement of claim 1, further comprising measurement means for measuring a distance between the exterior object and the vehicle.

10. The arrangement of claim 9, wherein said measurement means comprise a radar or laser radar system.

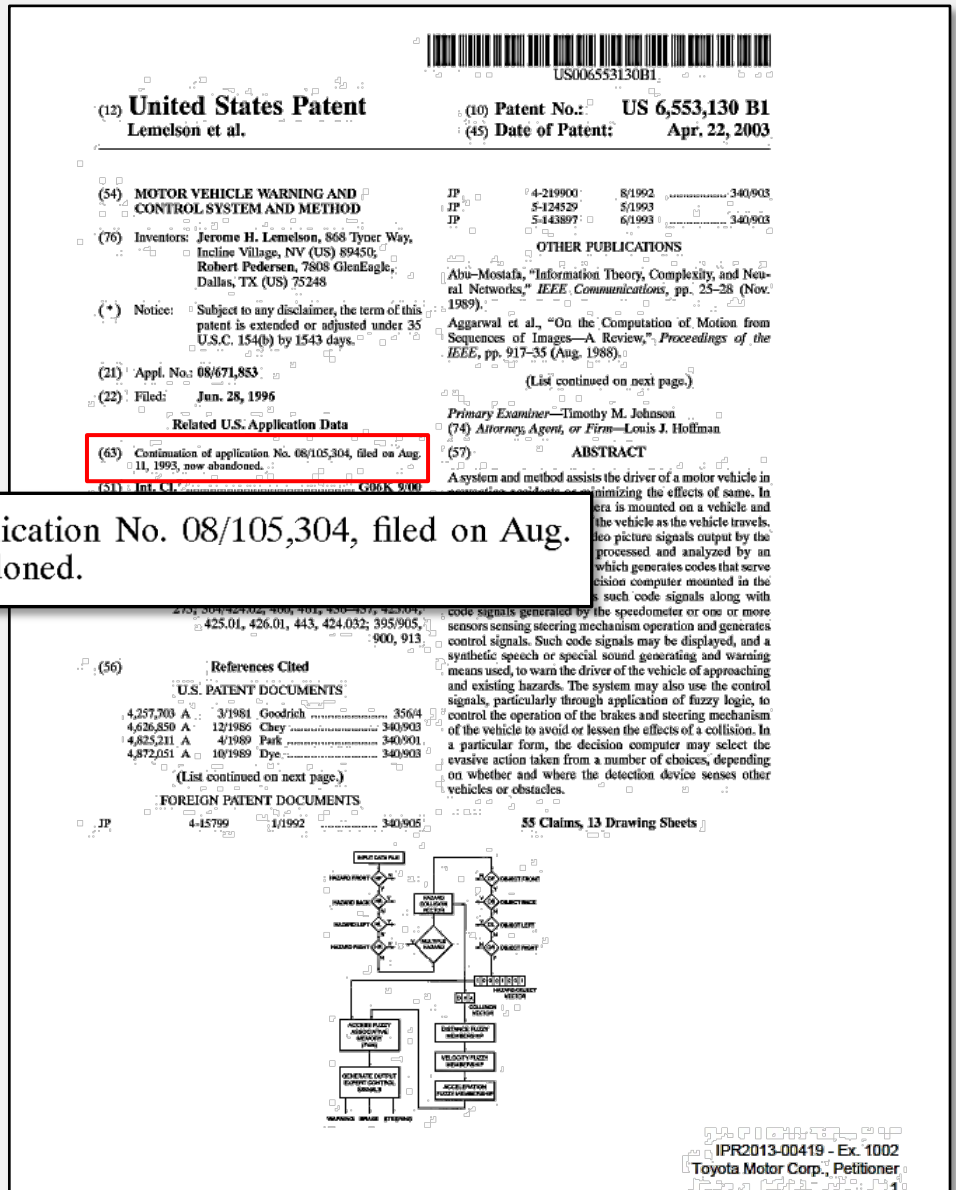
11. The arrangement of claim 1, wherein the another system is an airbag, said pattern recognition means being structured and arranged to apply the pattern recognition algorithm to provide the identification of the exterior object, deployment of said airbag being controlled based on the identification of the exterior object.

12. The arrangement of claim 11, wherein the airbag is an externally deployed airbag.

13. The arrangement of claim 1, wherein said processor is arranged to provide the classification of the exterior object.

arranged to apply a trained pattern recognition algorithm generated from data of possible exterior objects and patterns of received waves from the exterior objects to provide the classification of the exterior objects.

U.S. Patent No. 6,553,130 to Lemelson



(63) Continuation of application No. 08/105,304, filed on Aug. 11, 1993, now abandoned.

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