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 an
4. Claim 34 under 35 U.S.C. 103 over Lemelson, Borcherts, an
5. Claims 30, 32, and 37-39 under 35 U.S.C. 103 over Yamamu 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 Lemelso
2. Claims 10, 11, 19, and 23 under 35 U.S.C. § 103 over Lemel
3. Claims 16, 17, and 20 under 35 U.S.C. § 103 over Lemelson

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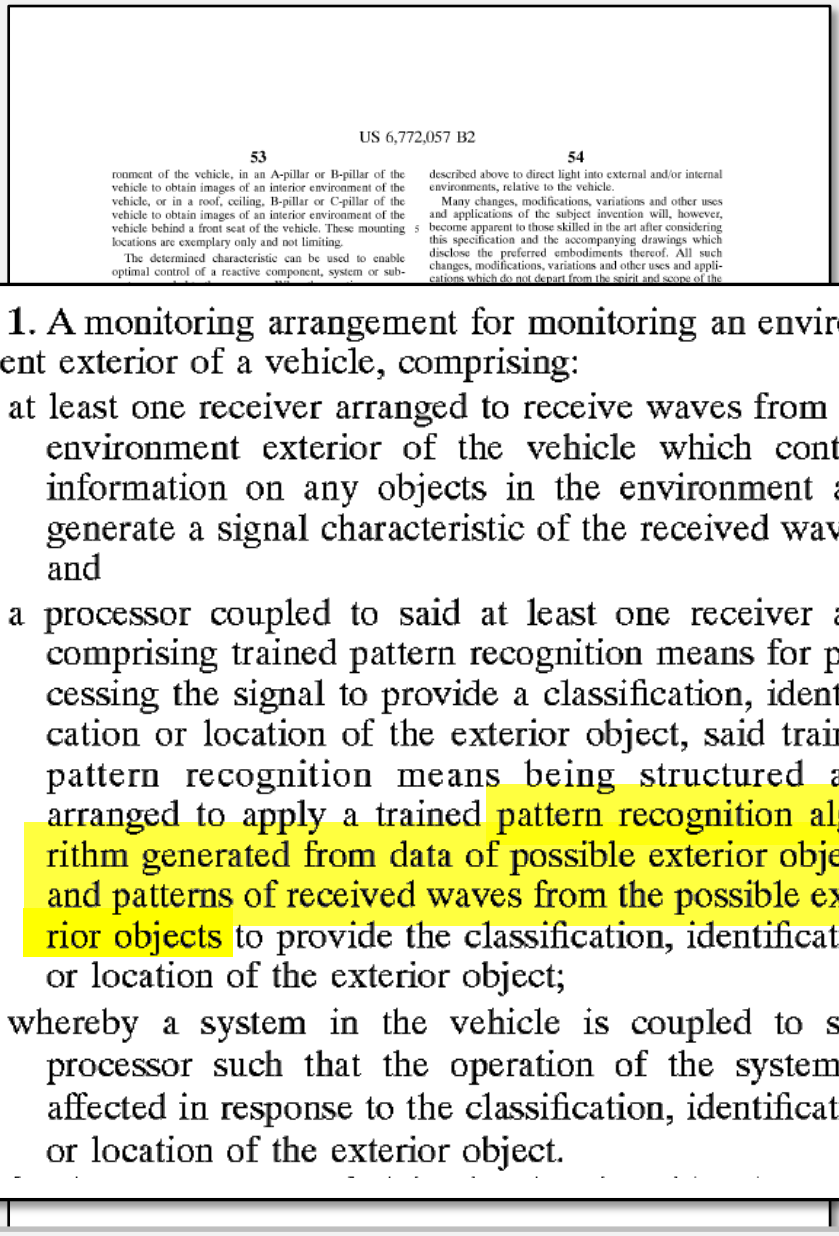

US 6,772,057 B2

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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 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 monit

exterior to said vehicle comprisi

a) transmitter means for tra
waves to illuminate the at l

b) reception means for recei
netic illumination from the

c) processor means coupled t
processing said received ill
electronic signal characteris
based thereon;

d) categorization means coupl
for categorizing said electro
exterior object, said catego
trained pattern recognition
electronic signal based on
from said exterior object to
said exterior object based t
nition means being structur
pattern recognition algorith
possible exterior objects an
tromagnetic illumination f
objects; and

e) output means coupled to sai
affecting another system in
the identification of said ex

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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.

We claim:

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

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whereby … processo… affected … or locati…

2. The arra… receiver comp… another.

3. The arra… receiver is ar…

4. The arra… arrangement … waves into th… said at least … transmitted by … objects.

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

6. The arrangement of claim 1, wherein said trained 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.

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and patterns of received waves from the
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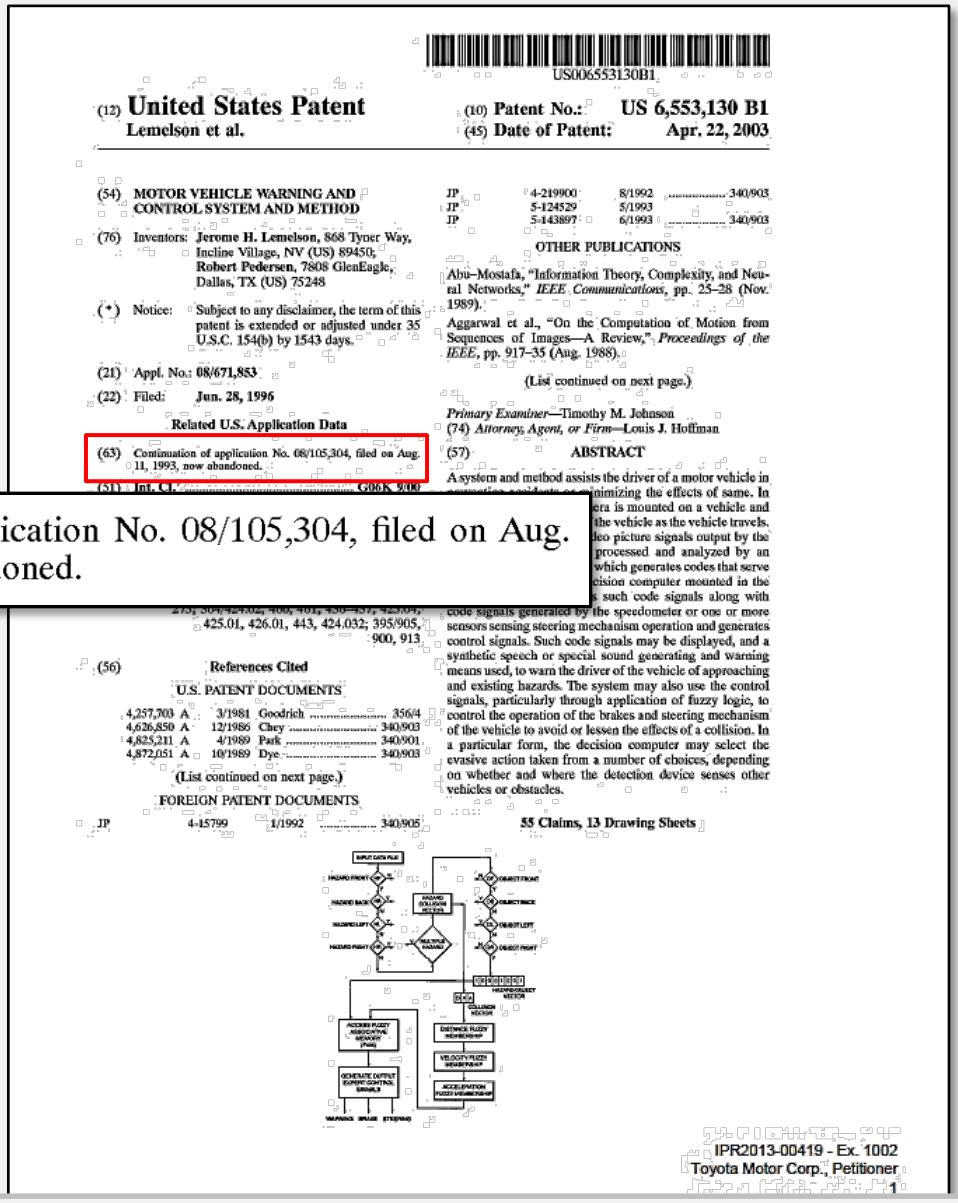
U.S. Patent No. 6,553,130 to Lemelson



US006553130B1

(12) **United States Patent**
Lemelson et al.

(10) **Patent No.: US 6,553,130 B1**
(45) **Date of Patent: Apr. 22, 2003**

(54) **MOTOR VEHICLE WARNING AND CONTROL SYSTEM AND METHOD**

(76) Inventors: **Jerome H. Lemelson**, 868 Tyner Way, Incline Village, NV (US) 89450; **Robert Pedersen**, 7808 GlenEagle, Dallas, TX (US) 75248

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1543 days.

(21) Appl. No.: **08/671,853**

(22) Filed: **Jun. 28, 1996**

Related U.S. Application Data

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

(51) Int. Cl. G06K 9/00

425.01, 426.01, 443, 424.032; 395/905, 900, 913

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

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(List continued on next page.)

Primary Examiner—Timothy M. Johnson
(74) *Attorney, Agent, or Firm*—Louis J. Hoffman

(57) **ABSTRACT**

A system and method assists the driver of a motor vehicle in ... minimizing the effects of same. In ... era is mounted on a vehicle and ... the vehicle as the vehicle travels. ... deo picture signals output by the ... processed and analyzed by an ... which generates codes that serve ... cision computer mounted in the ... such code signals along with code signals generated by the speedometer or one or more sensors sensing steering mechanism operation and generates control signals. Such code signals may be displayed, and a synthetic speech or special sound generating and warning means used, to warn the driver of the vehicle of approaching and existing hazards. The system may also use the control signals, particularly through application of fuzzy logic, to control the operation of the brakes and steering mechanism of the vehicle to avoid or lessen the effects of a collision. In a particular form, the decision computer may select the evasive action taken from a number of choices, depending on whether and where the detection device senses other vehicles or obstacles.

55 Claims, 13 Drawing Sheets

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