FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

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The Patent Rules, 2003

COMPLETE SPECIFICATION

(See sections 10 & rule 13)

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1. **TITLE OF THE INVENTION**

PARKING SYSTEM

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2. **APPLICANT (S)**

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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.

TECHNICAL FIELD

[0001] The present disclosure relates to a parking system for vehicles that provides real-time information on available parking spaces.

BACKGROUND

[0002] Background description includes information that may be useful in understanding the present disclosure. It is not an admission that any of the information provided herein is prior art or relevant to the presently claimed disclosure, or that any publication specifically or implicitly referenced is prior art.

[0003] The field of smart parking systems has witnessed remarkable advancements over the years, driven by the need to alleviate the perennial challenge of urban parking congestion. These systems leverage a variety of technologies to offer real-time parking availability information to users, transforming the parking experience from one marked by frustration and inefficiency into a seamless and convenient endeavor.

[0004] Sensor-based systems, one of the pioneering technologies in smart parking, employ ultrasonic, infrared, magnetic, or other types of sensors strategically placed in individual parking spaces. These sensors detect the presence of vehicles and transmit this data to a central server, which then updates parking availability information in real-time. While sensor-based systems are effective, they do pose certain limitations. Environmental factors such as adverse weather conditions or dirt can compromise their accuracy, leading to occasional false readings.

[0005] Camera-based systems, on the other hand, harness the power of image processing and computer vision to analyze images or video feeds from cameras strategically positioned in parking areas. These systems can discern empty and occupied parking spaces with a high degree of accuracy. However, they are not without challenges, as varying lighting conditions and visual obstructions can impact their reliability.

[0006] Mobile apps equipped with GPS technology have also made significant inroads in the realm of smart parking. These apps allow users to locate

available parking spaces using GPS and real-time data from parking lots, often providing intuitive maps displaying the locations of open spots. Nevertheless, some of these apps may lack user-friendly interfaces or real-time updates, potentially causing user frustration.

[0007]	Wireless communication technologies such as LoRa (Long Range) and NB-IoT (Narrowband IoT) have emerged as critical enablers of smart parking systems, facilitating the transmission of parking data from sensors to central servers over long distances with minimal power consumption. However, their scalability and effectiveness can be constrained by factors like communication range and cost-effectiveness.

[0008]	There is, therefore, a need to overcome the above drawback, limitations, and shortcomings associated with the existing techniques, and provide a solution for effectively providing real-time information on available parking spaces and navigation for users to the available parking spaces.

OBJECTS OF THE PRESENT DISCLOSURE

[0009]	Some of the objects of the present disclosure, which at least one embodiment herein satisfies are as listed herein below.

[0010]	An object of the present disclosure is to provide a parking system that effectively monitors and provide real-time information regarding the occupancy status of parking spaces within the area.

[0011]	An object of the present disclosure is to provide a parking system that incorporates navigation capabilities to guide users to available parking spaces based on real-time occupancy data.

[0012]	An object of the present disclosure is to provide a parking system for users with a visual representation of parking space availability through maps displayed on computing devices.

SUMMARY

[0013]	Various aspects of present disclosure relate to a parking system for vehicles that provides real-time information on available parking spaces.

[0014]   According to an aspect of the present disclosure a parking system is disclosed that includes one or more sensors and a control unit. The one or more sensos may be configured to detect presence of one or more vehicles in an area of interest. The control unit may be coupled to the one or more sensors and may be configured to monitor the area of interest for detection of the one or more vehicles through the one or more sensors and receive a set of information on detection of the one or more vehicles in the area of interest from the one or more sensors. The control unit may be further configured to send the received set of information from the one or more sensors to a server and display the received set of information pertaining to detection of the one or more vehicles in the area of interest for one or more users through one or more computing devices.

[0015]   In an aspect, the control unit may be further configured to provide a set of navigation instructions to guide the one or more users to an available parking space based on the received set of information.

[0016]   Various objects, features, aspects, and advantages of the inventive subject matter will become more apparent from the following detailed description of preferred embodiments, along with the accompanying drawing figures in which like numerals represent like components.

BRIEF DESCRIPTION OF DRAWINGS

[0017]   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.

[0018]   In the figures, similar components, and/or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label with a second label that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label.

4

[0019]   FIG. 1 illustrates an exemplary block diagram of the proposed parking system, in accordance with an embodiment of the present disclosure.

[0020]   FIG. 2 illustrates an exemplary functional components of a control unit, in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0021]   The following is a detailed description of embodiments of the disclosure depicted in the accompanying drawings. The embodiments are in such detail as to clearly 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.

[0022]   In the following description, numerous specific details are set forth in order to provide a thorough understanding of embodiments of the present invention. It will be apparent to one skilled in the art that embodiments of the present invention may be practiced without some of these specific details. Embodiments of this disclosure relates generally to field of truck systems and more specifically relates to a truck overloading detection system with real-time monitoring and response action.

[0023]   If the specification states a component or feature "may", "can", "could", or "might" be included or have a characteristic, that particular component or feature is not required to be included or have the characteristic.

[0024]   As used in the description herein and throughout the claims that follow, the meaning of "a," "an," and "the" includes plural reference unless the context clearly dictates otherwise. Also, as used in the description herein, the meaning of "in" includes "in" and "on" unless the context clearly dictates otherwise.

[0025]   FIG. 1 illustrates an exemplary block diagram of the proposed parking system, in accordance with an embodiment of the present disclosure.

[0026]   Referring to FIG. 1, a parking system 100 (hereinafter referred to as

system 100) is disclosed. The system 100 may include one or more sensors 102 and a control unit 104 coupled to the one or more sensors 102. The one or more sensors 102 may be configured to detect presence of one or more vehicles in an area of interest. The control unit 104 may be configured to monitor the area of interest for detection of the one or more vehicles through the one or more sensors 102 and receive a set of information on detection of the one or more vehicles in the area of interest from the one or more sensors 102. The control unit 102 may be further configured to send the received set of information from the one or more sensors 102 to a server 106 and display the received set of information pertaining to detection of the one or more vehicles in the area of interest for one or more users 110 through one or more computing devices 112. The

[0027]   In an exemplary embodiment, a server may be an application server, database server, media server, that may include, but is not limited, to any or a combination of the servers known in the art.

[0028]   In an embodiment, the one or more sensors 102 may be selected from a group including an ultrasonic sensor, a magnetic sensor and an infrared sensor. The one or more sensors 102 may detect the presence or absence of the one or more vehicles by measuring parameters such as distance, magnetic field and infrared radiation. In an exemplary embodiment, an ultrasonic sensor may measure the distance to a vehicle from a parking space using ultrasonic sound waves, the sensor may use a transducer to send and receive ultrasonic pulses to relay back information about proximity of a vehicle. In an exemplary embodiment, a magnetic sensor may measure the change in the ambient magnetic field and when a vehicle alter the magnetic field, the sensor detect the changes. In an exemplary embodiment, the infrared sensor may detect movement and measure the heat of a vehicle by detection of infrared radiation in the environment, once the light hits the vehicle it is reflected back to the sensor.

[0029]   In an embodiment, the received set of information on detection of the one or more vehicles in the area of interest may include an information indicating the occupancy status of parking spaces in the area of interest.

[0030]   In an embodiment, the control unit 104 may be further configured to

provide a set of navigation instructions to guide the one or more users 110 to an available parking space based on the received set of information. In an exemplary embodiment, a control unit 104 may be a Node microcontroller, but is not limited, to any or a combination of the one or more processor technologies known in the art. The server 106 may generate turn-by-turn navigation instructions, guiding users to the selected parking space using the shortest route.

[0031]   In an embodiment, the control unit 104 may be further configured to transmit alerts to the one or more users 110 through one or more computing devices 112 on availability of parking spaces in the area of interest. The one or more computing devices 112 may be connected to the control unit 102 and the processing unit 104 through a network 116. The computing devices 112 may be a smartphone, tablet computer, personal digital assistant, laptop, portable media device, or the like. Moreover, the computing devices 112 may include any web client or application that facilitates communication and interaction.

[0032]   Examples of the network 108 may include, but are not limited to, a Wireless Fidelity (Wi-Fi) network, a Wide Area Network (WAN), a Local Area Network (LAN), or a Metropolitan Area Network (MAN). Various devices in the system 100 can connect to the network in accordance with the various wired and wireless communication protocols such as Transmission Control Protocol and Internet Protocol (TCP/IP), User Datagram Protocol (UDP), and 2G, 3G, and 4G communication protocols.

[0033]   In an embodiment, the one or more computing devices 112 may be further configured to display a map indicating available and occupied parking spaces in the area of interest. The map may display the available parking spaces with green color and the occupied park spaces with red color. The one or more users 110 may select the available parking spaces on the map for parking the one or more vehicles.

[0034]   In an embodiment, the control unit 104 may be further configured to determine location of the one or more users 110 through a Global Positioning System (GPS).

[0035]   FIG. 2 illustrates an exemplary functional components of a control

unit, in accordance with an embodiment of the present disclosure.

[0036]   Referring to FIG. 2, exemplary functional components of the control unit is disclosed. The control unit 104 includes one or more processors 202, a memory 204, and an interface(s) 206. The interface(s) 206 may comprise a variety of interfaces, for example, interfaces for data input and output devices referred to as I/O devices, storage devices, and the like. The interface(s) 206 facilitates communication with various devices coupled to the user device. The interface(s) 206 also provides a communication pathway for one or more components of the control unit 104. Examples of such components comprise, but are not limited to, processing engine(s) and database. Interface 206 comprises a platform for communication with the devices/servers to read real-time data /write data in the system 100. The interfaces 206 allows user to feed inputs, to type/write/ upload the data, and other software and hardware interfaces, for example, interfaces for peripheral device(s), such as a keyboard, a mouse, an external memory, and a printer.

[0037]   In an embodiment, the processing engine(s) 208 are implemented as a combination of hardware and programming (for example, programmable instructions) to implement one or more functionalities of the processing engine(s) 208. In the examples described herein, such combinations of hardware and programming may be implemented in several different ways. For example, the programming for the processing engine(s) 208 are processor-executable instructions stored on a non-transitory machine-readable storage medium, and the hardware for the processing engine(s) comprises a processing resource (for example, one or more processors), to execute such instructions. In the present examples, the machine-readable storage medium stores instructions that, when executed by the processing resource, implement the processing engine(s). In other examples, the processing engine(s) 208 is implemented by electronic circuitry. The processing engine 208 includes a database 210 data that is either stored or generated as a result of functionalities implemented by any of the components of the processing engine(s).

[0038]   In an embodiment, the processing engine(s) 208 may include a data

monitoring unit 212, a data receiving unit 214 and other units (s) 216, but not limited to the likes. The other unit(s) 216 implements functionalities that supplement applications or functions performed by the control unit 102 and control unit 104 or the processing engine(s) 208. The database 210 serves, amongst other things, as a repository for storing data processed, received, and generated by one or more of the engines.

[0039] In an embodiment, the data monitoring unit 212 may monitor the area of interest for detection of the one or more vehicles through the one or more sensors 102. The one or more sensors 102 may be selected from a group including an ultrasonic sensor, a magnetic sensor and an infrared sensor.

[0040] In an embodiment, the data receiving unit 214 may receive a set of information on detection of the one or more vehicles in the area of interest from the one or more sensors 102 and send the received set of information from the one or more sensors 102 to a server 106 through a network 108. The received set of information on detection of the one or more vehicles in the area of interest may include an information indicating the occupancy status of parking spaces in the area of interest.

[0041] Above embodiments disclose a parking system. The system may include one or more sensors to detect presence of one or more vehicles in an area of interest. The control unit may be coupled to the one or more sensors and monitor the area of interest for detection of the one or more vehicles through the one or more sensors and receive a set of information on detection of the one or more vehicles in the area of interest from the one or more sensors. The control unit may further send the received set of information from the one or more sensors to a server through a network and display the received set of information pertaining to detection of the one or more vehicles in the area of interest for one or more users through one or more computing devices.

[0042] Moreover, in interpreting the specification, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "comprises" and "comprising" should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating

that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced. Where the specification claims refer to at least one of something selected from the group consisting of A, B, C….and N, the text should be interpreted as requiring only one element from the group, not A plus N, or B plus N, etc.

[0043]   While the foregoing describes various embodiments of the invention, other and 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 comprised to enable a person having ordinary skill in the art to make and use the invention when combined with information and knowledge available to those having ordinary skill in the art.

ADVANTAGES OF THE INVENTION

[0044]   The present disclosure provides a parking system with incorporation of one or more sensors to ensure efficient and versatile detection of vehicle presence within the parking area of interest. This leads to accurate real-time monitoring of parking space occupancy.

[0045]   The present disclosure provides a parking system with navigation instructions based on real-time occupancy data to guide user to available parking spaces efficiently.

[0046]   The present disclosure provides a parking system with the inclusion of maps on computing devices displaying available and occupied parking spaces offers a visual representation of parking conditions for users.

We Claim:

1. A parking system (100), said system (100) comprising:

   one or more sensors (102) configured to detect presence of one or more vehicles in an area of interest;

   a control unit (104) coupled to the one or more sensors (102) and configured to execute a set of instructions, wherein said set of instructions comprising:

   monitor the area of interest for detection of the one or more vehicles through the one or more sensors (102);

   receive a set of information on detection of the one or more vehicles in the area of interest from the one or more sensors (102);

   send the received set of information from the one or more sensors (102) to a server (106); and

   display the received set of information pertaining to detection of the one or more vehicles in the area of interest for one or more users (110) through one or more computing devices (112).

2. The system (100) as claimed in claim 1, wherein the one or more sensors (102) are selected from a group comprising an ultrasonic sensor, a magnetic sensor and an infrared sensor.

3. The system (100) as claimed in claim 1, wherein the received set of information on detection of the one or more vehicles in the area of interest comprises an information indicating the occupancy status of parking spaces in the area of interest.

4. The system (100) as claimed in claim 1, wherein the control unit (104) is further configured to provide a set of navigation instructions to guide the one or more users (110) to an available parking space based on the received set of information.

11

5. The system (100) as claimed in claim 1, wherein the control unit (104) is further configured to transmit alerts to the one or more users (110) through the one or more computing devices (112) on availability of parking spaces in the area of interest.

6. The system (100) as claimed in claim 1, wherein the one or more computing devices (112) are further configured to display a map indicating available and occupied parking spaces in the area of interest.

7. The system (100) as claimed in claim 1, wherein the control unit (104) is further configured to determine location of the one or more users (110) through a Global Positioning System (GPS).

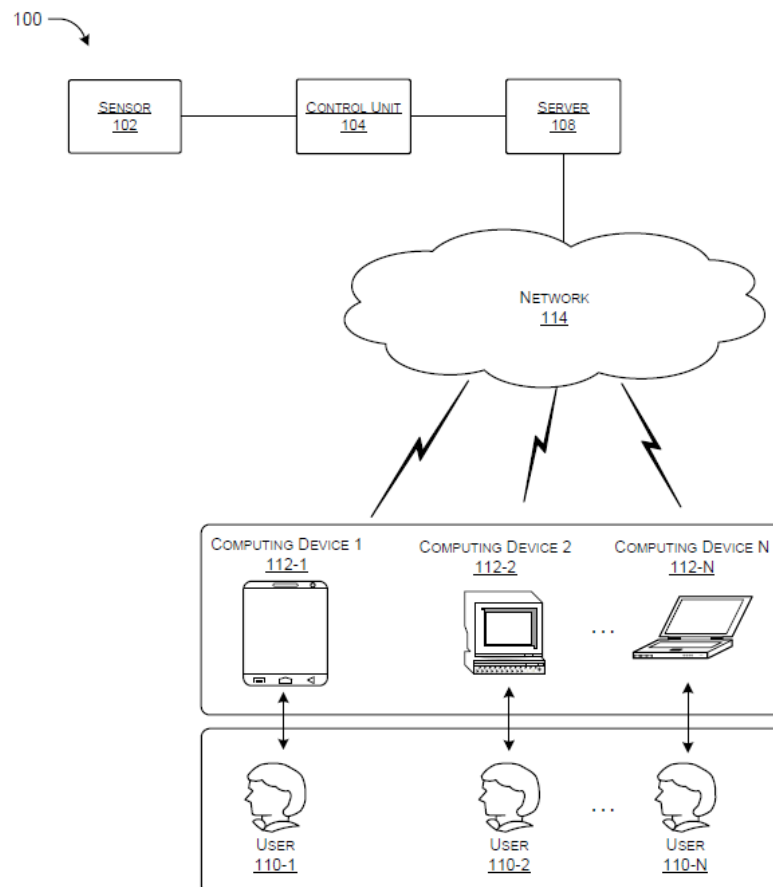**For Panipat Institute of Engineering and Technology**

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ABSTRACT

PARKING SYSTEM

A parking system is disclosed. The system comprises one or more sensors (102)
configured to detect presence of one or more vehicles in an area of interest and a
control unit (104) coupled to the one or more sensors (102). The control unit (104)
monitors the area of interest for detection of the one or more vehicles through the
one or more sensors, receive a set of information on detection of the one or more
vehicles in the area of interest from the one or more sensors (102), send the received
set of information from the one or more sensors (102) to a server (106) through a
network (108) and display the received set of information pertaining to detection of
the one or more vehicles in the area of interest for one or more users (110) through
one or more computing devices (112).

FIG. 1

13