FORM 2

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COMPLETE SPECIFICATION
(See section 10 and rule 13)

Title of Invention:

AUTONOMOUS APPARATUS TO OPERATE ELEVATOR

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

FIELD OF INVENTION

[0001] The present invention is generally related to an autonomous apparatus to operate an elevator.

BACKGROUND OF INVENTION

[0002] The subject matter discussed in the background section should not be assumed to be prior art merely as a result of its mention in the background section. Similarly, a problem mentioned in the background section or associated with the subject matter of the background section should not be assumed to have been previously recognized in the prior art. The subject matter in the background section merely represents different approaches, which in-and-of-themselves may also be inventions.

[0003] Typically, elevators have a control panel for entering control information. The control panel includes various keys assigned to each floor. The user presses the key corresponding to the floor he/she wishes the elevator to move to. The elevator then moves to the respective floor. However, the physical touches to the keysmay cause the spread ofinfectious viruses such as COVID-19 or coronavirus.A person can get COVID-19 by touching a surface of the control panel of the elevator that has the virus on it and then touching his/her mouth, nose, or eyes. Further, it is a possibility that someone who contains this virus touches the elevator buttons, and then there will be high chances of getting infected.

[0004] US patent publication US20130220740A1 titled, “Voice Recognition Apparatus For Elevator and Its Control Method” uses a technique that can control or operate elevator functions by voice recognition function. The US20130220740A1 talks about the elevator operations by using voice recognition apparatus by exchanging a hall call part (i.e. outside elevator buttons panel which is used to get the elevator at the current floor) and an operation panel (i.e. inside elevator buttons panel which is used to take

the elevator to the desired floor number). Thus the US20130220740A1 deals with the internal operations of the elevator i.e. to change the elevator algorithm by implementing voice recognition apparatus which is not feasible with elevators installed in the old dwelling and this system is costly because to implement this invention we need to change the internal operating systems.

[0005] Chinese patent application CN105704453A titled, “Raspberry Pi-based power grid equipment video monitoring device” a system mounted near the power grid equipment and their departments can accurately know about the appearance state of power grid equipment in real-time by video monitoring. The system disclosed inCN105704453A is not controlled by the human voice but only a kind of video monitoring apparatus.

[0006] US patent publication US20150278889A1 titled, “Guide robot for shopping guiding system and method” discloses a system that interacts with the customers and providesassistance to them and also guide them to improve their quality of shopping experience. The system disclosed in US20150278889A1 is not dealing with the group of people only dealing with the individuals and assists them.

[0007] US patent US8738739B2 titled, “Automatic message selection with a Chabot” talks about a system to use information gathered by a chatbot system which includes an explanation of why a customer is terminating the transactions. This invention is not controlled by the human voice but only to gather information about the terminated transactions by the customers and the use that information to automatically pick messaging and advertisements.

[0008] A non-patent literature document titled, “An Assistive System for Visually Impaired using Raspberry Pi” published in 2019 describes the concept of the reading machine (OCR), act as a virtual assistant for reading the document and home automation.

[0009] Another non-patent literature document titled, “Agrivigilance: A Security System For Intrusion Detection In Agriculture Using Raspberry Pi And Opencv” published in 2019 describes the concept of an image processing module in which image is identified by this module.

[0010] However, none of the existing systems and methods are effectively and accurately able to perform a contactless operation of the elevator by using an autonomous apparatus installed in proximity of a control panel placed inside and outside of the elevator.

[0011] Therefore there is a need for a contactless, and efficient autonomous apparatus to operate an elevator.

[0012] Thus, in view of the above, there is a long-felt need in the industry to address the aforementioned deficiencies and inadequacies.

[0013] Further limitations and disadvantages of conventional and traditional approaches 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 regarding the drawings. In some embodiment, the numbers expressing quantities or dimensions of items, and so forth, used to describe and claim certain embodiment of the invention are to be understood as being modified in some instances by the term “about.”

[0014] Accordingly, in some embodiment, the numerical parameters outlined in the written description and attached claims are approximations that can vary depending upon the desired properties sought to be obtained by a particular embodiment. In some embodiment, the numerical parameters should be construed in light of the number of reported significant digits and by applying ordinary rounding techniques. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of some embodiment of the invention are approximations,

the numerical values outlined in the specific examples are reported as precisely as practicable. The numerical values presented in some embodiment of the invention may contain certain errors necessarily resulting from the standard deviation found in their respective testing measurements. 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 dictates otherwise. Also, as used in the description herein, the meaning of “in” includes “in” and “on” unless the context dictates otherwise. The recitation of ranges of values herein is merely intended to serve as a shorthand method of referring individually to each separate value falling within the range. Unless otherwise indicated herein, each value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any examples, or exemplary language (e.g. “such as”) provided with respect to a certain embodiment herein is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention otherwise claimed. No language in the specification should be construed as indicating any non-claimed element essential to the practice of the invention.

[0015] Groupings of alternative elements or embodiment of the invention disclosed herein are not to be construed as limitations. Each group member can be referred to and claimed individually or in any 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 herein deemed to contain the group as modified thus fulfilling the written description of all groups used in the appended claims.

SUMMARY OF THE INVENTION

[0016] An autonomous apparatus to operate an elevatoris provided substantially, as shown in and/or described in connection with at least one of the figures.

[0017] An aspect of the present disclosure relates to an autonomous apparatus to operate an elevator that includes a microphone, a command recognition unit, a computational control unit, an audio unit, a visual unit, a plurality of actuation units, a power source, and a casing. The microphone is configured to receive a voice command from a user. The command recognition unit is operable to recognize the voice command of the user. The computational control unit processes the voice command of the user using an inbuilt register of the command recognition unit. The audio unit is a speaker that is operable to output a confirmation speech message in response to the voice command recognized by the command recognition unit. The computational control unit initiates a command signal pertaining to a button pressing mechanism. The visual unit is a camera to perform a visual search on a control panel of the elevator based on the command signal received from the computational control unit. Theactuation unitspress any of the buttons on the elevator control panel based on the button pressing mechanism. The power source supplies power to the microphone, the command recognition unit, the computational control unit, the audio unit, the visual unit, and the plurality of actuation units. The casing houses the microphone, the command recognition unit, the computational control unit, the visual unit, and the plurality of actuation units.

[0018] In an aspect, the actuation units comprising a plurality of stepper motors to perform a vertical movement and a horizontal movement.

[0019] In an aspect, the actuation units comprising a servo motor configured to press the button of the elevator.

[0020] In an aspect, the power source comprising an external power source electrically connected to a power system of the elevator, and a battery.

[0021] In an aspect, the casing is placed on the control panel of the elevator.

[0022] In an aspect, the voice command is pertaining to one or more floor numbers of a building.

[0023] In an aspect, the computational control unit matches the floor number received from the microphone with the floor number recognized by the visual unit.

[0024] In an aspect, the visual unit utilizes an image processing algorithm to recognize the floor number based on the voice command of the user.In an aspect, the visual unit is aPiCam to identify the buttons and pressing these buttons with the help of the plurality of actuation units.

[0025] Accordingly, one advantage of the present invention is that it isa human voice-controlled robot that can be installed inside and outside the elevator to operate the elevator buttons.

[0026] Accordingly, one advantage of the present invention is that it communicates with aplurality of users and announces various pre-stored messagessuch as to maintain social distancing, wear a mask, not to touch buttons in the elevator,andkeep the elevator clean to stop the spread of viruses (e.g. COVID) among elevator users.

[0027] Accordingly, one advantage of the present invention is that it operates the buttons of the elevator by theplurality of actuation unitstoeliminate the manual contact with the buttons to stop the spread of viruses (e.g. COVID) among the users of the elevator.

[0028] Accordingly, one advantage of the present invention is that it can be applied in variouselevators which are installed in industries, schools/colleges, malls, hospitals, airports, etc. to reduce manual contact with the elevator buttons.

[0029] Accordingly, one advantage of the present invention is that itis economical, portable, and compact along with low operating power.

[0030] Accordingly, one advantage of the present invention is that it preventsthe spread of surface adhering viruses such as COVID and will play an integral role in enhancing safety measurements in organizations.

[0031] Accordingly, one advantage of the present invention is that ituses advanced visual search techniques and a highly precise actuator button pressing systemthat can be embedded externally in an elevator or lift to allow reliability of operation.

[0032] Accordingly, one advantage of the present invention is that itallows audio feedback as per the user'svoice command thus ensures correct execution of the voice command.

[0033] These features and advantages of the present disclosure may be appreciated by reviewing the following description of the present disclosure, along with the accompanying figures wherein like reference numerals refer to like parts.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] The accompanying drawings illustrate the embodiment of systems, methods, and other aspects of the disclosure. Any person with ordinary skills in the art will appreciate that the illustrated element boundaries (e.g., boxes, groups of boxes, or other shapes) in the figures represent an example of the boundaries. In some examples, one element may be

designed as multiple elements, or multiple elements may be designed as one element. In some examples, an element shown as an internal component of one element may be implemented as an external component in another and vice versa. Furthermore, the elements may not be drawn to scale.

[0035] Various embodiment will hereinafter be described in accordance with the appended drawings, which are provided to illustrate, not limit, the scope, wherein similar designations denote similar elements, and in which:

[0036] FIG. 1 illustrates an implementation view of an autonomous apparatus to operate an elevator, in accordance with an embodiment of the present subject matter.

[0037] FIG. 2 illustrates a block diagram of the various components of the present autonomous apparatus to operate an elevator, in accordance with at least one embodiment.

[0038] FIG. 3 illustrates a schematic view of the plurality of actuation units, in accordance with at least one embodiment.

[0039] FIG. 4 illustrates a flow diagram of the present autonomous apparatus to operate an elevator, according to an embodiment of the present invention.

[0040] FIG. 5 illustrates an implementation flow diagram of the present autonomous apparatus to operate an elevator, according to an embodiment of the present invention.

[0041] FIG. 6 illustrates a circuit diagram of the present autonomous apparatus to operate an elevator, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS HEREIN

[0042] The present disclosure is best understood with reference to the detailed figures and description set forth herein. Various embodiments have been discussed with reference to the figures. However, those skilled in the art will readily appreciate that the detailed descriptions provided herein with respect to the figures are merely for explanatory purposes, as the methods and systems may extend beyond the described embodiments. For instance, the teachings presented and the needs of a particular application may yield multiple alternative and suitable approaches to implement the functionality of any detail described herein. Therefore, any approach may extend beyond certain implementation choices in the following embodiments.

[0043] References to “one embodiment,” “at least one embodiment,” “an embodiment,” “one example,” “an example,” “for example,” and so on indicate that the embodiment(s) or example(s) may include a particular feature, structure, characteristic, property, element, or limitation but that not every embodiment or example necessarily includes that particular feature, structure, characteristic, property, element, or limitation. Further, repeated use of the phrase “in an embodiment” does not necessarily refer to the same embodiment.

[0044] Methods of the present invention may be implemented by performing or completing manually, automatically, or a combination thereof, selected steps or tasks. The term “method” refers to manners, means, techniques and procedures for accomplishing a given task including, but not limited to, those manners, means, techniques, and procedures either known to or readily developed from known manners, means, techniques and procedures by practitioners of the art to which the invention belongs. The descriptions, examples, methods, and materials presented in the claims and the specification are not to be construed as

limiting but rather as illustrative only. Those skilled in the art will envision many other possible variations within the scope of the technology described herein.

[0045] FIG. 1 illustrates an implementation view 100 of an autonomous apparatus 102 to operate an elevator 104, in accordance with an embodiment of the present subject matter. According to an embodiment, the autonomous apparatus 102 is integrated with a door 106 of the elevator104 of a building.FIG. 2 illustrates a block diagram 200 of the various components of the present autonomous apparatus to operate an elevator 104, in accordance with at least one embodiment. FIG. 2 is explained in conjunction with FIG. 1. The autonomous apparatus 102 includes a microphone202, a command recognition unit 204, a computational control unit 206, an audio unit 208, a visual unit 210, a plurality of actuation units 212 and 110, a power source602 (shown in FIG. 6), a casing 108 and an operating system 214.

[0046] The microphone 202 is a USB microphone to receive a voice command from a user. In an embodiment, the voice command is pertaining to one or more floor numbers of a building. Further, the voice command is related to various pre-stored messages such as to maintain social distancing, wear a mask, not to touch buttons in the elevator, andkeep the elevator clean to stop the spread of viruses (e.g. COVID) among elevator users.

[0047] The command recognition unit 204 is operable to recognize the voice command of the user. The computational control unit 206 processes the voice command of the user using an inbuilt register of the command recognition unit 204.In an embodiment, the computational control unit 206 matches the floor number received from the microphone 202 with the floor number recognized by the visual unit 210.In an embodiment, the command recognition unit 204 and computational control unit 206 include

a memory to store voice command data. The memory can be a non-volatile memory or a volatile memory. Examples of non-volatile memory may include, but are not limited to flash memory, a Read Only Memory (ROM), a Programmable ROM (PROM), Erasable PROM (EPROM), and Electrically EPROM (EEPROM) memory. Examples of volatile memory may include but are not limited to Dynamic Random Access Memory (DRAM), and Static Random-Access memory (SRAM).In an embodiment, the command recognition unit 204 and computational control unit 206are connected with the operating system 214 that stores and executes a plurality of algorithmic instructions

[0048] The audio unit 208 is a speaker that is operable to output a confirmation speech message in response to the voice command recognized by the command recognition unit 204. The computational control unit 206 initiates a command signal pertaining to a button pressing mechanism.

[0049]The visual unit 210 is a camera to perform a visual search on a control panel of the elevator 104 based on the command signal received from the computational control unit 206.In an embodiment, the visual unit 210 utilizes an image processing algorithm to recognize the floor number based on the voice command of the user. In an embodiment, the visual unit 210 is a PiCam to identify the buttons and pressing these buttons with the help of the plurality of actuation units 212, and 110.

[0050] The plurality of actuation units 212 and 110 presses a button (shown as 1, 2, 3, 4, 5, 6, 7, 8, 9, 0) on the elevator control panel based on the button pressing mechanism. In an embodiment, the actuation units 212 and 110 comprising a plurality of stepper motors to perform a vertical movement (shown as 212) and a horizontal movement (shown as 110).In an embodiment, the actuation units212 and 110 comprising a servo motor 112 configured to press the button of the elevator.

[0051] The power source supplies power to the microphone 202, the command recognition unit 204, the computational control unit 206, the audio unit 208, the visual unit 210, and the plurality of actuation units 212 and 110.In an embodiment, the power source comprising an external power source electrically connected to a power system of the elevator 104, and a battery. The external power source can be 230 VAC and the battery can supply a 24 V DC battery supply.

[0052] The casing 108 houses the microphone 202, the command recognition unit 204, the computational control unit 206, the audio unit 208, the visual unit 210, and the plurality of actuation units 212 and 110.In an embodiment, the casing is placed on the control panel of the elevator.In an embodiment, the casing 108 is water-resistant and/or waterproof. The casing 108 can be made from metal or plastic, such as molded plastic. In some embodiments, the casing 108 is made from brushed nickel or aluminum. Rubber seals can be used to make the casing 108water-resistant or waterproof.

[0053] As used herein, and unless the context dictates otherwise, the term “configured to” or “coupled to” is intended to include both direct coupling (in which two elements that are coupled to each other contact each other) and indirect coupling (in which at least one additional element is located between the two elements). Therefore, the terms “configured to”, “configured with”, “coupled to” and “coupled with” are used synonymously. Within the context of this document terms “configured to”, “coupled to” and “coupled with” are also used euphemistically to mean “communicatively coupled with” over a network, where two or more devices can exchange data with each other over the network, possibly via one or more intermediary device.

[0054] It should be apparent to those skilled in the art that many more modifications besides those already described are possible without

departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the appended claims. Moreover, in interpreting both the specification and the claims, 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.

[0055] According to an embodiment herein, the autonomous apparatus is commercially named as “KRIS” to provide the command recognition unit to process on the human’s voice and search for requested floor button using image recognition through camera technology and initiate the actuator units to press the buttons in the elevator.

[0056] FIG. 3 illustrates a schematic view 300 of the plurality of actuation units, in accordance with at least one embodiment. The actuation units 212 and 110 include a stepper motor to perform a horizontal movement and a gear system to allow a vertical movement. The servo motor 112 allow pressing the button of the elevator. The actuation units consist of three degrees of freedom. Two linear axis x and z and one rotational along the y-axis. The actuation units allow the linear motion of the actuator units through stepper motors and desired gear systems to gain the linear movement and servo motor to gain rotational movements (for button pressing mechanism) in the mechanical structure.

[0057] FIG. 4 illustrates a flow diagram of the present autonomous apparatus to operate an elevator, according to an embodiment of the present invention. In operation, the autonomous apparatus is enabled by the computational control unit of the human voice control robot commercially named as “KRIS”. At step 402, the audio unitinitiates a

welcome message on detecting the presence of a person. At step 404, when a person enters the lift, the audio unit requests the person to initiate a voice command for the floor number i.e. floor 1, floor 2, etc. [0058] At step 406, the microphone receives he voice command from the user. The voice command is recognized by the command recognition unit integrated with the operating system 214. At step 408, a visual search is performed by the camera to allow the actuation units to press the right button on the elevator control panel. The interfacing between voice recognition, visual search, and initiation of actuation units is briefed as - the camera attached with the actuation units identify the image of the number spoken by the user, and once the number is identified it will be pressed by the actuation units. The input provided by the user will only be the floor number. This is done to complete the process faster and also to make the system easier. The camera used will be simply a raspberry-pi camera and there will be an image recognizing process that will go on once the voice processing is done. At step 410, the number once recognized is matched with the provided information and then it will be pressed by the actuation units and move towards the requested floor number. At step 410, the audio unit announces various pre-stored messages such as to maintain social distancing, wear a mask, not to touch buttons in the elevator, and keep the elevator clean to stop the spread of viruses (e.g. COVID) among elevator users.

[0059] In an embodiment, the visual search algorithm allows the camera to search the desired button on any elevator control panel. This will allow the mapping of button placement architecture on the lift control panel and initiate the actuation units to press button according to the verbal command by the user. In an embodiment, the actuation units allow 3 degrees of freedom thus allow easily maneuver in 2-D spacing and allow high accuracy in pressing the button as per verbal command by the user.

[0060] FIG. 5 illustrates an implementation flow diagram of the present autonomous apparatus to operate an elevator, according to an embodiment of the present invention. In an embodiment, the present autonomous apparatus implements a voice recognition mechanism in the audio unit to allow the users to set up command in the elevator verbally without manually triggering the elevator's button. The present autonomous apparatus acts as a voice control robotic actuator system commercially named as "KRIS" 504. At step 502, the user commands the present autonomous apparatus to get the elevator to the current floor. At step 506, the audio unit initiates a welcome message on detecting the presence of the person. At step 508, when a person enters the lift, the audio unit requests the person to initiate a voice command for the floor number i.e. floor 1, floor 2, etc. The microphone receives the voice command from the user. The voice command is recognized by the command recognition unit integrated with the operating system.

[0061] At step 510, a visual search is performed by the camera to allow the actuation units to press the right button on the elevator control panel. At step 512, the number once recognized is matched with the provided information and then it will be pressed by the actuation units and move towards the requested floor number. At step 514, the audio unit announces various pre-stored messages such as to maintain social distancing, wear a mask, not to touch buttons in the elevator, and keep the elevator clean to stop the spread of viruses (e.g. COVID) among elevator users.

[0062] FIG. 6 illustrates a circuit diagram 600 of the present autonomous apparatus to operate an elevator, according to an embodiment of the present invention. The circuit diagram depicts a microphone 202, a command recognition unit, a computational control unit, an audio unit 208, a visual unit 210, a plurality of actuation units 212 and 110, and a power source602.In operation, the users activate the robot by saying "KRIS".

After the activation of the robot, it will get ready to listens to voice commands by the elevator's users whether inside or outside of the elevator and they ask the robot to operate operations of the elevator accordingly. In case there are more persons enters the lift and gives voice commands to get to the desired floor, the robot (KRIS) will ask them to speak or gives the voice commands one by one because it is unable for the robot to perform operations in that scenario. After listening to the voice commands one by one then robot (KRIS) will perform the operations i.e. given voice commands by the users to get to the desired floor in increasing order.

[0063] Thus, the present autonomous apparatus is a human voice-controlled robot that can be installed inside and outside the elevator to operate the elevator buttons. Furthermore, the present autonomous apparatus operates the buttons of the elevator by the plurality of actuation units to eliminate the manual contact with the buttons to stop the spread of viruses (e.g. COVID) among the users of the elevator. The compactness and portability of the present autonomous apparatusallow it to be easily embedded in any elevators and allows autonomous functionally without customization at its installation stage.

[0064] The present autonomous apparatus acts as a voice control robotic actuator system for lift panels to allow autonomous pressing of lift button without being in manual contact of it thus the present autonomous apparatus plays an integral role in preventing the spread of surface adhering viruses. The present autonomous apparatus operates autonomously, as soon as a person enters the lift and give a voice command to get to the desired floor, the system revert with audio feedback to ensure correct execution of the operation. A smart operating system integrated with the computational control unit allows the processing of voice command of the user which further initiates the visual recognition search techniques. This visual search technique comes to play

through a camera embedded on the actuator system thus allow the actuator to follow the precise path for pressing the button on the lift panel. Hence, the present autonomous apparatus enhances the flexibility of operation without any human intervention. Thus, the present autonomous apparatus presents a technique to allow non-contact operation within the lift and serves in enhancing safety measurement from communicable viruses within an organization.

[0065] No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

[0066] It will be apparent to those skilled in the art that various modifications and variations can be made to the present invention without departing from the spirit and scope of the invention. There is no intention to limit the invention to the specific form or forms enclosed. On the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention, as defined in the appended claims. Thus, it is intended that the present invention cover the modifications and variations of this invention, provided they are within the scope of the appended claims and their equivalents.

CLAIMS:

We claim:

1. An autonomous apparatus (102) to operate an elevator (104), comprising:

a microphone (202)configured to receive a voice command from a user;

a command recognition unit (204)operable to recognize the voice command of the user;

a computational control unit (206)to process the voice command of the user using an inbuilt register of the command recognition unit(204);

an audio unit (208) operable to output a confirmation speech message in response to the voice command recognized by the command recognition unit (204), wherein the computational control unit (206)initiates a command signal pertaining to a button pressing mechanism;

a visual unit (210) configured to perform a visual search on a control panel of the elevator (104) based on the command signal received from the computational control unit (206); and

a plurality of actuation units (212 and 110) to press a button on the elevator control panel based on the button pressing mechanism.

2. The autonomous apparatus (102) according to claim 1, wherein the actuation units (212 and 110) comprising a plurality of stepper motors to perform a vertical movement and a horizontal movement.

3. The autonomous apparatus (102) according to claim 1, wherein the actuation units (212 and 110) comprising a servo motor configured to press the button of the elevator (104).

4. The autonomous apparatus (102) according to claim 1 comprises a power source (602)to supply power to the microphone, the command recognition unit, the computational control unit, the audio unit, the visual unit, and the plurality of actuation units.

5. The autonomous apparatus (102) according to claim 4, wherein the power source (602) comprising an external power source electrically connected to a power system of the elevator; and a battery.

6. The autonomous apparatus (102) according to claim 1, comprises a casing (108) to house the microphone (202), the command recognition unit(204), the computational control unit (206), the visual unit(210), and the plurality of actuation units(212 and 110).

7. The autonomous apparatus (102) according to claim 1, wherein the casing (108) is placed on the control panel of the elevator (104).

8. The autonomous apparatus (102) according to claim 1, wherein the voice command is pertaining to one or more floor numbers of a building.

9. The autonomous apparatus (102) according to claim 8, wherein the computational control unit (206) matches the floor number received from the microphone with the floor number recognized by the visual unit (210).

10. The autonomous apparatus (102) according to claim 1, wherein the visual unit (210) utilizes an image processing algorithm to recognize the floor number based on the voice command of the user.

Dated this 11/06/2020

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INPA 1407
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Digitally Signed

ABSTRACT

AUTONOMOUS APPARATUS TO OPERATE ELEVATOR

Disclosed is an autonomous apparatus (102) to operate an elevator (104)that includes a microphone (202), a command recognition unit(204), a computational control unit(206), an audio unit(208), a visual unit(210), and actuation units (212 and 110). The microphone (202) receives a voice command from a user. The command recognition unit (204) recognizes the voice command of the user. The computational control unit (206) processes the voice command of the user using an inbuilt register of the command recognition unit (204). The audio unit (208) outputs a confirmation speech message in response to the voice command recognized by the command recognition unit (204). The computational control unit (206) initiates a command signal pertaining to a button pressing mechanism. The visual unit (210) performs a visual search on a control panel of the elevator (104) based on the command signal received from the computational control unit (206). The actuation units (212 and 110) press a button on the elevator control panel based on the button pressing mechanism. **The most illustrative drawing: FIG. 1.**