**Proposal: Voice Recognition Car Door System**

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A Voice Recognition Car Door System allows for hands-free operation of car doors by voice activation. Using this system, a person carrying an item will be able to open their car door without having to juggle keys.

For example, when you are pushing a grocery cart, you can have the system open the back driver’s side door before you reach the car. You can place the items in your car as soon as you arrive since the door opens before you arrive. This system eliminates juggling for keys!

**Project Description**

This system will consist of three major subsystems. The system will be controlled by a mobile application. This app will have the ability to receive voice commands that trigger the opening of a car door. The app will also have the ability to be manually controlled with button presses. Besides voice recognition software, the app will collect historical actions and allow the user to set up their account.

Hardware is the second major subsystem. The hardware subsystem will consist of a microcontroller and Bluetooth transmitter/receiver. The microcontroller will receive inputs from the app through the Bluetooth receiver. The microcontroller will have several inputs and outputs that make the system work successfully and safely.

The third major component is the vehicle it’s self and the door actuator. The microcontroller will receive inputs from the vehicle showing if the vehicle’s parking brake engaged or disengaged, if the doors are locked or unlocked, and if the vehicle’s security system is engaged. If the parking brake is engaged then and only then can the system be enabled. The microcontroller will also have output signals that inform the app about the current state of the vehicle, a signal to disengage a security system, a signal to unlock the doors or selected door, and a signal to open the selected door. The doors will be opened with some sort of mechanism that opens a door.

**Similar Products**

**Denso International America Inc**

Denso International American incorporated patented a hands-free door opening system.  The complete system consists of a key fob, software, laser emitting motion sensor, and electric contacts. Signals are sent to the computer to verify the key fob matches the correct verification code in the car’s computer.  Upon completion of verification, the computer signals the lock to unlock.  Then a signal is sent to the door to unlatch, the spring in the door pushes the door open slightly.

**Product Offers:**

* Hands-free, need to place a foot under the door.
* Security verification
* Opens driver door only

Schematic of Denso International American incorporated patented a hands-free door opening system.

Diagram

Description automatically generated

**Nissan Hands-free sliding door**

Nissan hand-free sliding door operators in a similar way as Denso International American incorporated does.  The operator has a key fob, the vehicle has two motion sensors, and a computer to activate the operation.  The software receives the signal from the motion sensor, verifies the key fob matches the vehicle, and sends a signal to unlock the door.  Once unlocked the software sends a signal to the motor of the door and the motor opens the sliding door.

**Product offers**

* Hand-free, one foot must go under the car.
* Security verification
* Opens driver or passenger side sliding door. The operation depends on what side the operator is standing on.

**Deliverables**

* USB connected hardware to the microprocessor for initial programming. Will be disconnected once programmed.
* Bluetooth connection between the App and Microprocessor.
* Complete documentation for the entire project.
* Final working model.

**Work Citied**

**The competitor’s research was completed in a class from last semester by Micheal Hatch!**

Kurpinski, C. M., McBride, J. P., Aoyama, K., Keeling, T. J., Wiegand, M. A.,

Chiba, T., & Uesaka, H. (n.d.). Hands-free vehicle door opener.

Denso International America Inc

Retrieved March 8, 2022, from

<https://patents.google.com/patent/US7688179B2/en>

“Nissan Rogue Owners Manual: Operating the Power Liftgate (If so Equipped).” *Nissan Rogue Manuals*, https://www.nirogue.com/operating\_the\_power\_liftgate\_if\_so\_equipped\_-94.html.