**Project Synopsis**

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| ***Student & Supervisor Details*** | | |
| Name of Student: | **SAJAL MANNA** | |
| Roll Number: | **231220049** | |
| Course (Branch), Semester: | **B.Tech. (ECE)- 2nd Semester** | **Project Code- ECPB-151** |
| Supervisor’s Name: | **Dr. Nitin Singh Sinha** | |
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| ***Project Details*** | | |
| **Title of the Project:** | **Gesture Controlled Car** | |
| **Base Paper (Main Reference Paper):** | Shukla *et al* [15 November, 2019], worked on hand gesture recognition technology and incorporating it with car | |
| **Brief Introduction:** | An Electronic car consists of an electro-mechanical system that can be executed by an Arduino program. Electric cars can be autonomous or semi-autonomous. In industries, autonomous electric cars are mostly used because of their high speed and great accuracy. But in some applications semi-autonomous electronic car is needed which can be controlled by human. Some other control systems i.e., voice control, touch and motion controls are widely used.  One of the most implemented motion-controlled systems is a Hand Gesture Controlled Electronic device which works via skeletal hand tracking. In this project, a hand gesture controlled electronic car is made by using ADXL335 (3-axis Accelerometer) and is controlled by Arduino Nano. In this project, the action of the hand is used to console the stream of the electronic car in particular direction and also the speed instead of using remote control. The project is fully based on wireless communication. Using the RF link, a gesture of hand is passed on to the electric car. The project has two parts: receiver and transmitter. | |
| **Motivation of Project:** | This project is inspired from upcoming technologies which use hand gesture techniques such as Xbox Kinect console, uses VR/AR hardware and hand-controlled radio system in cars such as BMW 7 Series. This is a leading technology which captures  the hand movement. In future this technology will also be used in medical practices such as surgeries, scanning, radiology etc. This technology will also help in driving assistance and can be integrated with existing ADAS technology.  The main need of this tech was noticed during Covid-19 era which required use of telemedicine or contact-less medication. | |
| **Related Work (Literature Review with reference) :** | **Gesture Recognition Companies:**  **iProov**  Patented Flash mark technology flashes a sequence of colours illuminating the face and starting our unique, world leading face recognition.  **Toposens**  Toposens developed the first 3D sensor system based on ultrasound worldwide. Hardware components are combined with sophisticated algorithms, enabling localization of objects and people in real-time via the principle of echolocation.  **Version**  Software to understand real-time gestures using deep learning recognition algorithms, to automatically detect shoplifting behaviours. | |
| **Research Gap:** | Some of the most critical problems in this field are heavy occlusion, limited resolution, different lighting conditions, hand deformity, diverse hand gestures, and complicated interactions between hands and objects or other hands. | |
| **Objective:** | **The Objectives Of Gesture Control Car:--**   * The aim of the project is to develop a human machine interface used for gesture control cars. * Our objective is to make this device simple as well as cheap so it can be produced and used for a number of purposes. * Because of use of sensors in IoT devices the required output is given in a good speed with great accuracy * It can also be helpful in military equipment which can be operated with hand gestures and can improve accuracy and reduce casualty. * In this project the user is also able to control motions of the car by wearing a controller glove and performing predefined gestures. * IoT facilitates the communication between humans and machine. | |
| **Tentative Work Plan/Methodology:** | 1. We will research on the topic via research papers, YouTube, google and existing technologies. 2. Then we will make a list of all components needed for the project and arrange them via online or offline mode. 3. Once the components are arranged, we will design the prototype and make circuit connections. 4. The prototype will be tested and necessary work will be done to make some changes if required.   **COMPONENT REQUIRED:**   * Arduino Nano * RF Nano * NRF24L01 + RF Module * L298N Motor Driver * TT Gear Motor * Rubber Wheels * 189650 li-ion battery and battery holder * Screw Terminal * Custom PCB * .5mm Acrylic Sheet   **Diagram:**    **As you can see the two diagrams in the above picture. One is for the transmitter and another is for the receiver. make these both circuits separately.**  **Case Diagram:**  **A use case diagram is a graphical depiction of a user's possible interactions with a system.** | |
| **References (In IEEE format)** | [1] DIY Builder(2019, December 9), *How To Make DIY Arduino Gesture Control Robot At Home*[Online], Available: <https://www.youtube.com/watch?v=svJwmjplm4c>  [2] Project Hub(2021,August 26), *Hand Gesture Controlled robot* [Online], Available: https://projecthub.arduino.cc/abdelkader\_ch/hand-gesture-controlled-robot-3d232f    [3] Anita Shukla, Ankit Jain , Prajjwal Mishra and Rahul Kushwaha (2019, 15 November), *Human Gesture Controlled Car Robot*[Online], Available: https://www.researchgate.net/publication/345906307\_Human\_Gesture\_Controlled\_Car\_Robot/fulltext/6016ff8292851c2d4d0a7807/Human-Gesture-Controlled-Car-Robot.pdf | |