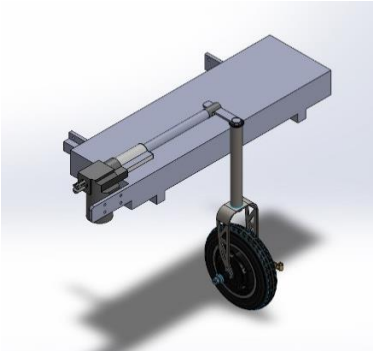
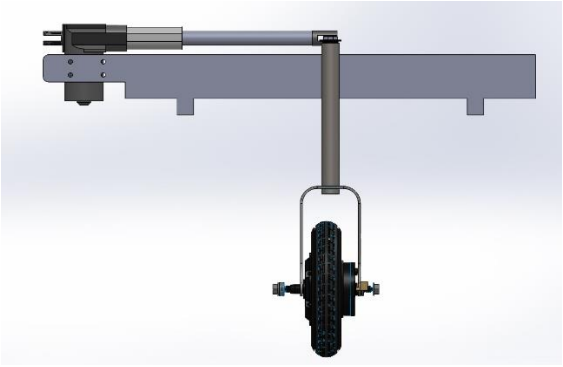
1.	**Title of the project:** Design and Fabrication of Attachable Electric Wheelchair
2.	**Name of the college and department:** P. A. College of Engineering, Mangalore. Dept. of Mechanical Engineering
3.	**Name of the student and guide:** **Name of project guide:** 1. Name: Prof. VARUN HEGDE Email id: varun_mech@pace.edu.in Contact No: 9164569010 **Name of the students:** 1. Name: T V VIGNESH USN No.: 4PA19ME028 Email id: viguvigzzzthenutcracker@gmail.com Mobile No: 8848780689 2. Name: ARUN KUMAR USN No.: 4PA19ME006 Email id: arunnkumar040@gmail.com Mobile No: 9110406780 3. Name: SUJAN RAJ USN No.: 4PA19ME027 Email id: sujanraj03@gmail.com Mobile No: 8296231078 4. Name: PRAJNESHA K USN No.: 4PA19ME025 Email id: prajnesh4736@gmail.com Mobile No.: 8921537082

4.	**Keywords:** Arduino UNO, Controller , Electric Wheelchair, Hub motor, ESP32, BLDC
5.	**Introduction:** The design and fabrication of an attachable electric wheelchair offers a transformative solution for enhancing mobility and independence for individuals who rely on traditional wheelchairs. This innovative project aims to bridge the gap between conventional manual wheelchairs and expensive, standalone electric models by enabling the conversion of a standard wheelchair into an electric-powered vehicle. Through meticulous engineering and cutting-edge technology, this attachable system provides a seamless upgrade, incorporating electric propulsion, intuitive controls, and enhanced maneuverability. This synopsis explores the comprehensive process of designing, prototyping, and fabricating this ground-breaking attachable electric wheelchair, shedding light on the numerous benefits it brings to individuals with mobility limitations and revolutionizing the accessibility landscape.
6.	**Objectives:** • Design and Fabrication of detachable Electric wheelchair using ARDUINO as Microcontroller and hub motor for compact design. • The proposed self-controlled wheel chair will be of low cost and simple in design. • Transforms an ordinary wheelchair into an electric wheelchair in a shorter period of time. • To drive and control the wheelchair with the average speed and stop the help of joystick and potentiometer. • Controlling the wheelchair via mobile phone by using ESP32 microprocessor.
7.	**Methodology:** • Design of attachable part using Solid Works. • Design of power system. • Design of control system. • Fabrication of attachable part. • Joystick is used to give direction (left/right) to the wheelchair. • Potentiometer is used to give the speed. • The input from the joystick and potentiometer is given to microcontroller. • Microcontroller is being programmed for different code combinations so that the decoded signal gets converted into appropriate movement of the wheelchair with the help of relays and DC motor. • ESP32 is used as a secondary microprocessor so that the user may also use

mobile to drive in wheelchair through the app/website.





CAD model of the prototype

8. Result and Conclusion:

Here we make a structure that consists of a motor at the front end and two connectors at the back end that connects to the wheelchair. In first mode hub motor is controlled through the Arduino microcontroller using the potentiometer. A linear actuator is attached to the wheel which will steer the wheelchair in the left and right direction. The steering is given by using joystick. The second mode is for the user or patient to use their cell phone to operate the wheelchair by using android application called ASHVA. The system will make use of batteries to drive the wheelchair. The E-wheelchair attachment will automate the wheelchair and the patient can be self-reliant.

	Final picture of attachable electric wheelchair  ASHVA android application to control the wheelchair
9.	**What is the innovation in the project:** Converting normal existing wheelchair into electric wheelchair by connecting an attachable model which is inexpensive comparing to fully electric wheelchair. Also, attachable model can be controlled by two modes by joystick and potentiometer and android application.

10.	**Scope of future work:** In the project "Design and Fabrication of Attachable Wheelchair," several potential future improvements can be considered to enhance the functionality and usability of the wheelchair. These improvements could include: ● *Intelligent Sensor Integration:* Integrating sensors like proximity sensors, pressure sensors, or gyroscopes can enable the wheelchair to detect obstacles, uneven terrain, or changes in body posture. This would allow for better obstacle avoidance and improved stability during wheelchair operation. ● *Autonomous Navigation:* Developing autonomous navigation capabilities using technologies like computer vision can enable the wheelchair to navigate and move independently in various environments. This feature would greatly benefit users who may have difficulty controlling the wheelchair manually. ● *Adjustable Seating and Ergonomics:* Enhancing the wheelchair's design to include adjustable seating options, ergonomic supports, and customizable settings would improve user comfort and accommodate different body types and preferences. ● *Energy Efficiency and Battery Management:* Implementing energy-efficient components and optimizing the power management system can extend the wheelchair's battery life. Additionally, integrating features like regenerative braking could help recharge the battery during operation, increasing overall efficiency.