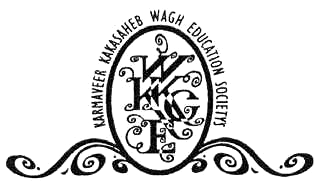
**K. K. Wagh Institute of Engineering Education and Research, Nashik.**

**Department of Computer Engineering**

**Name of Student: Jayashree Ahire**

**Roll No. : 02 Div: B**

**Name of Guide: Prof. S. D. Jadhav**

# SYNOPSIS

**Title Of The Topic:**

Automation of a Wheelchair Mounted Robotic Arm using Computer Vision Interface

**Area Of Topic:**

Assistive Technology, Automation, Computer Vision, Image Processing, Robotic Arm, Vision Sensor

**Abstract:**

Assistive robotic devices have great potential to improve the quality of life for individuals suffering with movement disorders. One such device is a robot-arm which helps people with upper body mobility to perform daily tasks. Manual control of robot arms can be challenging for wheelchair users with upper extremity disorders. This research presents an autonomous wheelchair mounted robotic arm built using a computer vision interface. The design utilizes a robotic arm with six degrees of freedom, an electric wheelchair, computer system and two vision sensors. One vision sensor detects the coarse position of the coloured objects placed randomly on a shelf located in front of the wheelchair by using a computer vision algorithm. The other vision sensor provides fine localization by ensuring the object is correctly positioned in front of the gripper. The arm is then controlled automatically to pick up the object and return it to the user. Tests have been conducted by placing objects at different locations and the performance of the robotic arm is tabulated. An average task completion time of 37.52 seconds is achieved. Experiments are done to implement a camera based vision system integrated with a computer vision algorithm to recognize object deformation and spatial coordination to control the deviation from the original training. The visualization systems are able to detect the objects as well as their distance from the End-effecter and transmit the signals to the drive system.

Quality of life of individuals suffering with movement disorders can be improved using assistive robotic devices. Robotic arm can help people with upper body mobility to perform daily tasks. Controlling robotic arm manually can be challenging for wheelchair users with upper extremity disorders. This research presents an autonomous wheelchair mounted robotic arm built using a computer vision interface. It consists of: a robotic arm with six degrees of freedom, an electric wheelchair, computer system and two vision sensors. The first vision sensor detects the coarse position of the coloured objects placed randomly on a shelf placed in front of the wheelchair using a computer vision algorithm. Another vision sensor ensures correct position of object in front of the gripper and thus, provides fine localisation. The arm is then controlled automatically to pick up the object and return it to the user. Performance of the robotic arm is evaluated after conducting tests by placing objects at different locations. Average task completion time of 37.52 seconds is achieved. Experiments are done to implement a camera based vision system integrated with a computer vision algorithm to recognize object deformation and spatial coordination to control the deviation from the original training. The visualization systems are able to detect the objects as well as their distance from the End-effecter and transmit the signals to the drive system.

Abstract should be of approximately 200-300 words giving brief introduction about the topic along with scope.

**References / Bibliography**

<https://ieeexplore.ieee.org/document/8409518>

List of books/ web/ Journal/ Magazine etc referred.

**Signature of Student Signature of Guide**