

WIRELESS CONTROL OF ROBOTIC ARM SYSTEM USING ACCELOMETER SENSING AND ZIGBEE APPROACH

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Abstract - In today's world there is an increasing need to create artificial arms for different inhuman situations where human interaction is difficult or impossible. Here it is propose to build a robotic arm controlled by natural human arm movements whose data is acquired through the use of accelerometers. For proper control mechanism and to reduce the amount of noise coming in from the sensors, proper averaging algorithm is used for smoothening the output of the accelerometer. The development of this arm is based on LPC2148 and ATmega328 along with a personal computer for signal processing, which will all be interfaced with robotic arm using serial communication and with transmitter using wireless. Finally, this prototype of the arm may be expected to overcome the problem such as placing or picking hazardous objects or non-hazardous objects that are far away from the user. The orientation of the control unit is tracked and displayed using MATLAB. The results show that the system allows the control of an industrial robot in an intuitive way. However, the achieved recognition rate of gestures and postures should be improved in future, keeping the compromise with the system response time.

1. INTRODUCTION

Now a day's technology has decreased working hours and has made complicated operations more effortless. Robotics is a field that has thrown up some wonderful machines. Typical industrial robots do jobs that are difficult, dangerous or dull. They lift heavy objects, paint, handle chemicals and perform assembly work. They perform the same, job hour after hour, day after day with precision. They don't get tired and they don't make errors associated with fatigue and so are ideally suited to performing repetitive tasks. Nowadays, robots are increasingly being integrated into working tasks to replace humans especially to perform the repetitive task.

In general, robotics can be divided into two areas, industrial and service robotics. International Federation of Robotics defines a service robot as a robot which operates semi or fully autonomously to perform services useful to the wellbeing of humans and equipment, excluding manufacturing operations.

2. BACKGROUND CONCEPT

There are various types of robots, which are used now in the modern world each having one or several tasks that it performs depending on the intelligence applied to it. However, robots can be classified broadly into two types namely:

- Autonomous mobile robots
- Manipulator robots

2.1 Robot Arm

Manipulator is a fancy name for a robot or mechanical arm; hence it will be used intermittently with robot arm. A manipulator is an assembly of segments and joints that can be conveniently divided into three sections: the arm, consisting of one or more segments and joints; the wrist, usually consisting of one to three segments and joints; and a gripper or other means of attaching or grasping. Alternatively, the manipulator can be divided into only two sections, arm and gripper, but for clarity the wrist is separated out as its own section because it performs a unique function. Industrial robots are stationary manipulators whose base is permanently attached to the floor, a table, or a stand. In most cases, however, industrial manipulators are too big and use a geometry that is not effective on a mobile robot, or lack enough sensors (indeed many have no environmental sensors at all) to be considered for use on a mobile robot. Figure 1 shows the basic robotic arm.

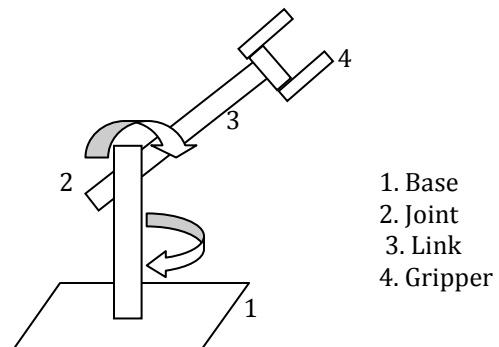


Fig- 1: Basic robot arm

