Design and implementation of Arduino based robotic arm

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Design and implementation of Arduino based robotic arm

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Article Info	ABSTRACT
	This study presents the model, design, and construction of the Arduino based robotic arm, which functions across a distance as it is controlled through a mobile application. A six degree of freedom robotic arm has been designed and implemented for the purpose of this research. The design controlled by the Arduino platform receives orders from the user's mobile application through wireless controlling signals, that is Bluetooth. The arm is made up of five rotary joints and an end effector, where rotary motion is provided by the servomotor. Each link has been first designed using solid works and then printed by 3D printer. The assembly of the parts of the robot and the motor's mechanical shapes produce the final prototype of the arm. The Arduino has been programmed to provide rotation to each corresponding servo motor to the sliders in the designed mobile application for usage from distance. *This is an open access article under the [CC BY-SA](#) license.* ![CC BY SA]

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1. INTRODUCTION

Autonomous systems and robots can contribute in plenty of functional operations over the world. The robotic arm can solve many limitations of humans in industrial fields especially with the aid of the distance controlled feature. Robotic arms' functions and their operations are extensively used in research laboratories and industries to automate processes and reduce human errors. Some of the tasks achieved by robotic arms include assembly lines and motions that demand the force control with feedback to its controller [1], [2].

Robotic systems have grown broadly due to their increasing applications in all fields of industry and their ability to decrease errors and wastage of material. Many different robotic systems have been developed for invasive proposes [3], [4]. The robotic arms could initially be used to move objects from one place to another [5], [6] in any industrial area [7], [8] that needs to achieve tasks repetitively for manufacturing products. Some industrial environments are not suitable for humans, thus robotic arms may be used. For instance, cases in which human workers cannot easily or safely gain access are handling radio-active materials or dealing with work in the deep sea and space [9], [10]. Generally, the two main purposes of the robotic arm systems are to minimize the risk of life by ensuring human safety, and to speed up industrial processes. This is where an automated, simple, and effective Arduino controlled robotic arm comes into play [11], [12]. The arm could be used for numerous tasks such as painting cars, soldering cars access unevenly placed parts for scanning, selecting. Most of the food industry companies use pick and place robots, which is useful in many criteria. In a human-designed environment, the robotic arm can also operate on a mobile base to be sent in a damaged/radioactive building and used to open the doors and manipulate the tools either by itself or through remote control [13], [14]. Table 1 illustrates a technical review on features of some robotic arms designed by researchers.