

# **Design and Development of Robotic Arm to Print Objects Using Point Detection**

A project report submitted to the Department of Computer Science and Engineering of the World University of Bangladesh in partial fulfillment of the requirement for the award of the degree of Bachelor of Science in Computer Science & Engineering

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May 2018

## LETTER OF TRANSMITTAL

May 2018

To

Afzal Hossain

Assistant Professor

Department of Computer Science and Engineering

World University of Bangladesh (WUB)

House #3/A, Road #4, Dhanmondi,

Dhaka-1205, Bangladesh.

**Subject: Submission of Project Report.**

Dear Sir,

We are pleased to submit the report entitled “**Design and Development of Robotic Arm to Print Objects Using Point Detection**”. It was a great pleasure to work on such an important topic. The report is prepared according to the requirements and guideline of the Department of Computer Science and Engineering, World University of Bangladesh (WUB).

We believe that the report will help you evaluate our project work. It would be a great pleasure for us to interpret a part or whole of the report whenever necessary.

Sincerely yours

Sincerely yours

Sincerely yours

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Md Mahamudur Rahaman

WUB 03/15/32/1325

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Mehedy Hasan

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## World University of Bangladesh

### DECLARATION

We hereby solemnly declare that the project work entitled “**Design and Development of Robotic Arm to Print Objects Using Point Detection**” has been supervised by **Afzal Hossain**, Assistant Professor of the Department of Computer Science and Engineering, World University of Bangladesh. We ensure that the project report has not been submitted either in whole or part for any degree in any university.

We hereby proof that the work we have presented does not breach any existing copyright rule.

We further undertake to indemnify the university against any loss or damage arising from breach of the foregoing obligation.

Sincerely yours

---

Md Mahamudur Rahaman  
WUB 03/15/32/1325

Sincerely yours

---

Mehedy Hasan  
WUB 03/13/29/800

Sincerely yours

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Kazi Tashnia Suraya  
WUB 03/15/32/1340



Department of Computer Science and Engineering  
World University of Bangladesh

## CERTIFICATE

We hereby certify that the project Report on “**Design and Development of Robotic Arm to Print Objects Using Point Detection**” is a confide record of project work done by **Md Mahamudur Rahaman, Mehedy Hasan, and Kazi Tashnia Suraya** for partial fulfillment of the requirements for award degree of the Bachelor of Computer Science and Engineering from World University of Bangladesh (WUB).

The project report has been carried out under my guidance and is a record of the bonafide work carried out successfully by the students.

Supervisor

---

**Afzal Hossain**

Assistant Professor

Department of Computer Science and Engineering

World University of Bangladesh (WUB).

## ACKNOWLEDGEMENT

We are extremely grateful and remain indebted to almighty ALLAH who has guided us in ventures to complete our project work successfully.

We would like to thank our family who always supports us in our study. They were the reason that keeps us go further and to be successful in our life.

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Finally, we would like to thank all teachers and staffs of World University of Bangladesh for their kind assistance and support that provide us a perfect environment and good facility to help us in the accomplishment of our project.

Sincerely yours

Sincerely yours

Sincerely yours

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## **ABSTRACT**

This paper discusses the design and realization of complex 3-axis Robotic Arm based on the microcontroller which combined with spindle drill. This machine can be used for Cutting, Engraving and Marking on wood, acrylic and PCB objects.

Robotic Arm has not been developed so that they are imported directly from another country. This has an impact on the industry that is difficult to develop because of the price of Robotic Arm still expensive. The challenge is how to make Robotic Arm with good performance but low cost so that it can contribute to the acceleration of domestic manufacture industry.

The software portion of a computer numerical control system must consist of at least of three major programs: a part program, a service program, and a control program. The part program contains the geometry description of the part being produced and the cutting conditions such as spindle speed and federate.

Design picture that has been made on the PC sent to the microcontroller using serial communication then Robotic Arm perform an execution on an object according to point coordinates. Drill spindles will create patterns on objects automatically according to the design drawings.

After testing, the Robotic Arm can be used for cutting, engraving and marking on wood, acrylic, and PCB to 2D objects with 96% of carving accuracy and 100% of depth accuracy. This machine works on an object with a maximum size of 28cm x 21cm.

In this paper, we have used the concept of low cost mini Robotic Arm plotter machine, which is easily controlled by a computer and suddenly stop and paused by click action on the computer. By using this we have to make Difficult and Complex Design in the paper. This is a small machine which is easily Transportable and Assembled everywhere on Requirement of it. Stepper Motor will be run on in these criteria of bed size. If we have increased the size or length of the lead screw, it will be free to make the big size of design in the paper. We have used G-codes to give the command. G-codes are language to give the command to the machine to move right, left or up and down. On the successful work of this machine, we have some change on it and make it commercial used and applying tools for cutting, grinding of soft material etc.

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