BANGLADESH UNIVERSITY OF PROFESSIONALS

B U P

EXCELLENCE THROUGH KNOWLEDGE

OBJECTIVE COMPLETION REPORT

Presented To

NAZNEEN AKHTER

LECTURER, BUP

PROJECT BRIEF

PROJECT NAME: Light Following Robot

TIMELINE: March 4 - June 2, 2024

BUDGET: ৳1529

TEAM MEMBERS:

SHAMOYETA MOURIN MOULY	----------	2252421036
LATIFA NISHAT NISHI	----------	2252421062
JAYED BIN ALAMGIR	----------	2252421066
TAHSINA TABASSUM ROZA	----------	2252421084

INTRODUCTION

This project aims to revolutionize automation in Bangladesh's manufacturing, agriculture, and construction sectors by developing a light-following robot. The robot, built with an Easier Pro Development Board, light sensors, TT gear motors, and a car chassis, will navigate towards light sources using sensor signals and programmed controls. This 3-month project with a budget of approximately 1529 Taka has the potential to improve efficiency, safety, and productivity across various sectors in Bangladesh.

FUNCTIONALITY

The robot will be programmed to move towards light sources. When the light sensors detect a light source, they send signals to the Easier Pro Development Board. The board processes these signals and controls the TT gear motors to adjust the robot's direction and speed, guiding it towards the light. This mechanism allows the robot to autonomously navigate environments by following light cues.

- To develop a method for detecting the presence of light sources in the robot's vicinity
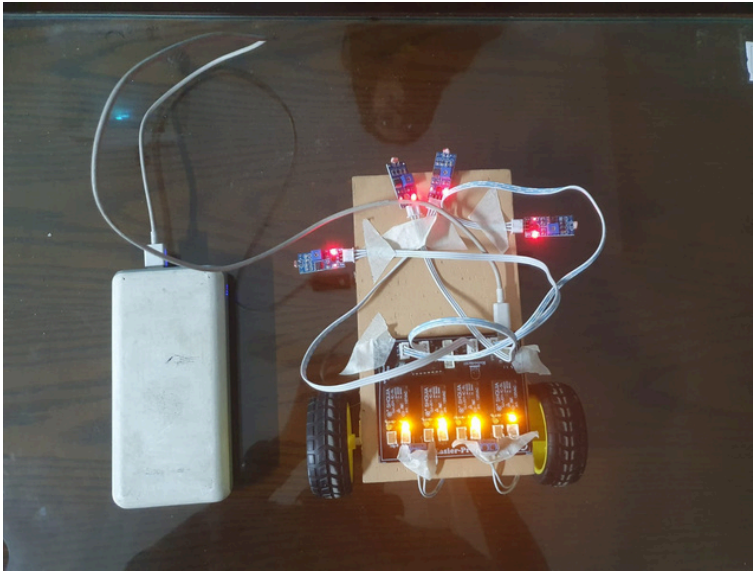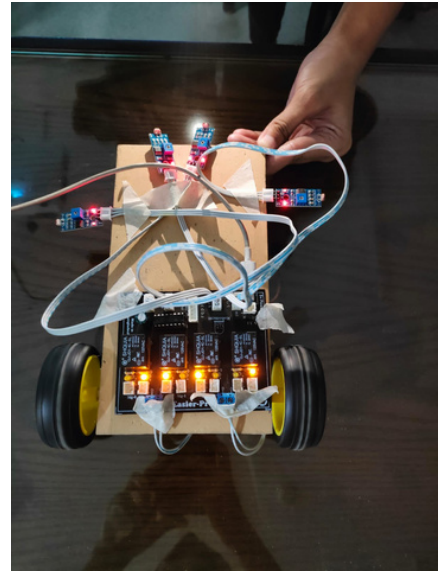

Figure 1

Figure 2

FIGURE 1:

IN FIGURE 1, ALL THE OUTPUT LEDS ON THE ROBOT ARE OFF, INDICATING THAT NO LIGHT HAS BEEN DETECTED BY THE SENSORS. THE ROBOT IS POWERED AND OPERATIONAL, AS EVIDENCED BY THE POWER CONNECTIONS AND THE ILLUMINATED COMPONENTS, BUT IT IS NOT CURRENTLY RESPONDING TO ANY LIGHT SOURCES IN ITS ENVIRONMENT.

FIGURE 2:

IN FIGURE 2, THE MIDDLE TWO SENSORS ON THE ROBOT HAVE THEIR OUTPUT LEDS ILLUMINATED, INDICATING THAT LIGHT HAS BEEN DETECTED BY THESE SENSORS. THIS SUGGESTS THAT THE ROBOT IS RESPONDING TO A LIGHT SOURCE POSITIONED IN FRONT OF IT, AS THE ACTIVATED SENSORS ARE IN THE CENTRAL AREA OF THE ROBOT'S SENSOR ARRAY.

- To implement control mechanisms allowing the robot to navigate towards detected light sources without human intervention.
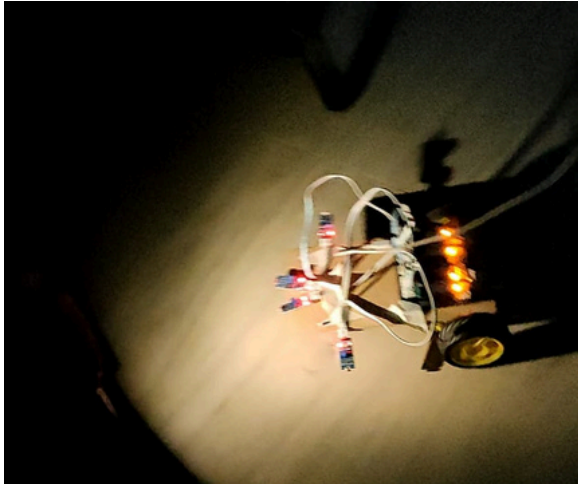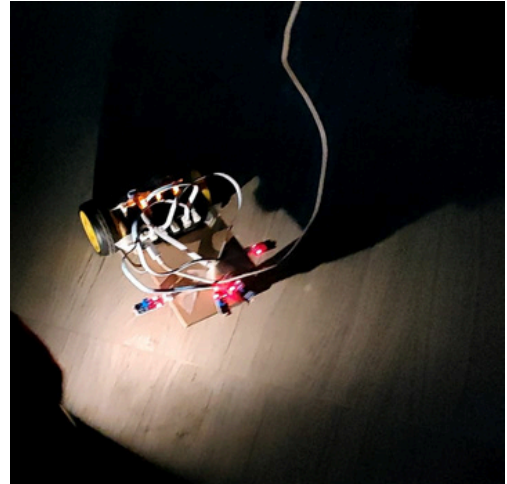

Figure 3

Figure 4

THIS LIGHT-SEEKING BEHAVIOR IS ACHIEVED THROUGH THE IMPLEMENTATION OF CONTROL MECHANISMS THAT LEVERAGE STRATEGICALLY PLACED LIGHT SENSORS. THESE SENSORS CONVERT DETECTED LIGHT INTENSITY INTO ELECTRICAL SIGNALS, ALLOWING THE ROBOT TO INTERPRET THE ENVIRONMENT. THE CONTROL PROGRAM THEN TRANSLATES THIS INFORMATION INTO DIRECTIONAL ADJUSTMENTS, EFFECTIVELY STEERING THE ROBOT TOWARDS THE BRIGHTEST LIGHT SOURCE IT PERCEIVES. HOWEVER, ACHIEVING OPTIMAL PERFORMANCE REQUIRES CAREFUL CONSIDERATION OF SENSOR RANGE, LIGHT SOURCE COMPATIBILITY, AND OBSTACLE AVOIDANCE ALGORITHMS FOR ROBUST AND RELIABLE NAVIGATION.