

Project Milestone 2: Spicy Killa Bytes

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1 Current Progress on Structure

The purpose of this document is to report on the progress the project has made since the last submission on October 2, 2022 and the key deliverables over the next month of the project. The robot's base was built from the ground up, components were acquired from various sources, design features were modified owing to certain constraints, the robot's circuitry was established, and a coding methodology was devised. The main controller of our robot is the TivaC micro-controller issuing basic commands such as forward, reverse, left and right. The processor is required to start up the robot, configure it, and keep it running. The motors receive a constant level of 12V power from a set of batteries connected in series to improve durability of the connections. We essentially have 6 functions for locomotion and traversal that regulate the robot's movement in the forward, backward, forward left, forward right, backward left, and backward right directions. We have also incorporated a few additional components along with those discussed previously, to build a potent defense and attack mechanism. The electrical wiring in our present design, however, has not been finalized and is still being worked on.



Figure 1: Front-View of Robot



Figure 2: Side-View 1 of Robot



Figure 3: Side-View 2 of Robot

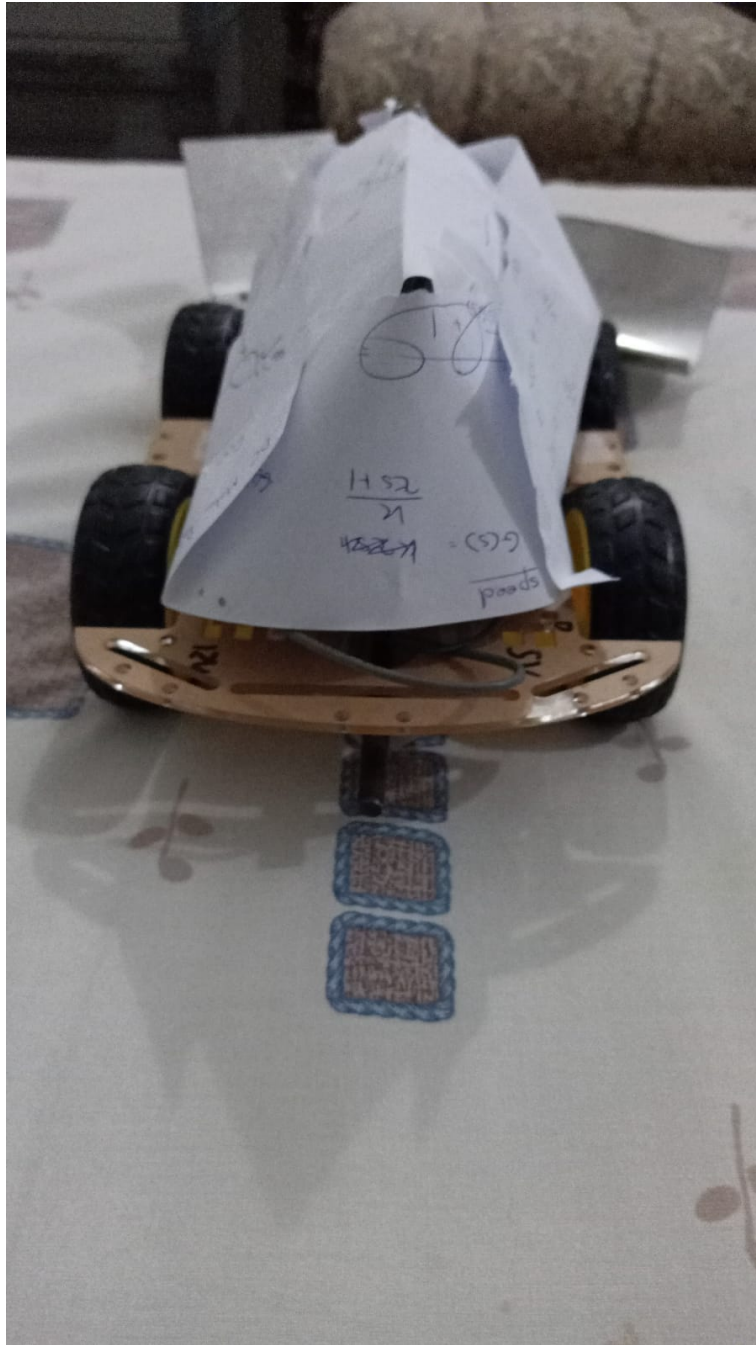


Figure 4: Back-View of Robot



Figure 5: Top-View of Robot

2 Linear and Rotational Motion

Using four wheels coupled to four separate motors, we were able to move the robot in both linear and rotational directions. The main driver of rotational motion will be the back wheels which will move in opposite directions to rotate the robot. The main driver for quick linear motion will be the back wheels which will provide the force to move forward and backward quickly to evade enemy attacks and provide us more opportunities to attack. Additionally,

assisting in the linear motion are the front wheels.

3 Deviations from initial proposed design

The robot design was modeled after the original concept proposed in Milestone 1, with a few modifications. The initial design included an axle for the front wheels. The reasoning behind this design was to enable quick movement and rotation simultaneously. Our current design has discarded the idea of using an axle. The axle design had only a limited range of motion for rotation as the wheels collided with the main frame when the axle rotated too much. The current implemented design still has 4 wheels but rather than rotating the wheels with a center of rotation close to the center of the body, the wheels will now either move forward or backward (independently) to provide rotation and movement. This logic is better shown in the in-person demonstration of the project. Also, the more components our project has, the more likely it is to fail if it is struck by enemy attacks. At this stage there are no risks to the successful delivery of the project

4 Sustainability

Our design incorporates sustainability in this stage of development by having the motors and wheels detachable from the main body to be re-used in a different project. The entire structure can be disassembled and components can be separated. In keeping with the sustainability of our design, the robot's defense mechanism is constructed from repurposed metal plates.

5 Distribution of Tasks

Hamna: Documentation, Arena Volunteer, Control Logic

Mustafa: Structure & Hardware

Suleiman: Integration & Testing