BFMC2026: Status Report 1
Team: SafeForce
Date: 12/22/2025

Github link: https://github.com/vicyan1611/Brain/

Introduction

Entering this competition as a new team, we have focused on learning from other teams and adapting proven methodologies to our specific hardware constraints. Our team has diverse backgrounds in software and embedded engineering, so we taught each other the knowledge from other fields. We have individual strengths in Computer Vision and Motor Control, we identified that a lack of smooth integration could be a bottleneck. Our primary strategic focus is on integration testing to ensure our software logic works in physical movement. Each week, our team has two working sessions together, on Tuesday and Sunday.

Planned Activities

Our goal for this phase was to establish a working baseline for the car, ensuring the Raspberry Pi 5 could communicate with the STM32 Nucleo. We planned to dedicate the first weeks to analyzing the provided reference code for both the 'Brain' (High-level) and 'Embedded' (Low-level) systems to understand the existing communication protocols.
We structured the team into two workstreams: two members focused on the software environment, two members focused on hardware assembly, sensor mounting, and motor control. The team leader was assigned to manage the repository and oversee system integration.

Project Status - Task Status

Based on what we planned, we are on track with it. We started with a steep learning curve, but we will increase the development speed later. We now fully understand the codebase. The car is working. And a simple version of the obstacle detection algorithm is also working. Based on these first steps, our development velocity is accelerating as we transition into implementing complex lane-keeping logic and integration testing.

Encountered Issues

The calibration process took longer than we expected. There were some bugs in the codebase, so we need to find them, then calibrate back and forth. We also had some problems with the Wi-Fi connection in Vietnam because of the region. The codebase on an embedded system is very different from the web or mobile codebase. So it also took a longer time for us to fully understand the codebase. We also need to debug some random bugs from the Bosch NodeJS bumping bot.

<u>Upcoming activities</u>

With Phase 1 complete, our focus shifts to preparing for the Project Status 2 milestone in February. First, we will briefly pause development to complete our final semester exams. Once the team returns in early January, our top priority is the hardware integration of the TOF sensor to improve obstacle detection accuracy. The software team will implement the core Lane Following algorithm, moving from simple motor commands to a closed-loop PID control system. We plan to print the remaining curved sections of the test track to begin full-lap integration testing by mid-January. We also plan to work with a streaming log system so that the debugging process will be easier.