Team Contract Fulfillment

Project Goals: At the start of the semester, our goal was to build a color-detecting automatic paint dispenser. This device would accurately detect surface colors using an RGB sensor, convert these RGB values to CMYK format via an MCU, and dispense precise amounts of paint to replicate the scanned color. Success was defined by several criteria, including accurate sensor integration, reliable RGB to CMYK conversion, precise motor control, and consistent paint dispensing. Additionally, the software was expected to achieve robust error handling, seamless integration of components, and user-friendly operation. Reflecting on our progress, we met many of these goals. The RGB sensor integration and the MCU's conversion functionality were achieved with high accuracy. The paint dispensing mechanism functioned reliably under standard conditions. However, challenges arose with precise motor control and battery life optimization, partially limiting the system's performance.

Expectations: The expectations outlined in our team contract emphasized timely preparation for meetings, active participation, prompt communication, and thorough documentation. Overall, these expectations were largely met. Team members attended scheduled and unscheduled meetings with preparation and contributed constructively to discussions. Communication on challenges was open and productive, and regular updates ensured clarity on progress. There were minor delays in response times during peak workload periods, but these instances were promptly resolved by redistributing tasks or adjusting deadlines. Documentation was maintained consistently on GitHub, aiding in collaboration and progress tracking.

Roles: Initially, roles were distributed to ensure a fair workload, with members specializing in subsystems such as PCB design, coding, and bookkeeping. As the semester progressed, roles

evolved naturally based on expertise and project needs: Alexander Kaplich: Maintained project documentation, oversaw GitHub updates, and supported the RGB to CMYK algorithm implementation. Rajeev Bommana: Focused on PCB design, stepper motor control, and ensuring hardware-software communication. Lucky Konatham: Took charge of 3D modeling for the dispenser mechanism and assisted with integrating hardware components, while writing all the code for software components. Leadership was shared, and decisions were made collaboratively. While tasks were often tackled individually based on expertise, major milestones, such as system integration, were addressed as a group.

Agenda: Decision-making followed the guidelines in the contract: goals were set by majority vote, and progress was tracked weekly. Issues were addressed during meetings, with adjustments to priorities as needed. For example, when motor control precision posed challenges, the team collectively decided to allocate additional time to resolve this. This flexible approach ensured the project stayed on track despite setbacks.

Team Issues: While the team worked well together overall, some issues arose, particularly with workload balance and unforeseen technical difficulties. For instance early in the semester, one member faced challenges balancing other coursework, causing delays in PCB design. This was managed by temporarily redistributing responsibilities. The stepper motor control encountered technical difficulties during testing, requiring the team to collaborate intensively to debug the issue. The contract's conflict resolution process—calm discussion and open communication—was followed effectively. In hindsight, setting earlier deadlines for critical tasks would have allowed more time to address such issues without affecting later stages of the project. The experience has not only strengthened our project but also improved our collaborative skills for future endeavors.