KTO KARATAY UNIVERSITY

KTO KARATAY UNIVERSITY
FACULTY OF ENGINEERING
MECHATRONICS ENGINEERING

Embedded Systems Lecture
Project Report

INTERACTIVE SIMULATION SYSTEM

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1. INTRODUCTION

In this project, systems were prepared and used by leveraging the learning outcomes of the embedded systems course. A pneumatic piston system is controlled using an STM32. The project is about realistic game control. This system provides the user with a realistic experience of weapon recoil and flash bombs in war games.

1.1 Purpose

With advancements in today's technology, efforts are being made to make games more realistic. The primary purpose of this project is to develop a system that offers a realistic gaming experience to players playing games on computers.

1.2 Research or Application Methods Used

Various research and application methods were used to complete the project successfully. These methods were chosen and applied to achieve the project's goals and address challenges effectively.

Use of Simulations

For simulations and data analysis, Cube IDE and Proteus software were utilized. The embedded codes written in Cube IDE for the STM32 were tested in the Proteus simulation environment to verify key components of the system [1]. The results obtained provided valuable insights for achieving the project objectives.

Use of Online Resources

During the project, online resources were used to gain knowledge on various topics and access existing solutions. These resources played a significant role in tracking recent developments in the project area, evaluating experiences from similar projects, and finding solution suggestions for encountered issues [2].

Review of Articles and Theses

To strengthen the theoretical foundation of the project and integrate information from similar studies, various academic sources were reviewed. In this context, related articles,

theses, and scientific publications were examined, providing an in-depth understanding of the main topics of the project. This information was used in forming the methodology and evaluating the results of the project [3].

These various research and application methods contributed to the successful implementation of the project and enhanced the reliability of the results obtained. The methods used solidified the scientific foundation of the project and served as an effective tool for achieving the objectives.

2. PROJECT

2.1 Game Controller

This project aims to enhance the feedback features of a war game. The piston moves to simulate weapon recoil. The motion occurs when the player presses the button on the mouse to fire. To simulate a flash bomb, when the flash bomb explodes on the game screen, the LED strip above the player's screen turns on, simulating a flash bomb experience when the measured light sensor values reach the predefined range. Figure 1 shows the operating principle of the game controller system.

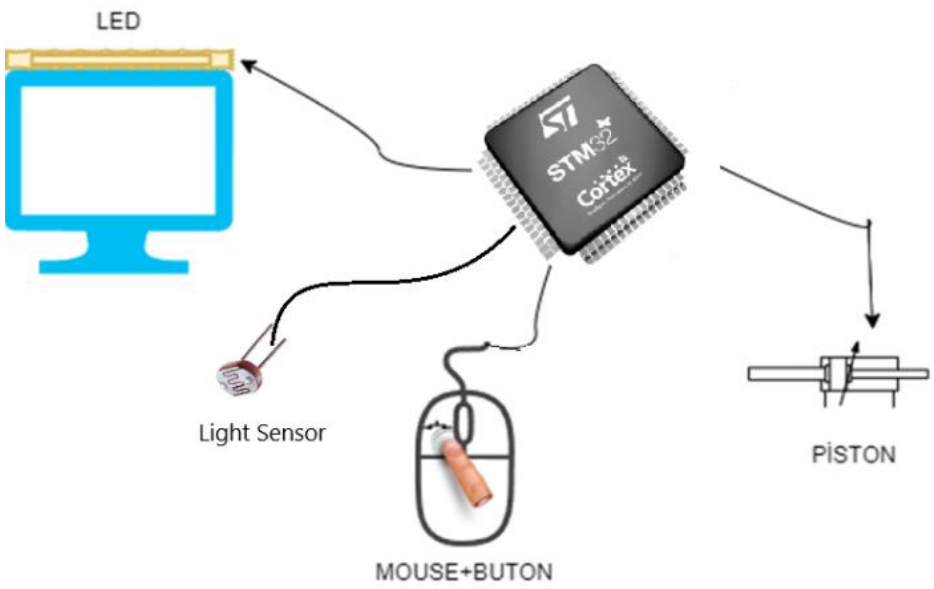
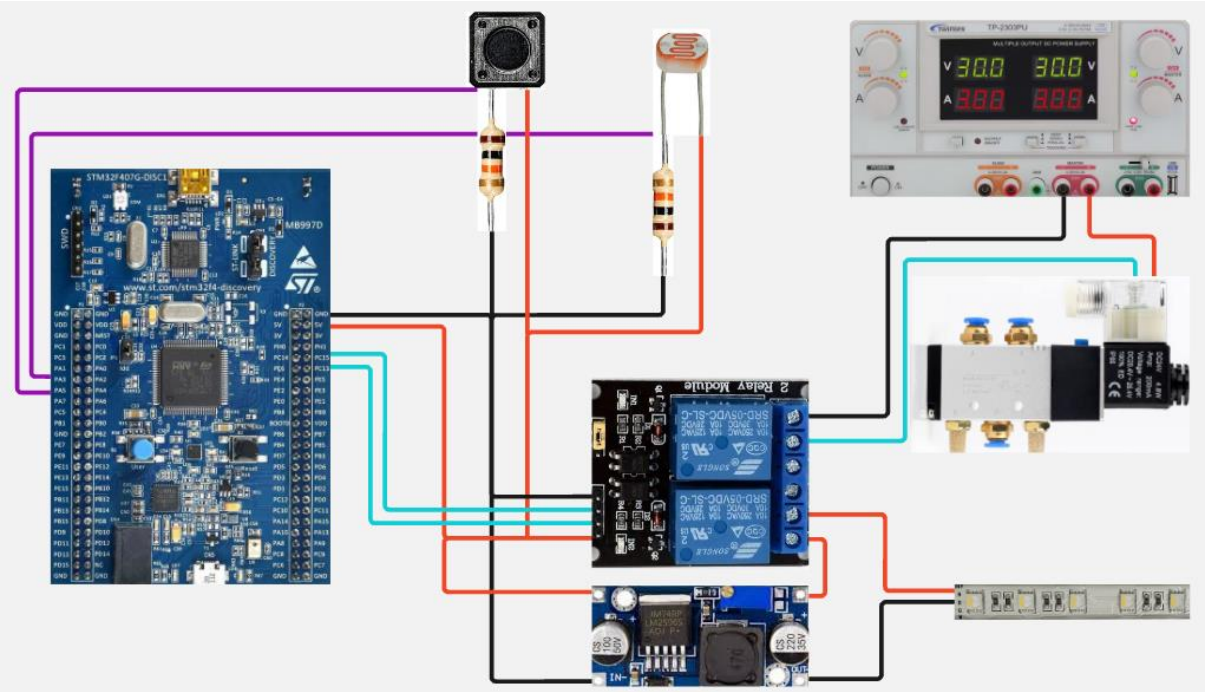


Figure 1. Game Controller System Operating Logic Demonstration

2.2 Application Areas

This project is specifically designed for war simulation games. However, it can also be adapted for different types of games or entertainment applications that require similar realistic feedback features. Additionally, similar technologies could be valuable for military training simulations or defense-related applications.

2.3 Model Circuit Diagram



A schematic of the system's circuit design is provided in Figure 2.

Figure 2. System Circuit Design

Materials Used

- STM32VLDISCOVERY [1]
- LDR, Button, LED Strip
- 5V 2-Channel Relay
- DC-DC Step Up Converter
- 5V Power Supply
- 10K-1K Resistors
- Pneumatic Piston [2]

2.4 Operating Algorithm

A diagram explaining the operating algorithm of the system is shown in Figure 3.

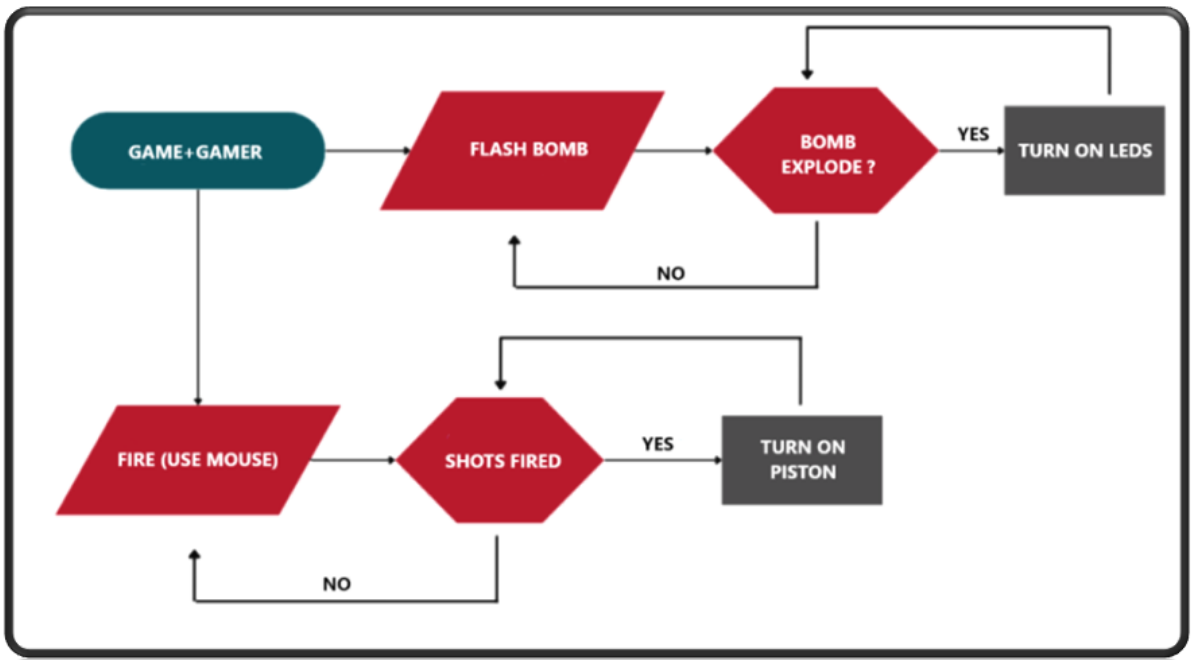


Figure 3. System Working Algorithm

3. REFERENCES

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