# Verbal Description

**PROJECT OVERVIEW:**

Security System is an intelligent monitoring system designed for homeowners and business owners who need an automated threat detection system to keep their properties safe. The Security System is built in Java using OpenCV and Yolo's object detection model to provide clients with real time video monitoring, object identification, and alerts when a threat is detected.

**COMPARISON TO OTHER PRODUCTS:**

The most similar product out there to the Security System is Ring. Ring offers motion detection and alerts homeowners and business owners when someone is approaching the door. However, Ring requires monthly subscription fees ranging from $4-20/month and stores all footage in the cloud which raises privacy concerns. The Security System does the same motion detection while also distinguishing between the objects that cause motion at its sensors between people, cars, animals, knives, guns, and other dangerous objects. The model then uses its inner logic to determine if whatever is approaching is a threat or not which then a buzzer will go off. Everything is processed locally on the Raspberry Pi so there's no subscription fees and all your data stays private.

**FEATURES:**

1. **Yolo Object Detection:** Yolo works to identify objects that have been detected in the camera feed
2. **Motion Detection:** The camera senses motion and alerts the inner logic to start trying to figure out if it's a threat or not.
3. **Intelligent Threat Tracking:** Once a weapon is detected the camera will take a screenshot of it and store it locally as evidence. This way if the threat goes out of sight there's still proof of what was detected that can be shown to authorities.
4. **Real-time Visualization:** Any object detected from the camera feed will be outlined in green if safe and flashing red and white if it's a threat. The buzzer also goes off during threat detection.

**HARDWARE AND SOFTWARE REQUIREMENTS:**

*Hardware:*

- Raspberry Pi
- Raspberry Pi Camera
- Buzzers

- Breadboard

*Software:*

- Java Runtime Environment
- OpenCV library tailored for Java development
- Yolo model weights
- IntelliJ IDE

**END USERS:**

Homeowners and small business owners that are looking for affordable security monitoring to keep their properties safe.

**MAINTENANCE:**

The system doesn't need much maintenance once it's set up. Users can adjust the sensitivity settings through config files and update the Yolo model if they want better detection. The local storage needs to be cleared every so often so it doesn't fill up the Pi. If anyone needs help there's documentation and the GitHub repo has everything they need.