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Real-Time Shot Analysis System

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ABSTRACT:
In general, the military is crucial in defending their nations, primarily against territorial assaults. Shooting targets from various locations is one of the primary components of military officer training. Therefore, we are creating a project to improve the precision of determining an individual's target shooting ability. This project is helpful for any shooting training and is not just for the military. Our project's goal is to determine target shooting accuracy while preventing needless target damage. There are two target types available for this project: mobile targets and fixed targets. The percentage is determined before to the bullet striking the target when someone shoots it, and it is shown on an LCD display. We refer to this system as a fixed goal system. We are using an LCD display and an ultrasonic sensor for this goal. After striking the target, the percentage is computed and shown on an LCD display when someone shoots a target. This system's name, "movable target," indicates that it is a target that may be moved during training. Depending on the individual's shooting abilities, the project will provide all the information, including whether they are chosen, disqualified, or require additional training. Our idea will thus make it easier and more accurate to choose the right candidate, and it will also save money on target preparation.

INSTRUCTION:
There are several targets that are utilized in various domains, such as police, military, and sports training, to choose applicants. Preferred targets are selected based on the necessity. We discovered that there are four distinct target kinds present based on the serve: paper, clay, steel (reactive), and explosive targets. The most common targets are paper ones, which are inexpensive but not very effective. The bull's eye is one of the most common shapes. Steel targets are another kind; they are also known as reactive targets because their ability to make sound depends on the shooter's skill. These are superior to paper targets since they can be altered, reused, and given a fresh appearance with a straightforward painting technique. The next kind are clay targets, which are constructed from clay material and will explode when a bullet strikes it. These targets have a lot of disadvantages. The final category is binary explosive targets, which are created by combining two distinct explosive compounds. The government has rejected this type of objective in several states, particularly in forest areas, because to the high expense and the dangers of the chemicals. We have created new, highly accurate, and reasonably priced targets to address all of these issues. In addition to reducing the amount of money spent on targets and eliminating the need for frequent target changes, these targets also allow for the automatic selection of qualified individuals without the need for human intervention.

METHODOLOGY:

People are having a lot of trouble determining the precise location where the shooter hits the target in this manner after learning about various target types and scoring systems. This makes it difficult to determine who is more proficient at shooting. Therefore, we have put in place a tool known as the "advanced target system for shooting" to get around all of these issues. We have employed two distinct approaches in the implementation of this system: one for moving targets and one for stationary targets. Servo motors, LCD displays, Arduino UNOs, and ultrasonic sensors are used to create fixed targets. The project's primary sensors are ultrasonic ones, which carry out the fundamental task of determining the shooting score. Two sensors in the shape of a "L" have been positioned a few centimeters from the target. The two ultrasonic sensors are positioned so that the target will bend backward before the bullet strikes it and the appropriate percentage will be shown on the LCD display when a bullet is fired after passing through the sensors. Sound sensors, LCD displays, Arduino UNOs, DC motors, and motor drivers are used to create movable targets. When analyzing the shooter's score while the target is moving, the sound sensor is crucial. The target in this system will move both left to right and right to left. Three sound sensors are positioned behind the target so that each one will be triggered and the associated result will be shown whenever the bullet strikes the target.

ACTING:

One ultrasonic sensor is positioned in the fixed target system so that it analyzes the target in the X axis direction, and another sensor is positioned so that it analyzes the target in the Y axis direction. When the bullet is identified by According to the Arduino software, the sensors' corresponding percentage will be shown on the LCD display. When the ultrasonic sensor detects a bullet in the center of the target, the Arduino is programmed to print the 100% value on the LCD display. Similarly, depending on the bullet's position, the 80% and 60% values will be printed on the LCD display. Additionally, when the ultrasonic sensor detects a bullet, the target is bent backward at a 90-degree angle with the aid of a servo motor. Regarding movable targets, sound sensors are positioned behind the target, which is moved with the aid of a DC motor in both left-to-right and right-to-left directions. According to the Arduino's programming, the relevant sound sensor will sound whenever the bullet strikes the target, and the LCD will show the percentage. Similar to this, each sound sensor will be triggered based on the target the shooter hits, and the LCD display will show the relevant percentage.

OUTCOMES:

Figure 1 shows the finished kit for a fixed target that shows the shooting %.

Figure 1 shows the target's overall configuration for displaying shot accuracy.

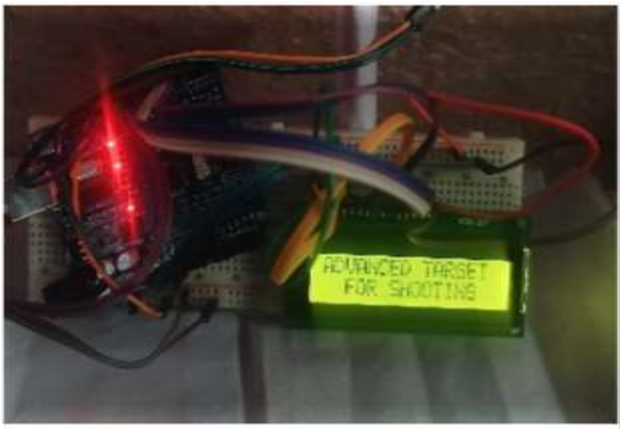

Fig. 2: Project name displayed on LCD monitor.

The warning that appears when the ultrasonic sensors fail to detect a target is shown in Fig. 2.

Figure 3: The bullet's position prior to impacting the target.

According to Fig. 3, the bullet is positioned within a 100% range of the target.

Figure 4: When the bullet is within 100% of the range, a message is displayed.

The message that appears when the bullet is within 100% of the target is shown in Fig. 4.

Figure 5: The bullet's position prior to impacting the target.

The bullet's position, as shown in Fig. 5, is within 80% of the target.

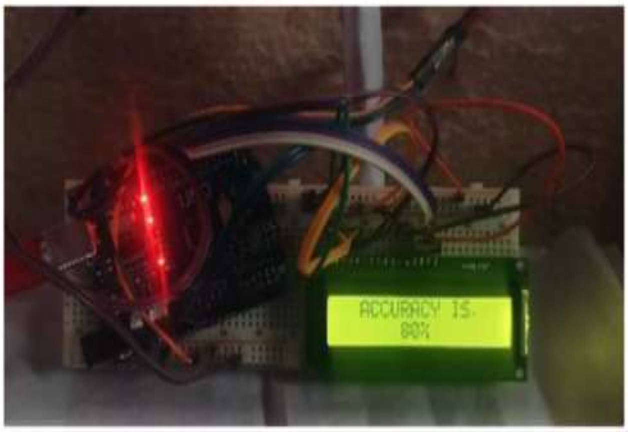

Figure 6: A notification is displayed when the bullet is within 80% of the frame.

The message that appears when the bullet is within 80% of the target is shown in Fig. 6.

Figure 7: The bullet's position prior to impacting the target.

The bullet's position, as shown in Fig. 7, is within 60% of the target.

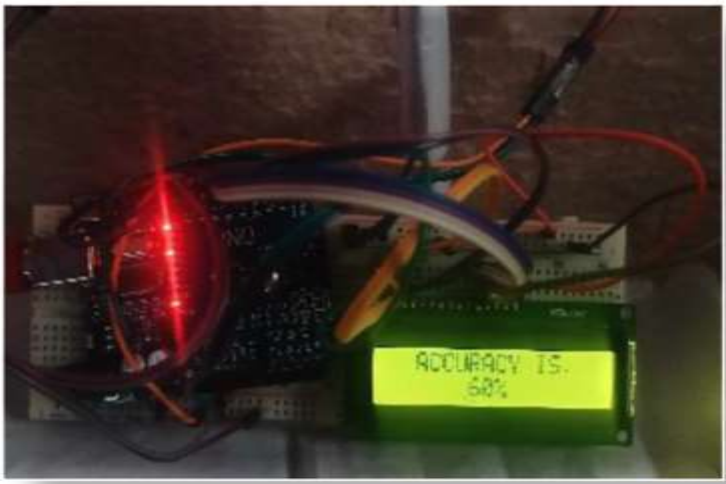

Figure 8: A notification appears when the bullet is inside 60% of the frame.

The message that appears when the bullet is within 60% of the target is shown in Fig. 8.

Fig. 9: The movable target's finished kit.

The entire configuration of the movable target, which uses a DC motor to move from left to right or right to left, is shown in Fig. 9.

Figure 10 shows how the sound sensor is positioned behind the target.

The location of the sound sensors for showing various percentages is shown in Fig. 10.

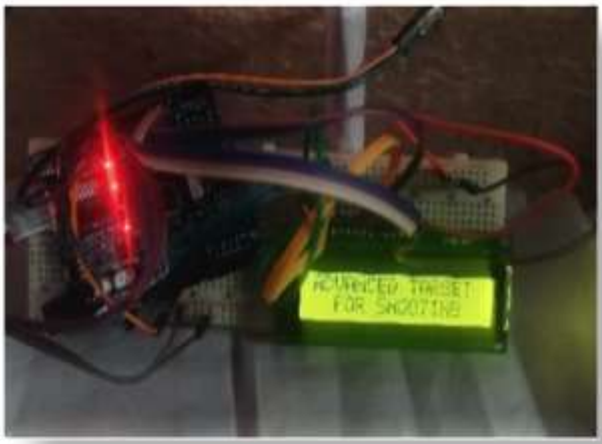

Figure 11: Project name displayed on LCD screen.

The warning that appears when the sound sensors fail to detect a target is shown in Fig. 11.

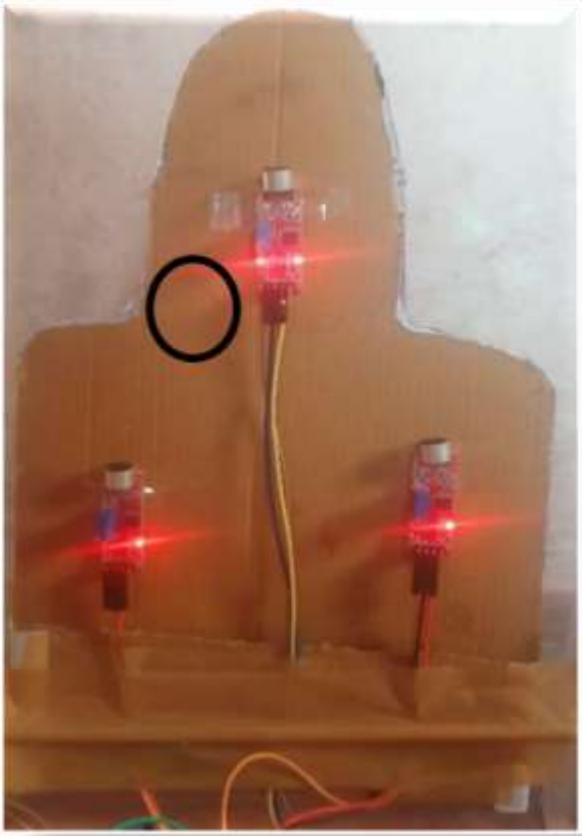

Figure 12: The sound sensor is activated.

According to Fig. 12, the sound sensor is triggered when a bullet strikes within range of the sensor, which is positioned above the target.

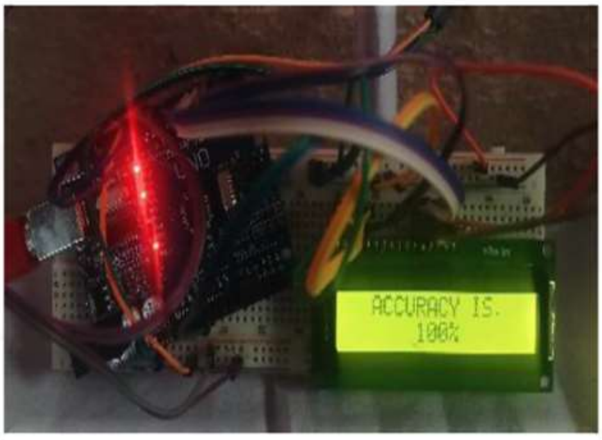

Figure 13: When the bullet is within 100% of the range, a message is displayed.

Figure 13 shows the message that appears when the bullet strikes a target that is within range of the sound sensor that was positioned in the head position.

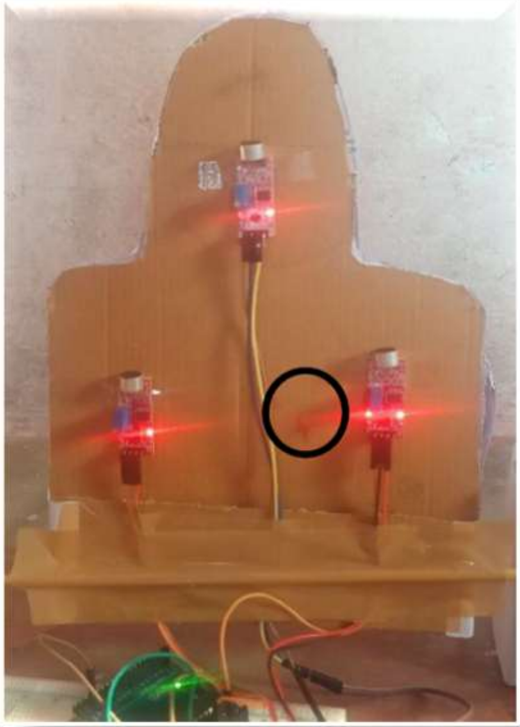

Figure 14: The sound sensor is activated.

According to Fig. 14, the sound sensor is triggered when a bullet strikes within range of the sensor, which is positioned to the target's left.

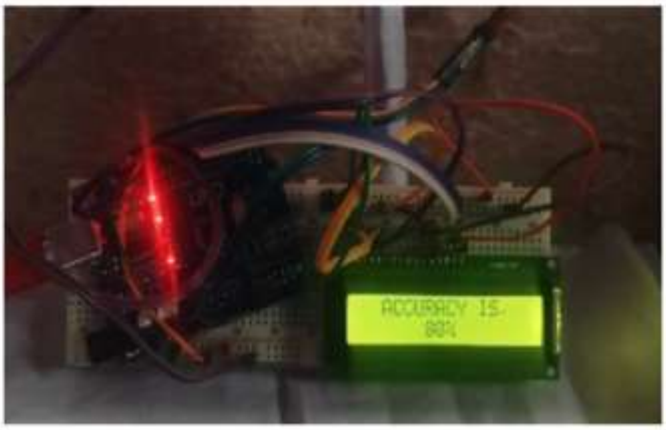

Figure 13: A notification is displayed when the bullet is within 80% of the frame.

Figure 13 shows the message that appears when the bullet strikes the target, which is within range of the sound sensor that was positioned on the left.

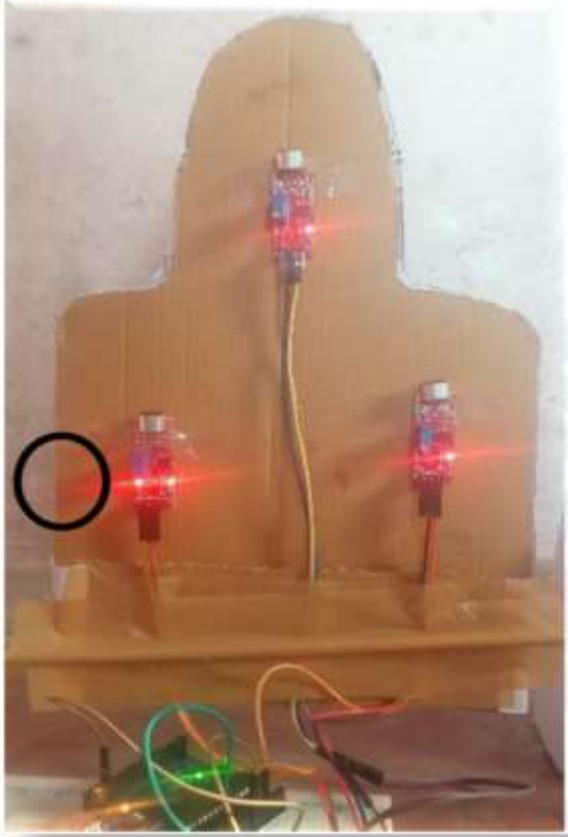

Fig. 17: The sound sensor is activated.

According to Fig. 17, the sound sensor is triggered when a bullet strikes within range of the sensor, which is positioned to the target's right.

Figure 13: A notification is displayed when the bullet is within 60% of the frame.

Figure 13 shows the message that appears when the bullet strikes the target, which is within range of the sound sensor that was positioned on the right side.

CONCLUSION:

We may infer from the results of the study that the "advanced target system for shooting" is a very helpful tool for evaluating the shooting abilities of the target shooter. Sound sensors in mobile targets and ultrasonic sensors in fixed targets will be used to display the precise score. It lowers the cost of the targets, improves accuracy, and decreases the need for human intervention.

FUTURE SCOPE:

Our project's future scope includes adding an Excel sheet that will automatically store all of the data and use that data to calculate the average. The final outcome will be determined by the individual's average score.

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