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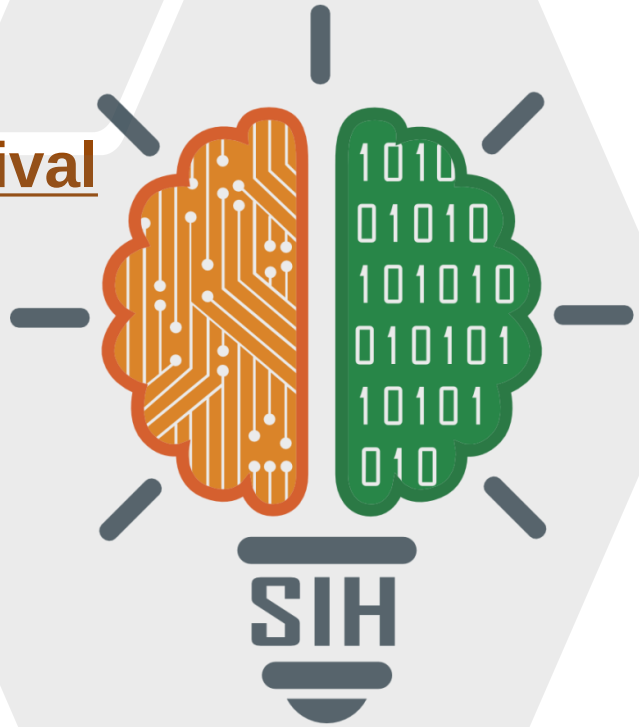
- **Problem Statement ID –** SIH1651
- **Problem Statement Title-**

  Microphone array-based direction of arrival for gunshot detection
- **Theme-** Miscellaneous
- **PS Category-** Software
- **Team ID-** IT07
- **Team Name-** ALPHA-1947



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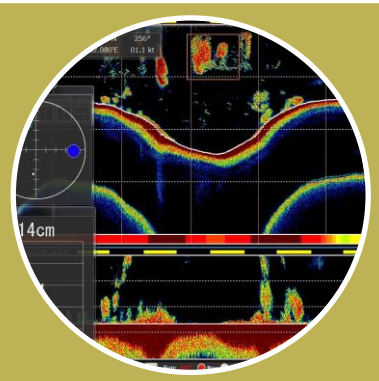
FPGA-BASED GUNSHOT DETECTION AND LOCALIZATION SYSTEM

Modern military operations require advanced tools to detect and respond to threats quickly.

An FPGA-based gunshot detection system using a network of omnidirectional microphones.



Real-time processing of sound data to determine the direction of gunfire.

Expected accuracy of gunfire direction detection.

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TECHNICAL APPROACH

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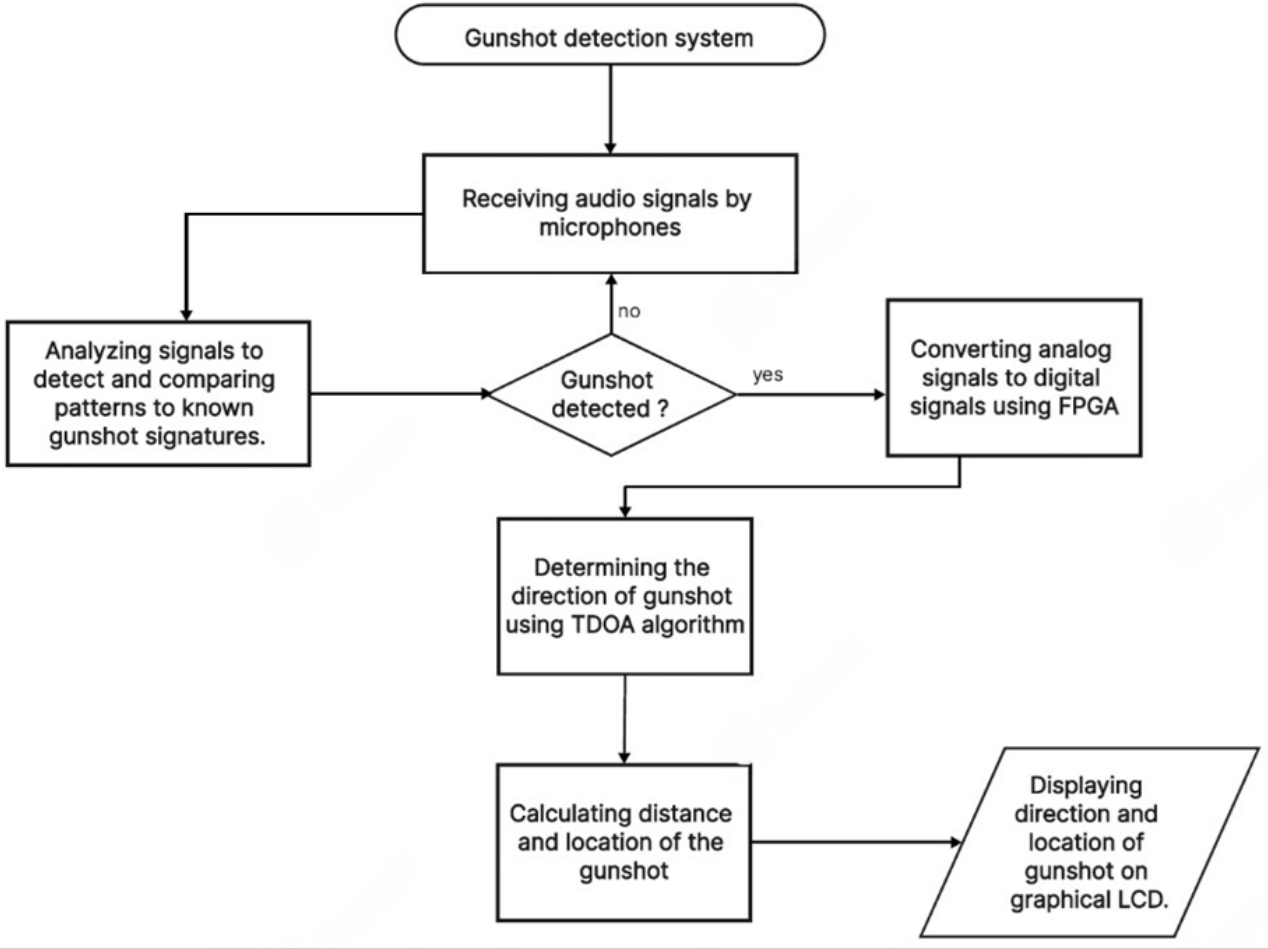
LANGUAGE:

- python (MyHDL 0.11.0,Migen)

SYSTEM COMPONENTS:

- Omnidirectional Microphones
- (6 units)
- Analog-to-Digital Converter (ADC)
- FPGA for signal processing
- Graphical LCD for display



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FEASIBILITY AND VIABILITY

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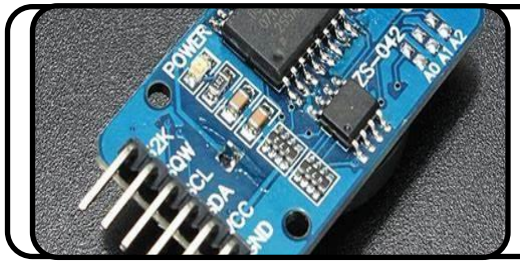
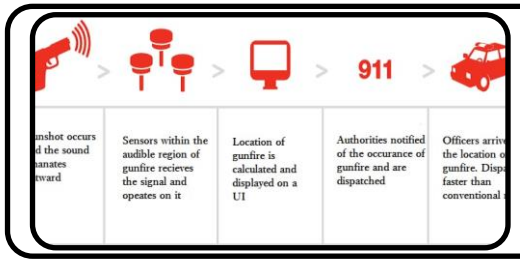
Modern military operations require advanced tools to detect and respond to threats quickly.



Existing systems may lack the precision or real-time capability necessary for detecting gunfire and determining its origin.



Quick and accurate detection of hostile fire is critical for battlefield effectiveness.

Strategies for overcoming these challenges

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IMPACT AND BENEFITS

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- Expected accuracy of gunfire direction detection.
- Real-time performance metrics.
- Fast, reliable, and robust detection.
- Enhanced situational awareness for soldiers.

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RESEARCH AND REFERENCES

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- http://Researchgate.com
- https://response-technologies.com/gunshot-detection-sensor/
- https://www.mdpi.com/2073-431X/7/3/41#:~:text=While%20the%20FPGA%20part%20computes,cross%2Dcorrelate%20the%204%20microphones