Project Proposal

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Counter-Threat Surveillance System

Background

National security has always been at the core of a country's progression.

From the earliest recorded histories, states have persevered due to their military might. In fact, a state's military prowess was so crucial that it shaped the life around early states, from architecture like Great Zimbabwe or even the Great Wall of China to geo-political boundaries and alliances.

Out of this, a state's lifeline industries such as tourism, agriculture, mining and the commerce surrounding them have had the chance to grow and bloom into whole nations with sustaining economies. It is necessary that a nation's interests are protected both for internal (restoring public confidence in the nation's ability to control itself and the threats surrounding it) and external (making the nation a

dependable ally and able to protect not only itself from being dealt the underhand but its allies) reasons.

A nation can either outsource or develop military systems internally. While outsourcing allows us to trade our resources for such technologies, unfortunately the international arms market is not a free market but rather a political one. It is also unfortunate that Zimbabwe faces sanctions from some of the countries offering the best technologies. As such, this means that Zimbabwe is not an ally of those with the best arms. This leaves our nation with the need to innovate internally in order to achieve these technologies

Peace is the primary requirement for growth in a country and it is of paramount importance that the ability to protect such peace is native and independent, regardless of the cost.

Problem Statement

Zimbabwe is currently not indigenously capacitated enough to defend herself against emerging security threats posed by modern aerial warfare technologies such as swarms of UAVs. The nation's reliance on foreign technology, albeit viable, is limited due to sanctions, while its internal defence industry lacks adequate resources for modernisation.

Without an indigenous and cost-effective anti-aero defence system, Zimbabwe remains vulnerable to surveillance, sabotage, and external threats, thereby weakening its national security framework.

Objectives

The Counter-Threat surveillance system should:

1. Incessantly detect potential UFO threats in real time within the area of concern , without any blind spots with the minimum end to end detection latency and the detection precision greater than 90%.
2. Classify the detected flying objects to predefined categories.
3. Track the detected flying object classified as a threat , maintaining the object's identity over time.

4. Alert responsible personnel within the lowest response time upon detection of a high level threat UFO to confirm engagement.
5. Engage protocols to neutralise the threat after engagement is confirmed.

Expected Outcomes

1. Functional Hardware Prototype
2. A Trained AI Object Detection and Accurate Trajectory Prediction Model
3. Real Time Software Applications
4. A detailed Project Documentation
5. Final Project Presentation and Demonstration

Engineering Aspects Covered

1. Hardware Engineering -
    a. circuit design and development
    b. component assembly
    c. manufacturing and product design
2. Software Engineering -
    a. Computer Vision (detection, classification)
    b. Mathematical Algorithm Design (Trajectory Prediction)
    c. UI & UX design (for the dashboard/observability)