Hackathon NATO IST - AI-based Drone Detection and Classification

Technical Information

Context and Event Integration

This hackathon will run alongside the NATO IST drone measurement event during Aveiro Tech Week, a city-wide initiative that turns Aveiro into a hub of technology and culture with conferences, exhibitions, and hackathons.

Main Goal of the Hackathon

The primary objective is to attract fresh minds to address a critical challenge in security and technology: **detecting and classifying drones**. The problem is divided into two key subtasks, **dataset labelling**, a time-consuming but essential process for preparing high-quality training data for AI models; and **drone and communications data detection and classification**, which involves developing algorithms capable of accurately identifying and classifying different types of drones, including those measured during the NATO exercise.

Due to the high level of participation, the organization has decided to divide the hackathon into three phases. The **first phase** (19-30/09/2025) will help pre-select the top teams using public data. The **second phase** (1-5/10/2025) will refine this selection with additional data and support provided by the NATO IST working group. The **final phase** (6-8/10/2025) will take place in the field to assess the robustness and performance of the developed AI models.

Target Participants

The hackathon is open to anyone registered at UA with valid passport or ID card from NATO nations, including students, professionals and enthusiasts in AI, data science or drone communications. No advanced technical expertise is required, only **curiosity and motivation**.

Teams may consist of **1 to 3** members. Please update your information: https://forms.gle/1fNTqZSg571FaX9r6

Timeline

12-18/09/2025   - Teams registration

15/09/2025 (19h)   - Opening and introductory session at DETI-UA

19/09/2025 (11h)   - Kick-off meeting at DETI-UA

19-30/09/2025   - Development stage

24/09/2025   - Q&A session

1/10/2025   - Evaluation and pre-selection of the top teams

1-5/10/2025   - Adaptation to the NATO data and scripts

5/10/2025 (18h)   - Final selection of the top teams for on-site deployment

6-8/10/2025   - On-site AI model testing

9/10/2025   - Award ceremony during the NATO Session at Teatro Aveirense

Mentorship

Teams will be supported by mentors from the Telecommunications Institute and by experts involved in the NATO drone exercise. A face-to-face Q&A session is scheduled for **September 24 at 17:00**, at the IT2 building.

In addition, a Slack group is available at the following link (only @ua.pt accounts will be accepted): https://join.slack.com/t/natoist/shared_invite/zt-3dn7h43py-_h8388EOI0qA9~jSkcUhVw

Base Datasets and Scripts

Attached and available in the Slack channel, you will find the base datasets and scripts for data labeling, as well as for general and UAV communications detection and classification. These resources will serve as the foundation for the 1st phase of the NATO IST Hackathon. In addition, a set of reference technical articles is also provided to support your work.

Evaluation

The most challenging subtask is the **automatic data labelling**, which in some cases still requires human verification or even manual completion. Therefore, this component will be evaluated with **10 points out of a total of 20**. The second component, **detection and classification with general and UAV data**, will account for the **remaining 10 points**. This subtask may also be further decomposed into two sub-subtasks if the teams so wish.

Additionally, innovative solutions will be evaluated, provided they meet the requirements established in the literature in terms of **accuracy, latency, and computational efficiency**, as well as their **robustness, scalability, and explainability**. Solutions that demonstrate a good trade-off between performance and practical feasibility will be particularly valued. The following table provides the evaluation details that will be considered for the first phase of the Hackathon:

Criteria	Sub-Criteria	Points	Description
Automatic Data Labelling (10 pts)	Automation quality	4	From mostly manual (0) to highly automated with minimal errors (4).
	Human verification integration	2	From no verification loop (0) to efficient human-in-the-loop with minimal effort (2).
	Accuracy of labels	2	From inconsistent/error-prone (0–1) to reliable and consistent labels (2).
	Innovation & usability	2	From standard/basic (0–1) to novel, efficient, user-friendly (2).
Detection & Classification (10 pts)	Accuracy	4	From poor (<60%) (0–1) to high (>85%) with generalization (4).
	Latency & efficiency	2	From heavy models, high inference (0–1) to optimized real-time models (2).
	Robustness & scalability	2	From unstable/limited (0–1) to stable across datasets, scalable (2).
	Innovation & explainability	2	From standard pipeline (0–1) to innovative and/or interpretable (2).

Contacts

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Organization

Partners