Object Recognition and Classification Task

Goal: Create a machine-learning project that describes the process of building and training object recognition and/or classification models based on the Military Aircraft Recognition dataset.

Task duration: 1 week.

Disclaimer: The primary purpose of this task is to see and understand how you approach the solution of the problem, the organization of your work, the approach to documenting the stages of the task, and describing and visualizing the results. It is not important how many steps you manage to perform in the allotted time, it is important how you perform them and how you document your work.

Disclaimer: All task code should be committed to the Git repository with appropriate commits and branch management. This repository can be public or private depending on your preferences. If you want to keep the repository private please inform our IT Recruiters, they will provide you email address to which you can grant access to the repository for our reviewer. You can use any Git service (GitLab, GitHub, Bitbucket, etc.). The structure and commit history of the Git repository will be part of the evaluation of your work.

Note: Each step of this task should be documented and described. You can provide any significant information that is important to perform the corresponding step, including links and references to sources that you are used to collect or get this information.

Note: You can use any environment or IDE of your preference as well as a programming language, frameworks, libraries and tools. All dependencies should be properly documented in the repository.

Task description:

Object recognition and classification is one of the most important and complex tasks for computer vision problems especially if the data for it is collected by remote sources like remote sensing, satellites or drones. The widespread use of drones for military purposes has only brought to the fore the issue of developing automatic object recognition systems capable of detecting and recognizing targets on the surface. In this task, we want to lay the foundation for the development of such a system by implementing a machine-learning model that can classify and recognize objects. Depending on usage both tasks, classification and recognition, can be

used. You can choose the best way to solve this task and even propose a way to integrate your model into such an automatic object recognition system.

Task steps:

1. Download and prepare the Military Aircraft Recognition dataset for usage.
   Note: You can create a script for the downloading of the dataset.
2. Analyze the dataset.
   Note: Analysis of the dataset may include analysis of the dataset structure, training and test sets distribution, types distribution, data visualization and visualization of various statistical information about the dataset.
3. Describe what task you will solve and how are you planning to solve this task.
   Note: You can use references to the solution of similar problems.
4. Prepare the dataset for solving your task.
5. Create, train and test at least 3 models for solving the chosen task.
   Note: You can use an incremental approach and try to make each next model better than the previous one by improving it, or try a few completely different approaches that use different machine learning methods, architectures, etc.
6. For each trained model, provide an evaluation of the accuracy, precision, recall and F1 score. The evaluation of these metrics for each class (type) of objects will be assessed additionally.
7. [Optional] Propose your vision of integrating your models into an automatic object recognition system.