Automatic detection of poses and trajectories of symbols on military plans

In collaboration between Institute of Computer Science and the Military Academy, we have developed a solution to detect the locations of mission task symbols on military plans. This solution is based on YOLO v5 and returns to us locations and identities of symbols.
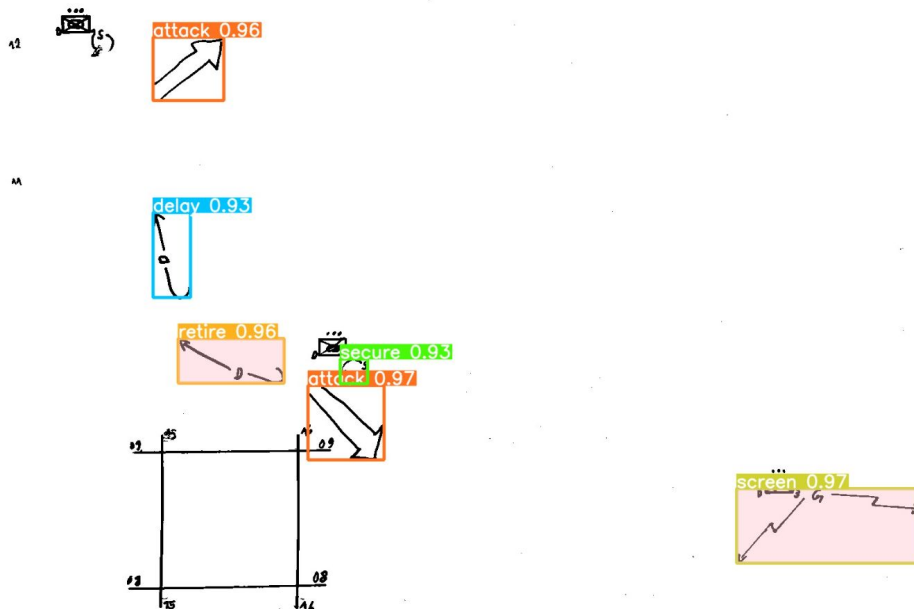

Figure: YOLO detection results. Mistakes are filled with pink semi-transparent color. In both error cases there is another that differs only by a letter (R/D for retire and delay) and (S/C/G for screen, cover and guard). Overall, bounding boxes are good, surrounding objects tightly.

We also have first iteration of a solution to detect the rotations of these symbols with respect to a defined zero-rotation; and a solution to detect trajectories for arrow-like symbols. But we want to improve. YOLO v8 model allows detecting poses, as well as location. This is commonly used to detect poses of humans, e.g. to understand the motion of pedestrians. However, it is based on detecting keypoints of a localized object, which can be applicable to our case. In fact, each military symbol is indeed defined via keypoints, not via location+rotation as in out initial solution. So this keypoint detection approach would fit the nature of these military symbols.
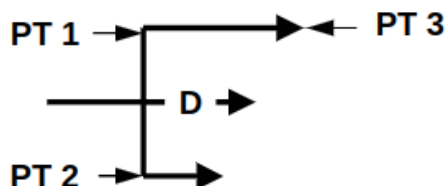
This thesis will allow you to demonstrate your ability to work with state-of-the art YOLO v8 models in a very practical approach, eventually deploying the solution on real data from the Military Academy.