

Deep Learning for Missile Guidance, Navigation, and Control

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Deep Learning with applications in missile guidance, navigation, and control (GNC) is a novel research area in the defense industry and is a subject area within R&D receiving a lot of funding for most big defense contractors. Applications of deep learning apply to almost all GNC subsystems including automatic control, trajectory prediction, and advanced image processing for seekers. Within the focus of this project, we will mainly be focused on developing an image processing model capable of identifying targets inside the image.

Project Goal:

The main goal of this project will be to develop a deep learning model for advanced image processing for seekers. This goal can be broken up into a few subsections explained next. The first subsection to accomplish this task will be acquiring data for our model to perform image processing on. I am already into the process of reaching out to some professors that have done research for missile guidance and have a backup plan of using images that will represent our target. The main goal of this is to be able to use a deep learning model that will identify if a desired target, ships in our case, are within the image. The next subsection towards achieving our goal to address is the architecture in which we will be using. My proposal for implementation is going to be using a widely known Object Detection library called Yolo. This library should provide us with high accuracy and will allow us to be confident with our model's output. The final subsection that our project will consist of is model evaluation and refinement. This will be a continuous process as I develop the GNC software to meet the needs of projects main goal, which again is to identify potential desired targets within a seekers given image.

Planned deliverables:

For the scope of this project, I will be delivering a trained deep learning model(more than likely YOLO) capable of identifying targets within a given test image. I also will be delivering a comprehensive report evaluating metrics such as model accuracy, precision, and potentially more. The comprehensive report will include all the requirements listed from the assignment including Algorithms/Optimization used and more.