PURDUE
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Department of
COMPUTER & INFORMATION TECHNOLOGY (CIT)

Supervisor's report on PhD Thesis

Title: "Research of effective UAV detection using smart sensors"
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The submitted thesis deals with the organization of a reliable UAV detection system that plays an important role in preventing drone intrusions on the territory of critical infrastructure facilities. In general, UAV detection technologies consist mainly of: radar, radio frequency (RF), acoustic, camera and LiDAR etc. This thesis addresses all these drone detection techniques with main focus on original results with camera sensors.

The chapters of the dissertation are constructed as follows: Chapter 1 presents relevant background information about the significance of UAV detection and relevant literature on drone detection. Chapter 2 addresses data preparation and data pre-processing steps, while Chapter 3 includes the theoretical description of existing moving object detection and convolutional neural network-based classification methods used to solve the problem. Chapter 4 presents the design of real-time and accurate drone detection system in a static background, including the description of the dataset, evaluation metrics, the structure of the model, and the results of the experiment. Chapter 5 addresses the development of a smart sensor fusion system using voting method for multi-angle detection of UAVs. The thesis finalizes with the Conclusions section, where the most important contributions are highlighted and open problems are discussed.

As a general review, the work has a relevant contribution to the UAV detection system. It can be used for protected areas where security is required. My assessment is that the proposed approach is a reliable and efficient real-time solution for detecting suspicious UAV positions using camera sensors.

All in all, the submitted thesis presents more than sufficient number of high-quality original results of large importance which can be a stimulus for the future research. Moreover, it is complemented by an excellent publication list of Ulzhalgas Seidaliyeva. Therefore, I strongly recommend to accept the submitted work as the dissertation PhD thesis and to award the PhD degree to the candidate.

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