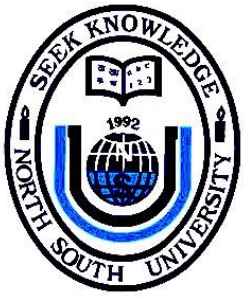
Department of Electrical and Computer Engineering
North South University



Senior Design Project

Autonomous Air Defense System for National Security

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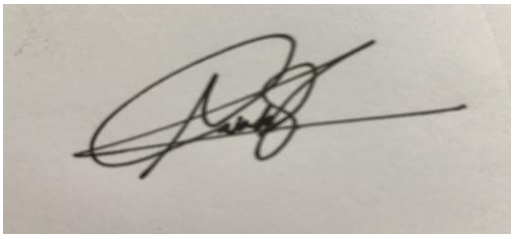
Summer, 2020

DECLARATION

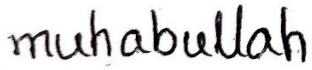
This is to certify that this Project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. Any material reproduced in this project has been properly acknowledged.

Students' name & Signature

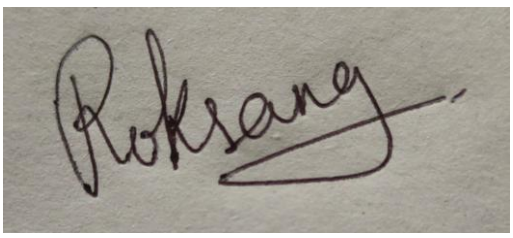
1. **Fazle Rabby Khan**



2. **Md. Muhabullah**



3. **Roksana Islam**



APPROVAL

The capstone project entitled "**Autonomous Air Defense for National Security**" by **Fazle Rabby Khan (ID#1611089042), Md. Muhabullah (ID#1611090042),** and **Roksana Islam (ID #1620686042)** is approved in partial fulfillment of the requirement of the Degree of Bachelor of Science in Computer Science and Engineering and has been accepted as satisfactory.

Supervisor's Signature



Dr. Mohammad Monirujjaman Khan
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Department Chair's Signature

Dr. Rezaul Bari
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ACKNOWLEDGMENT

First of all, we want to show gratitude to the almighty for completing senior design project titled as “Autonomous Air Defense System for National Security”.

Our deep gratitude goes first to our faculty advisor Dr. Mohammad Monirujjaman Khan, who expertly guided us in our senior design project throughout the whole CSE499A and CSE499B. His guidance helped us to complete our project. With his proper guidance and skills, we have learned a lot about writing, research and organization of work.

We thank our friends and family for their support towards this project. They always motivated us during the whole period of our project.

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We also thank “Kaggle” for providing us the dataset which helped us to save a lot of time.

ABSTRACT

Air defense systems were designed to reduce threats efficiently and thus protect the country from major attacks. It is therefore a fundamental part of any country around the world because it provides national security. This paper presents the development of an Autonomous Air Defense System (AADS) which will automatically detect aerial threats (e.g. drones) and target them without any human intervention. The AADS is implemented using a radar, camera and laser-gun. The Radar system dynamically emits microwaves and detects objects around it. It triggers the camera system if it senses the frequency of any aerial threat. The camera receives the radar's signal and detects using a neural network whether it's a threat or not. Neural network algorithms are used for the detection and classification of objects. The Laser gun locks its target if the live video feed classifies an object as a threat of more than 75%. In the detection stage an average loss of 0.184961 was achieved using YOLOv3 and 0.155 using Faster RCNN. This system will ensure that no human errors are made while detecting threats in a region and improve national safety.