DEVELOPING A PREDICTIVE MODEL FOR FACILITATING DRONE LANDING

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A DISSERTATION, SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE (M.Sc) DEGREEE IN COMPUTER SCIENCE, DEPARTMENT OF COMPUTER AND INFORMATION SCIENCES, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENENT UNIVERSITY, OTA, OGUN STATE, NIGERIA

AUGUST, 2023

ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfillment of the requirements for the award of Master of Science in Computer Science in the Department of Computer Information Science, College of Science and Technology, Covenant University, Ota, Nigeria.

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(Secretary, School of Postgraduate Studies) **Signature and Date**

Prof. Akan B. Williams
(Dean, School of Postgraduate Studies) **Signature and Date**

DECLARATION

I**, AKPABIO, INYENEOBONG EFFIONG (14CH017843),** declare that this research was carried out by me under the supervision of Prof. Victor C. Osamor of the Department of Computer and Information Sciences, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria. I attest that the dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation are duly acknowledged.

AKPABIO, INYENEOBONG EFFIONG

Signature and Date

CERTIFICATION

We hereby certify that this dissertation titled "**DEVELOPMENT OF A PREDICTIVE MODEL FOR FACILITATING DRONE LANDING**" is an original research work carried out by **AKPABIO INYENEOBONG EFFIONG** (**14CH017843**) in the Department of Computer Information Science, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of Prof Victor. C. Osamor. We have examined and found this work acceptable as part of the requirements for the award of Master of Science in Computer Science.

Prof. Victor C. Osamor
(Supervisor) **Signature and Date**

Prof. Olufunke O. Oladipupo
(Head of Department) **Signature and Date**

Prof. Adio T. Akinwale
(External Examiner) **Signature and Date**

Prof. Akan B. Williams
(Dean, School of Postgraduate Studies) **Signature and Date**

DEDICATION

This project is dedicated to Almighty God for his grace, wisdom, provision, and protection all through this program. I also dedicate this project to my family for their support during the span of this program

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ABSTRACT

Drones are one of the leading technological improvements of the 21st century and have a wide range of use in different fields of human endeavor: Military, Retail, and Medicine amongst other fields. The increasing use of drone in day to day like unfortunately comes with dangers as the number of damages and injuries increase with the increase in use of drones especially with respect to safely landing of the drones in cases of emergency. In Particular the use of autonomous drones has also seen increase number of usage in recent times. These unmanned aerial vehicles can perform majority of drone activities such as navigation, acceleration, landing, surveillance e.t.c with little to no human intervention. Landing is one such activity that yields dangers such as injury or loss of property. To mitigate this problem, this study aims to develop a model to analyze images and determine if the image represents a landmark that is safe for emergency landing of the drones. Across Literature several approaches exist to achieve autonomous drone landing, it can be broken down broadly into visual and non-visual approaches. Our study focuses on the visual approach, utilizing landmark images captured by the drone live camera. The image will then be processed by the deep learning model that utilizes convolutional neural network that will predict if the image is a safe landmark for landing. The other visual approach involves using a marker or co-operative target to mark where is safe for the drone to land with the obvious drawback of needing to pre-install the marker. Our solution also mitigates the need to have a marker installed before autonomous drone landing can be accomplished.

Keywords: Drones, Drone Landing, Image Classification, CNN, Deep Learning, Machine Learning, Transfer Learning.