TRAJECTORY OF THE CYCLONE IN SATELLITE VIDEO USING ADVANCED MACHINE LEARNING TECHNIQUES

A

Project Report Submitted in Partial fulfilment of the Requirement for the

Award of the Degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

Submitted by

K.S. GOWTHAMI - 199Y1A0458 KAYALA JANARDHANA - 199Y1A0467

G. PRASANNA KUMAR -199Y1A0448 KALLURI KHAJABEE - 199Y1A0462

Under the Guidance of

Dr. D. ARUN KUMAR, Ph.D.

Associate Professor

Department of Electronics and Communication Engineering

DEPARTMENT OF ELECTRONICS& COMMUNICATION ENGINEERING

K.S.R.M. COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)

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– 516003 (A.P.) 2022- 2023

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(An ISO 14001:2015 Certified Institution) KADAPA – 516003 (A.P.)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CERTIFICATE

This is to certified that the project report entitled "TRAJECTORY OF THE CYCLONE IN SATELLITE VIDEO USING ADVANCED MACHINE LEARNING TECHNIQUES" is being submitted by K.S. GOWTHAMI (199Y1A0458), KAYALA JANARDHANA (199Y1A0467), GOLLA PRASANNA KUMAR (199Y1A0448), KALLURI KHAJABEE (199Y1A0462) to K.S.R.M. College of Engineering (AUTONOMOUS), Kadapa in partial fulfilment of the requirements for the award of the degree of "BACHELOR OF TECHNOLOGY" in "ELECTRONICS AND COMMUNICATION ENGINEERING" is a bonafide record of the project work carried out by them under our supervision during the period 2022-2023.

Project guide:

Dr. D. ARUN KUMAR

M. Tech, Ph.D.,

Associate Professor & Dept. of E.C.E

Head of the Department:

Dr. G. HEMALATHA

M. Tech, Ph.D., Professor

HOD & Dept. of E.C.E

Date: Internal Examiner External Examiner

ACKNOWLEDGMENT

Our sincerest appreciation must be extended by our faculties. We also want to thank faculties of the college. They have been very kind and helpful to us. Especially we'd also like to express my gratitude to our principal Prof. V.S.S. MURTHY, Ph.D. for providing all sorts of facilities regarding for completion of this project whole heartedly.

We would like to express our sincere thanks to Dr. G. HEMALATHA M. tech., Ph. D, Professor and Head of Electronics and Communication Engineering (ECE) department for providing us an opportunity and being centre of attention to complete the project. It is a great pleasure in expressing a deep sense of gratitude and veneration to our mentor Sri Dr. D. ARUN KUMAR, M. tech., Ph. D, for his suggestions and directions all through the course and the project.

Finally, we are thankful to all of our team members who helped us in getting towards the completion of the project work successfully.

We would like to thank to all above members who contributed directly or indirectly to complete our final year project "TRAJECTORY OF THE CYCLONE IN SATELLITE VIDEO USING ADVANCED MACHINE LEARNING TECHNIQUES".

K.S. GOWTHAMI (199Y1A0458)

KAYALA JANARDHANA (199Y1A0467)

GOLLA PRASANNA KUMAR (199Y1A0448)

KALLURI KHAJABEE (199Y1A0462)

ABSTRACT

The aim of current project is to get the trajectory of the Cyclone and to predict the point of contact of the Cyclone on the land surface in Satellite Video using Advanced Machine Learning Techniques. The precise location of the tropical cyclone (TC) center is critical for intensity estimation and trajectory prediction. Due to the variability of TC morphology and structure, there are still some challenges in locating its center automatically. The ability of the deep convolutional network to capture multilevel structural features of the images is exploited. Furthermore, a two-step scheme for locating the TC center is proposed, which contains the object detection for TCs with deep learning and the comprehensive decision for TC centers. In the object detection, considering the statistical scale distribution of TCs, the global and local features extracted by the network are combined to form the fusion feature maps through the upsampling and concatenation. The changes in the TC scale are accommodated by two different scale outputs. A high detection rate and a low false alarm rate are obtained with the object detection, which provides an initial position for the TC center. Within the scope of the TCs, the final position of the center is obtained through segmentation, edge detection, circle fitting, and comprehensive decision. The experimental results show that the average latitude and longitude error of the proposed method is about 0.237°. For the TC in the initial phase or dissipation stage, the location results are usually superior to the results of the comparison algorithms.

TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
1	INTRODUCTION	1-2
2	LITERATURE SURVEY	3-5
3	DATA SOURCE	6-7
4	OBJECT DETECTION	8-9
5	IMAGE PROCESSING 5.1 IMAGE CLASSIFICATION IN OBJECT DETECTION	10-11
6	OBJECT DETECTION 6.1 OBJECT DETECTION USING ROBO FLOW 6.2 OBJECT DETECTION USING YOLOV5	12-13 13-14
7	EPICENTER 7.1 IMAGE SEGMENTATION 7.1. 1 OBJECT DETECTION 7.1.2 BINARYSEGMENTATION 7.1.3 EDGE AND CIRCLE DETECTION 7.1.4 EYE DETECTION ON CONCENTRIC CIRCLE 7.2 CONCENTRIC CIRCLES 7.3 BOUNDING BOX METHOD 7.4 LABELLING METHOD	15-16 17 18-19 19-20 21-22

	7.5 GETTING THE EPICENTER 7.6 GETTING THE EPICENTER OF CYCLONE USING YOLIV7 7.7 CODE	22-24 25-26 26-27 27-35
8	8.TRAJECTORY OF THE CYCLONE 8.1 CODE	36-38 38-49
9	CONCLUSION	50
10	REFERENCES	51

LIST OF FIGURES

1. Fig.4: Object Detection
2. Fig.5.1: Block Diagram for image classification
3. Fig.6.1: Robo flow process
4. Fig.6.2: Object detection using yolov5
5. Fig.7: Epicenter
6. Fig.7.1 : Block diagram Image segmentation
7. Fig. 7.1: Image segmentation
8. Fig. 7.1.1: Object detection technique
9. Fig.7.1.2: Binary segmentation
10. Fig.7.1.3: Edge and circle detection
11. Fig.7.1.4: Eye detection on concentric circle 12. Fig.7.3: Flow chart of the OSIP algorithm
13. Fig.7.4: Examples of bounding box labelling
14. Fig.7.4.1: Structure of Darknet
15. Fig.7.6: Epicenter of cyclone in satellite image
16. Fig.8: Trajectory of cyclone
17. Fig.8.1: The colours marks of position
18. Fig.8.2: Trajectory of cyclone in satellite image

LIST OF TABLES

1. Table.3: Data Collection