

Cyclone Intensity Estimation System using Satellite Images

Sakshi Desale¹, Mujnabeen Khan², Shweta Patil³, Nisarga Pahune⁴, Shrinidhi Gindi⁵

Students, Department of Information Technology^{1,2,3,4}

Assistant Professor, Department of Information Technology⁵

M. H. Saboo Siddik College of Engineering, Byculla, Mumbai, India

¹sakshi.612016.it@mhssce.ac.in, ²mujnabeen.612025.it@mhssce.ac.in,

³shweta.612041.it@mhssce.ac.in, ⁴nisarga.512035.it@mhssce.ac.in ⁵shrinidhi.gindi@mhssce.ac.in

Abstract: Tropical cyclones are big storms that can cause a lot of damage. Cyclone intensity estimation plays a vital role in disaster preparedness, response, and mitigation strategies. This paper introduces a novel approach to estimating cyclone intensity using satellite images through a Convolutional Neural Network (CNN) model. Unlike previous methods, we employ advanced techniques such as histogram analysis for feature extraction and adaptive thresholding for image segmentation using mean, Gaussian, and Otsu methods. The model also predicts potential coverage distance. Additionally, we present a user-friendly visualization portal, a pioneering effort in this field, which displays the deep learning output along with contextual information for end-users

Keywords: Satellite Images, Convolutional Neural Networks, Cyclone Intensity Estimation, Deep Learning

REFERENCES

- [1]. Dr. Madhumala R B, Abhijna K C, B G Shreyas, Bhargavi, Dhanush Gowda S, (2023). Cyclone Intensity Estimation Using INSAT-3D IR Imagery and Deep Learning.
- [2]. National Hurricane Center (NHC): <https://www.nhc.noaa.gov/>.
- [3]. World Meteorological Organization (WMO): <https://public.wmo.int/en>.
- [4]. National Oceanic and Atmospheric Administration (NOAA): <https://www.noaa.gov/>.
- [5]. Manil Maskey ,Rahul Ramchandran, Mutthukumaran Ramasubramanian ,Iksha Gurung , Brian Freitag ,Aaron Kaulfus ,Drew Bollinger,Daniel j. Cecil, Jeffrey Miller, (2020).Deep Learning Based Tropical Cyclone Intensity Estimation System.
- [6]. Harshal Dharpure ,Tejal Mohod, Radhika Malani,Janhavi Chandak, Atharva Belge, Preet Ambadkar, Prof Ankita Pande,(2023).Deep learning Based Cyclone Intensity Estimation Using INSAT-3D IR Imagery: A Comparative Study.
- [7]. Dешna Jain, Esha Mathur, Garima Mathur, Priti Shukla, Praveen Bhanodia,(2022).Cyclone Intensity Estimation Based on Deep Learning Utilizing INSAT-3D Data.
- [8]. Chang-Jiang Zhang, Xiao-Jie Wang, Lei-Ming Ma, and Xiao-Qin Lu,(2021).Tropical Cyclone Intensity Classification and Estimation Using Infrared Satellite Images With Deep Learning.
- [9]. M. Swarna, N. Sudhakar and N. Vadaparathi, (2020).An effective tropical cyclone intensity estimation model using Convolutional Neural Networks
- [10]. Harshal Dharpure ,Tejal Mohod, Radhika Malani,Janhavi Chandak, Atharva Belge, Preet Ambadkar, Prof Ankita Pande,(2023).Deep learning Based Cyclone Intensity Estimation Using INSAT-3D IR Imagery: A Comparative Study.
- [11]. Smith, J., et al. "Advancements in Cyclone Intensity Estimation using Satellite Imagery." Journal of Meteorological Research, vol. 25, no. 3, 2021.
- [12]. Shih, Y. L., & Lu, J. Y. (2021). Development of a wireless weather monitoring system with a cloud-based database using NodeMCU. Applied Sciences, 11(8), Article ID 3456.

- [13]. M.SWARNA,N.SUDHAKAR,N.VADAPARTHI(2020).An effective tropical cyclone intensity estimation model using Convolutional Neural Networks
- [14]. P Wang, P Wang,D Wang,B Xue,(2021).A conformal regressor with random forests for tropical cyclone intensity estimation.
- [15]. Kapoor,R.Kumar,Kim, Jaeyoung,GŁowacz, Zygfyrd,sciencedirect ,(2017).Image Histogram-a overview
- [16]. Parthima Guruprasad, Kushal S, Manjesh.T.N,(2020). OVERVIEW OF DIFFERENT THRESHOLDING METHODS IN IMAGE PROCESSING