



A Comprehensive Review on Tropical Cyclone Prediction Based on Deep Learning Techniques with Data Analytics

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Abstract:

Tropical Cyclones occupy main part of worry in meteorology, examinations in regards to the axisymmetric structures, dynamic components, as well as estimating procedures beyond hundred years. Precise and productive demonstrating of the breeze field is basic to viable moderation of misfortunes because of the Tropical Cyclones - related perils. The Tropical Cyclones (TC) track conjecture is as yet a difficult issue. For functional TC figures, it is valuable for forecasters to observe the comparable TC in history and reference its information to further develop TC. Lately, the accessibility of reasonable TC information has expanded and further developed methods have been created, notwithstanding old strategies having been adjusted. Specifically, Deep Learning based methods are currently being considered at meteorological workplaces. This new procedure involves openly accessible satellite pictures as information, can be run on standard PCs, and can create estimates with great exactness. Thus, Deep Learning based procedures appear to be particularly appropriate for agricultural nations which have restricted ability to gauge typhoons and where human losses are the most noteworthy. In this review, the best in class investigations of Deep Learning - based weather conditions gauging and Tropical Cyclone forecast utilizing Deep Learning models. The benefits and constraint of the condition-of-craftsmanship techniques have been talked about.

Keywords: Tropical Cyclone, Deep Learning, Cyclones, forecasting techniques, dynamic mechanisms, accuracy, satellite images.

Introduction:

Cyclones, also known as thunderstorms are basically round winds formed across tropical waters with poor climatic tension, strong winds, and heavy rain. Tropical Cyclone generates wind over 119 Kilometers per hour by cohesiveness throughout the duration of its stay over warm water. Winds might exceed 240 kilometers per hour in extreme situations, and explosions could exceed 320 km per hour. As these strong gusts come downpours, terrifying feature called storm's flooding, increase in water may reach 6 meters beyond average limits. Thunderstorms are created by a combination of strong winds and waters, and they are a real threat to coast regions. [1],[2].

Cyclones are called by various titles in different parts of the world. Storms are named storms mostly in North-Atlantic Ocean as well as east North-Pacific, and typhoons are called typhoons in the west North-Pacific near Philippines, Japan, and China[3],[4]. Thunderstorms are referred to as intense tropical cyclones, tropical cyclones, or simply typhoons in west South-Pacific and Indian Ocean. This plethora of titles all hint to a specific sort of storm. Typhoon are minimized, round storms, for the most part approximately 320 km in measurement, where gusts whirl together around low-barometric-strain focal point The winds are propelled by reduced core and the Earth's tilt, that, through with a phenomenon called as Coriolis force, alters the breeze's path. In the North-Hemisphere, Tropical Cyclones rotate inside a circular or storm direction, while in the South-Hemisphere, they rotate inside clockwise or anticyclonic direction [5]. Figure 1 addresses the picture of tropical cyclon framed in the year 2021 under control of Bengal India [6].

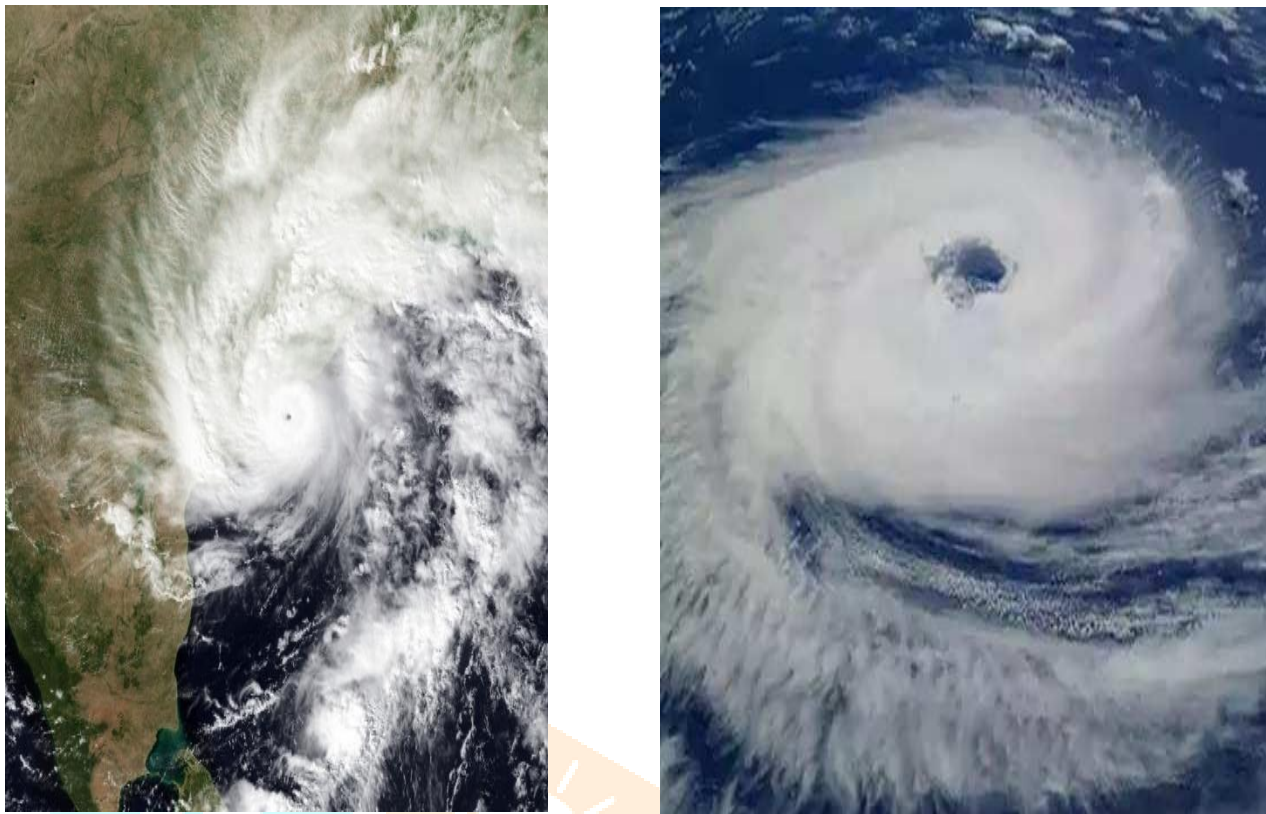


Figure 1: Satellite image of Tropical Cyclone in Bay of bengal

Harms brought about by TCs might increment in the future for two reasons. To start with, misfortunes are relied upon to increment as populace and abundance focus along weak shores keeps on developing. Continued by, vulnerability with discussion, a few researchers and environment adjust conduct with respect to tropical cyclones, for example, expanding recurrence extraordinary span in most noteworthy power [7].

The counterfeit neural organization (ANN) is a strong information demonstrating apparatus that can catch and address complex connections among data sources and results, which is created by the inspiration of carrying out fake frameworks that can perform clever errands like those performed by the human cerebrum. As a rule, ANN can surmised any nonlinear capacity. DL-based climate forecast (DLWP) has stood out in many fields, like the definitive meteorological examination foundations.

DLWP is an information driven methodology. The first is always contribution of DNN, meant for tracking down basic regulations or connections information, catch element in terms of environmental conditions change lot information. As indicated by the attributes of the meteorological information, the most appropriate DNN models for the comparing information types are examined [8].

According to the point of view with designs of DLWP, assembled into three classifications. Structures in view of essential, for example, in light of encoders [9,10,11,12]. Half and half structures made out of the fundamental DNN catch complicated fleeting highlights, totally information derived. Combine structures of DNN and NWP, information derived, yet in addition hypothesis directed. It is a clever examination point targets working on the presentation of anticipating [13].

Outrageous climate (e.g., tropical storm) discovery is urgent for calamity anticipation and crisis navigation. The information driven techniques can give forecasts promptly after getting new information, which might better suit the requirements of exceptionally responsive expectation administration than customary hypothesis driven NWP. Then again, directed and semi-administered DNNs can get through the restrictions of edge based customary location draws near. Tool compartment for outrageous environment investigation (TECA) is a use of enormous scope design identification on environment information utilizing heuristic strategies [14]. In light of the result of TECA examination, profound CNN was applied to anticipate the class mark for two outrageous climate occasion, twofold order task on focused, edited two layer pictures. Identification and limitation outrageous climate, like Tropical Cyclones, extra-Tropical Cyclones, tropical sorrows and environmental waterways. Profound Autoencoding design for bouncing box relapse involving semi-regulated learning in [15], via preparing the Autoencoding recreation od information, successfully defeats trouble marking meteorology datas. For easing tremendous death toll and property that might cause by hurricane, the expectation of its development and power has become basic. A mixture CNN-LSTM [16] anticipating storm development with force hurricane, solid conditions impacted few connected meteorology qualities, cross breed intended catching transient highlights.

In this paper, the far reaching review of Deep Learning procedures in climate expectation and Tropical Cyclones are performed. The limits and benefits are examined in this paper. At long last, it is closed with the end area with strategies to defeat the restrictions of the current techniques.

Related works:

Deep Learning techniques in weather prediction:

In [17] two methodologies for anticipating air temperature from authentic strain, moistness, and temperature information assembled in meteorology sensor in North - West Nevada. On this noisy time series forecast job, a deep neural organisation using Stacked Denoising Auto-Encoders (SDAE) outperforms a traditional multi-facet feed forward network. In temperature expectation space, the stacked denoising auto-encoder outperforms NN by achieving 97.94 percent precision vs 94.92 percent precision for NN. Profound Weather Forecasting Procedures [18] studied the forecasting of Recurrence Neural Network (RNN), Conditional Restricted Boltzmann Machine (CRBM), and Convolutional Network (CN) systems. The outcome was relied upon to add to weather conditions estimating multiple users as well as applications.

A technique in light of a profound neural organization to gain a high-goal portrayal from low-goal expectations involving weather conditions estimate as a pragmatic use case was proposed in [19]. A directed learning approach, for acquiring named information should be possible consequently. This outcomes showed critical improvement when contrasted the technique as yet humble PC frameworks. From

this investigations, critical improvement of the proposed technique was seen as contrasted and standard downscale methodology. In [20], a Deep Learning target was designed to predict the outcome demonstrate that the Deep Learning calculations showed better organization reliability on HR and hail than the assistance vector machine, irregular backwoods, and other traditional calculations. [21] demonstrated the feasibility and implementation of a start-to-finish Deep Learning nowcasting approach. The nowcasting issue was changed into a grouping issue first, and afterward, Deep Learning strategy that utilizes CNN introduced to make expectations. The exploratory outcomes showed that the Deep Learning technique improves nowcasting abilities contrasted and customary AI strategies. Sensible ability was acquired by utilizing just radar or reanalysis information. It is hard for the Deep Learning technique to recover sufficient data on Convective Initiation CI to make exact forecasts. A self-versatile cell based Deep Learning examination technique by using the multisourced information is proposed in [22] for metropolitan LULC change expectation. Profound Learning long transient memory neural organization, which is a high level model of repetitive neural organization and has a solid capacity in managing succession information, is used to metropolitan LULC change expectation. This strategy can really and effectively make LULC change forecast, and the precision ultimately depends on 93.1%. Interjection and information increase procedures for upgrade of the worldly goal and expansions of characters in a given dataset was utilized in [23]. A few tornado information were utilized for preparing. For twister characterisation and detecting the typhoon vortex, a Deep Learning model is created and tested using erroneously densified and defined storm data, yielding at least 90% and 84 percent accuracy, respectively. The direct relapse approach can be used to predict the path in the final progress. Because of the earth's arch, level photographs fail to provide impact and must be consolidated independently. In [24], an anticipating computation using a Long Short Term Memory (LSTM) Neural Network (NN) was developed to predict photovoltaic (PV) power age. This manufactured weather conditions figure is demonstrated to implant the measurable highlights of the authentic climate information, which brings about a critical improvement in the anticipating exactness. This features the meaning of using the engineered conjecture, and advance a more effective use of the freely accessible kind of sky estimate to accomplish a more dependable PV age forecast. [25] introduces a spatial Deep Learning approach that can capture the linkages of Sea surface temperature (SST) in both existences. The model is built from the ground up using the Convolutional Long Short-Term Memory (ConvLSTM) also as structural block. The findings indicated that the model is particularly optimistic for predicting short and mid-term SST field expectations correctly and usefully. The forecast exhibition is restricted simply by involving the SST itself as the info expectation variable. Another method was investigated for anticipating climate with an information serious methodology for estimating climate with an information concentrated methodology was introduced in [26]. The obtained findings revealed that DNN systems possess given around the world great exhibitions a most extreme arrived at an incentive for day by day GHI anticipating. NN expectation system known as EALSTM-QR created in [28] of wind's power forecast thinking about contributions in NWP as well as DL technique. Here, 4 primary stages:

Encoding, Bidirectional Long Short-Term Memory (LSTM), Attention and Quantile Regression (QR). Expectation precision is should be gotten to the next level. A high level Bayesian Deep Learning strategy for airplane direction expectation considering weather conditions impacts was introduced in [29]. A deterministic direction forecast system of traditional DL strategies introduced for dealing with spatial as well as transient data utilizing settled CNN, RNN, and Connected NN. Outcomes showed a critical decrease in expectation change. To lessen the direction deviation, ML pipeline is required. The lopsidedness information of precipitation making ANN, NTM , LSTM, RNN, GRU interaction introduced in [30]. A successful environment investigation is expected to comprehend the different elements that add to environmental changes. It's important for recognizing relationships between characteristics comprehension for climate information. It is intended to give non-experts simple admittance to systems also strategies utilized in the field of downpour conjecture and analyze different aftereffects of different techniques and calculations utilized in research. It is required work on the design and accomplish more exactness with new information datapoints. Table1 addresses the correlation of different Deep Learning strategies in climate expectation.

Table1: Comparison of various Deep Learning techniques in weather prediction

Ref. No.	Method	Result	Limitation
17	Forecast climate in Nevada: Deep Learning model	In the temperature forecasting domain, its stacking noise removal auto-encoder outperforms NN by achieving 97.94 percent precision compared to NN's 94.92 percent accuracy.	Numerical strategy and factual recipes based techniques keeps on experiencing high intricacy
18	Weather determining utilizing Deep Learning techniques	The result was relied upon to add to weather conditions anticipating for wide application spaces including flight route to farming and the travel industry.	This strategy is experienced with generally low forecast exactness
19	Deep Downscale: DL technique in high-goal climate forecasting.	Significant improvement of the proposed system was seen as contrasted and standard downscale procedures.	Flexibility of this strategy was not consolidated in this technique
20	Forecasting various kinds of convective climate: A Deep Learning approach	Higher arrangement exactness on Heavy Rainfall and hail than help vector machine, arbitrary timberlands, and other conventional AI algorithms	Complication of the work is higher

21	Convolutional neural organization for convective tempest nowcasting utilizing three dimensional Doppler climate radar data	Reasonable expertise was gotten by utilizing just radar or reanalysis data	It is challenging for the Deep Learning strategy to recover sufficient data on Convective inception CI to make precise forecasts
22	Using self-versatile structure, based DL using multi source information, urban land-use alter expectations.	This technique can actually and productively make LULC change forecast, and the exactness ultimately depends on 93.1%	As this strategy depends on metropolitan land and cell based Deep Learning, it is hard to execute inclusion range.
23	Deep Learning calculation for satellite imaging based twister detection	the straight relapse strategy can be utilized for foreseeing the path	The level pictures neglect to grant impact because of shape of the earth and need to fused independently
25	Using time-series satellite measurements, the spatiotemporal DL in ocean average temperatures prediction.	The findings indicate that this system is extremely promising for accurately and efficiently forecasting short and mid-term daily SST field conditions.	The expectation execution is restricted simply by involving the SST itself as the information expectation variable.
26	Deep Learning for sunlight based power anticipating A methodology utilizing AutoEncoder and LSTM Neural Networks.	Estimation approach for the climate boundaries thought about with the use of Filters.	Limitations happens with the layers of neural organization.
27	DNN predict Radiations from sun in Hail Region and Saudi Arabia.	The acquired outcomes shows DNN given worldwide great exhibitions a most extreme arrived at an incentive for every day GHI forecasting.	Classification precision is required to have been gotten to the next level
28	EALSTM-QR: Interval	Weather prediction is occurred	The prediction

	wind-power expectation model in view of mathematical climate forecast and Deep Learning.	with Deep learning models shows better performance	accuracy is need to be improved
29	Data-driven direction forecast with climate vulnerabilities: A Bayesian Deep Learning approach.	The results showed a significant reduction in prediction variance	To reduce the trajectory deviation, ML pipeline is needed
30	An incorporated methodology for weather conditions estimating and catastrophe forecast utilizing Deep Learning design in light of memory Augmented Neural Network's (MANN's).	It is intended to give non-experts simple admittance to systems too techniques utilized in the field of downpour figure and analyze different consequences of different strategies and calculations utilized in research.	It is required work on the design and accomplish more exactness with new information datapoints.

Tropical Cyclone Prediction by Deep Learning techniques:

A coordinated short reach Tropical Cyclone track anticipating framework that examinations the Tropical Cyclone tracks from the accessible satellite pictures was introduced in [31]. The presentation of the model is palatable with a normal of estimating mistakes from best track information and normal blunder is lower than conventional procedures on Mercator projection map. This choice emotionally supportive network can be caused because of human and diminishing properties misfortune. NN system created in [32] anticipate occasional no., TCs in northern side of Indian Ocean after storms. Outcomes surmised anticipated TC with 2 systems extremely near genuine with 2 time frames. Notwithstanding, the NN model is viewed as better than MLR systems. One such Tropical Cyclone Expectation Technique might have been useful for forecasting tropical cyclones. This approach relies solely on the actual count. [33] uses three ANN methodologies to predict TC movement across the Northern side of Indian Ocean after storms. The conjecture has direct importance to the drawn out arranging and readiness for calamity the board organizations, the travel industry, fishing, and so on, The outcomes demonstrated that the absorption of brilliance information emphatically affects the expectation of track, power, thermodynamic designs, and reflectivity related with the tempests. RNN with LSTM climate information expectation was introduced in [34]. Study focuses rationale review, as well as a discussion of the model used and where twisters are

constructed, in regards to the current edge, the examination of the dataset and in conclusion the outcomes from the investigation completed and got with exceptionally less RMSE. It was likewise noticed that the expectation goes very stale as you go further in anticipating the qualities. A group ML system of TC tracks figures in West side of the Northern Pacific ocean was created and assessed in [35]. Regarding TC track conjectures, a nonlinear system named the Angle Boosting Decision Tree (GBDT) was used. Finally, the GBDT model was compared to a commonly used procedure: the Climatology and Persistence (CLIPER) model, using the Tenfold Cross-Validation technique. The test findings revealed that the GBDT system operates effectively in three gauge times, with minor figure error. This ML Prediction graphic is very dependent on the variables used and the GBDT's convenience. A profound CNN engineering is introduced for completely robotized typhoon power assessment from satellite Infrared (IR) pictures in [36]. This design is vigorous to mistakes in explanation of the tempest place with a more modest Root-Mean-Square Error (RMSE) in contrast with the past best in class techniques. It is required to have been improved by supplementing it with time series determining information. A picture handling based technique was introduced in [37] to appraise Tropical cyclone energy satellite - derived images of tropical cyclones. Using the multi-facet recurrent neural network approach, various mathematics components of TC images are used for the layout. With an accuracy of 84 percent, our technique describes TC images across the Bay of Bengal and Arabian Sea. This project is restricted to ESCS, CS, and D images. [38] uses standard deep convolution organization to determine overall strength of Tropical Cyclones. Dichotomous Logistic Regression (DLR) is a kind of regression models that may be used DLR-FH system was devised to improve overall ordering accuracy of both the satellites storm image in the shortest time possible. Fluffy participation work is then applied to appraise the force of the tornado. Tornado expectation is consequently completed with least time and high exactness. Test assessment of DLR-FH model is completed utilizing twister pictures with various factors, for example, top sign to commotion proportion, grouping precision, characterization time and bogus positive rate. information improved Deep Learning calculation was created in [39] to reproduce the breeze field inside Tropical Cyclone limit layer. information improved profound organization was created to reproduce Tropical Cyclone limit layer winds utilizing the tempest boundaries. These have been demonstrated also that boundary layer flow twisting associated with various Tropical Cyclones may be predicted exactly as well as effectively. In view of the generated information enhanced profound arrangement, the results show that a mild turmoil inside estimation information does not appreciably disintegrate reenactment outcomes. From Himawari-8 (H-8) satellite images, a profound CNN was constructed in [40] to measure the development path of Tropical Cyclone (or storms) well over Northwest Pacific bowl. The average error of the hurricane formation point is up to 27.8° , demonstrating Deep Learning's remarkable potential in forecasting Tropical Cyclone tracks. This suggests that the model's complexity be increased by taking into account the BN layers. Hurricane global positioning framework is created in [41] by joining 10-overlap cross approval is utilized to prepare and test the information. A cloud force order procedure for Tropical Cyclones in view of element extraction and example acknowledgment,

over the Bay of Bengal and Arabian Sea bowls was introduced in [42]. TC pictures have scope networks, longitude matrices, and shorelines. These constraints are because of the utilization of IR pictures. An elective methodology is to gauge the Tropical Cyclone force in a roundabout way from satellite pictures was introduced in [43]. Scientists can appraise force utilizing design extraction and examining similitudes. For transient connections, the force of the typhoon is accepted to change without a hitch, as a Tropical Cyclone is a persistent climate peculiarity. Results showed 15.77-tie root-mean-square mistake (RMSE) for the power assessment of Tropical Cyclone in the West Pacific Basin region. The arbitrary woodland strategy had the best exhibition as far as RMSE, and that of LSTM was slightly below average true to form. A bidirectional Gated repetitive units (BiGRU) network was proposed in [44] for the forecast of wave tallness during Tropical Cyclone (TC). The outcomes represent that BiGRU's prescient presentation is steady, particularly for expectation 24 hours ahead of time, and the model can in any case be actually utilized for constant wave tallness forecast when the exhibition of customary AI strategies is seriously corrupted. The lack of this work is that the information of various floats are input into the model as persistent information, which makes the information of various floats cooperate with one another, consequently the model gleans some significant experience of unimportant data. A repetitive neural organization model for anticipating the directions and forces of Tropical Cyclones (TCs) in the northwestern Pacific Ocean bowl is portrayed in [45]. The precision of the 6 to 24-h conjectures by the model was equivalent or better than Climatology and Persistence (CLIPER), Statistical Typhoon Intensity Forecast (STIFOR), and existing AI-based methodologies. The RCTCP accordingly addresses an alluring choice to support brief decision making in pertinent fields because of its computational effectiveness. It is expected to expand the conjecture length and territorial scope of activity of the model. The Tropical Cyclone forecast model has been built [46] considering keeping the difficulties winning in the field of Tropical Cyclone force expectation. Examination of strange conduct or dynamic attribute of Tropical Cyclone is significant in the field of TC power expectation. Force of the twister is anticipated utilizing the proposed order model. Track, landfall area, timing and strike power isn't considered in this exploration. The effect of El Niño-Southern Oscillation (ENSO) on the recurrence of TC over the BoB by utilizing 100 years TC and Southern Oscillation Index information was introduced in [47]. The paper likewise did investigations utilizing Poisson and Bayesian relapse model for the TC landfall likelihood expectation. Table2 addresses the examination of different Deep Learning strategies in Tropical Cyclone Prediction.

Table 2: Comparison of various Deep Learning techniques in Tropical Cyclone Prediction.

Ref. No.	Method	Results	Limitation
31	Application of remote detecting for hurricane track estimating in light of measurable methods	The execution of the model is palatable with a normal mistakes from best track information and normal blunder is lower than conventional procedures on Mercator projection map	This choice emotionally supportive network can be caused because of human and diminishing properties misfortune.
32	Seasonal forecast of hurricane action utilizing 3 CNN.	it is gathered that the anticipated typhoon count by the two models is exceptionally near the genuine counts for the two time frames.	This model is reliant just on the genuine count
33	Impact of satellite brilliance information on recreations hurricanes utilizing WRF-3DVAR.	The results showed that the digestion of brilliance information emphatically affects the forecast of track, power, thermodynamic designs, and reflectivity related with the storms	Intensity is just in light of the thermodynamic constructions of typhoon
34	Analyzing events of typhoon district utilizing intermittent organization.	Result are anticipated by SST utilizing RNN and LSTM expect event of TC.	It was likewise noticed that the expectation goes very stale as you go further in foreseeing the qualities
35	Western North Pacific hurricane track estimates by an AI model.	GBDT model performs well in three gauge times with generally little conjecture error.	This ML based plot is exceptionally reliant upon the chosen indicators and the convey ability of GBDT
36	Deep-PHURIE: typhoon force assessment.	This design is hearty to mistakes in comment of the tempest community with a more modest root-mean-squared blunder (RMSE) in contrast with the past best in class methods.	Complexity is expanded as it relies upon the satellite pictures
37	Tropical typhoon force identification by mathematical highlights of tornado pictures and multi-facet perceptron	This strategy groups TC pictures.	This is confined on ESCS, CS, and D sort pictures.

38	Satellite cloud picture arrangement for tornado forecast utilizing model	model is completed utilizing twister pictures with various factors, for example, top sign to commotion proportion, grouping exactness, order time and bogus positive rate.	Time taken for the characterization was high
39	Knowledge-improved Deep Learning for reproduction of hurricane limit layer winds	It has been shown that the limit layer twists related with different typhoons can be precisely and productively predicted.	Outcomes demonstrate mild clamor in estimation information considerably decay reenactment outcomes in view of the created information upgraded profound organization.
40	CNN-Based Tropical Cyclone Track Forecasting from Satellite Infrared Images.	The mean blunder of the hurricane development point comes to up to 27.8°, which shows the extraordinary capability of Deep Learning in typhoon track prediction.	Complexity happen with the development point
41	Combining Support Vector Machine and Polynomial Regressing to Predict Tropical Cyclone Track	The typhoon by SVM, tornado track is anticipated by utilizing polynomial relapsing model.	10-overlay cross approval is utilized to prepare and test the information which makes the framework extremely complicated.
42	Intensity forecast of hurricane utilizing multi-facet multi-block nearby parallel.	Results shows included procedure AI classifiers are attainable typhoon force arrangement from infrared images.	TC pictures have scope lattices, longitude networks, and shores which makes the assessment troublesome
43	Interpretable hurricane force assessment utilizing Dvorak-motivated AI strategies.	The arbitrary backwoods strategy had the best presentation as far as RMSE	LSTM was not quite so great true to form
44	Forecasting typhoons wave stature utilizing bidirectional gated repetitive unit.	The outcomes show that BiGRU's prescient exhibition is steady, particularly for expectation 24 hours ahead of time, and the model can in any case be actually utilized for constant wave stature forecast when the presentation of customary AI strategies is seriously degraded.	The model gleans tons of useful knowledge of immaterial data
45	Near constant expectations of hurricane direction and power utilizing	The precision of the 6 to 24-h figures by the model was equivalent or better than climatology and ingenuity (CLIPER), measurable	It is expected to expand the conjecture length and provincial scope of activity of the model

	reverberation organization.	tropical storm force gauge.	
46	Tropical Cyclone forecast in light of multi-model combination across Indian waterfront region	Intensity of the twister is anticipated utilizing the proposed order model	Track, landfall area, timing and strike force isn't considered in this examination
47	Markov Chain Monte Carlo reenactment and relapse approach directed by El Niño-Southern Oscillation to demonstrate the hurricane event over the Bay of Bengal.	The paper likewise did investigations utilizing Poisson and Bayesian relapse model for the TC landfall likelihood prediction.	Prediction in light of likelihood makes the interaction troublesome

Conclusion:

Here, tropical cyclone prediction using Deep Learning has been reviewed, based on design of Deep Learning. The advantages and limitation of the state-of-art methods have been discussed. Most of the existing methods suffers from the installation and maintenance of sensors will cost a lot of manpower and material resources. high complexity and relatively low prediction accuracy. No analysis of the individual lags. These methods did not address shortcomings related to the asymmetry of the wind profile and the flexibility to incorporate many wind speed observations. Convergent cross mapping (CCM) test for determining the time series. Locally Linear Embedding is used for efficient forecasting with reduced computation. AUTOencoder base Neural Network (AUTO-NN) is used for reducing errors and improving the prediction accuracy. High-resolution regression based data analytic model for forecasting Tropical Cyclone (TC) activity with describing TC intensity in the bay of bengal region have been planned to use in the upcoming research in order to overcome the limitations of the existing approaches.

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