



IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 Issue: IV Month of publication: April 2023

DOI: https://doi.org/10.22214/ijraset.2023.51149

www.ijraset.com

Call: 🕥 08813907089 🔰 E-mail ID: ijraset@gmail.com



# A Review on Prediction and Analysis of Forest Fires Using AI and ML Algorithms

Sai Sparsha G S<sup>1</sup>, Renuka Y<sup>2</sup>, Rakshitha D Nanda<sup>3</sup>, Sonika Harshitha<sup>4</sup>, Mrs. Pushpa R N<sup>5</sup> <sup>1, 2, 3, 4</sup>Research Scholar, <sup>5</sup>Assistant Prof., Dept. of CS&E, JNNCE, Shimoga, India

Abstract: Forest fires or wildfires are major catastrophes that occur in forests, grasslands, or prairies (Grassland areas). Wildfires mostly occur either due to natural factors or human activities such as smoking cigarettes, campfires, or arson, etc. Forest fire has become one of the most drastic problems that cause damage to several forests around the globe. To prevent forest fires, analysis, and predictions should be made on land that is affected by forest fires based on temperature, wind, humidity, etc. Depending upon the above factors, analysis, and prediction are done, which region has a high possibility of wildfires' dangerous effects. Fire detection will help in finding and controlling an extreme problem in forests, this will help in reducing the forest fire in the future. Many Algorithms are available for the detection of the fire, Based on the use of Algorithms analysis and prediction of the forest fires are made.

Keywords: Forest fire, Wildfire, Analysis, Forest fire detection, Forest fire prediction

# I. INTRODUCTION

Forests are large, dense areas dominated by trees and vegetation. Forest provides food, shelter, and clothes, and is a major source of oxygen. However, forests are extremely susceptible to fire, which can have a huge negative impact on the environment, economy, and society.

In recent years, many species have lost their lives, soil erosion and loss of vegetation have increased and infrastructures and properties have been damaged mainly due to forest fires. In addition, wildfires have caused air pollution, respiratory problems, cardiovascular issues, and eye problems to people. Therefore, significant measures need to be taken to prevent wildfires.

The main purpose of the study is to compare and review ten different papers, where each author has proposed different algorithms and methodologies to predict forest fires more accurately.

### II. RELATED WORKS

Xufeng Lin et al. [1] put forward an LSTNet algorithm to detect through remote sensing satellites and GIS. The study area is situated in Chongli district, china. The proposed architecture made use of a convolution layer, a recurrent layer, and a recurrent-skin layer to detect results. The model was trained with a prediction map with ACC, and RMSE metrics. The best results were obtained from CIMISS, GCS\_WGS\_1984 coordinates.

Veerappampalayam Easwaramoorthy Sathishkumar et al. [2] put forward a Convolution Neural Network (CNN) to classify input of surveillance systems obtained from camera trap networks for wildlife monitoring and analysis. There are many techniques used for smoke detection and fire for example sensor based etc. Simple color features are used for the false alarms and computer vision-based technology was used to recognize them and further predict their smoke images or fire. Various state-of-art machine learning algorithms such as SVM, decision trees, and neural networks were used for classification. BPNN was trained using both balanced and unbalanced datasets. For unbalanced datasets, a high proportion was used along with the non-fire images to measure the performance. An accuracy of 98.72% was reported with a perfect 100% during initial training.

Chao Gao et al. [3] used a random forest (RF) and Back propagation neural network (BPNN) to predict the forest fires at the north western. The datasets were divided into training sets and validation sets. Two machine learning methods were used i.e., prediction accuracies, and AUC values. The BPNN can be optimized using network topology learning rate and threshold. Qualities of results were measured using accuracy, precision, and recall. The accuracy ranged from six significant forest fire driving factors. Made use of Convolution Neural Network (CNN) supplemented by support vector machines. The result was obtained from perception and relative humidity. Support Vector Machines and artificial neural networks were used as a classifier.

Bhogendra Mishra et al. [4] suggested a spatiotemporal dimension by combining the set of weights. Model evaluation has been performed. The required data was collected from the Kaggle with data used for training and testing. A comparative study was carried out using forests in South Korea. It was concluded that the DNN model came out to be the most successful one among others.



## International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538 Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

Akshatha V et al. [5] proposed a Deep Learning method based on a convolution neural network (CNN). The datasets were used as images after collecting we are pre-processing for training and testing to classify datasets using the CNN algorithm and we can get the output as fire is present or not. And support vector machine (SVM) and KNN were used as a classifier. To extract features several CNN such as ResNet50 were used. Complex data using CNN were used in the form of text, images, or sound. The number of cycles of the epoch was used to train the machine learning model. Introduced the Resnet-50 model, it proposed accurate rate and is feasible, Resnet-50 extract structure. It will stay away from false alarms. The accuracy rate reached 93% which is the best.

Kajol R Singh, and K.P et al. [6] used Indian Meteorological Department and UCI with a Support Vector Machine, Parallel Support Vector Machine, and PySpark model. It divides the training dataset into subsets and combines the first and second layers from support vectors. Big data analysis can handle distributed framework and this model makes it more efficient and reliable. Communicate between client and server for request responses that use Django and in the background it will run the programs to predict the forest fire. Predicts, alerts, Intensity, and Validation were divided into results in this we have an automated alert.

Preeti T et al. [7] came forward with Decision Tree, SVM, Random Forest Regression, and ANN, to detect forest fires at the order level. The required data were collected from the Kaggle with 517 observations and 13 variables in the European Republic. After data pre-processing it is formed in a standard format and a suitable model was selected based on the dataset for data preparation, pre-processed data were plotted correlation matrix between the correlations between metrological data like relative humidity, wind speed, temperature, and rain two variables measures and move together.

Ahmed M. Elshewey et al. [8] made use of Linear Regression, Ridge Regression, and Lasso Regression supplemented by k-means to detect fires. To extract features several Data mining such as data collection, data pre-processing, data analysis, and data post-processing were used, and Support Vector Machine (SVM) and KNN were used as a classifier. In machine learning algorithm, linear regression for predicting variables such as temperature, and humidity and show the outperformed result in accuracy, ridge regression is a variation of linear regression and minimizes the model of the complexity, when applied to the lasso regression it shows the highest accuracy score overall. After performing multiple tests, the linear regression algorithm showed the best result.

Mochammad Anshori et al. [9] proposed ELM, Random Forest Regression, Linear Regression, and Support Vector Regression. In machine learning the first step is data collection using collecting relevant data based on satellite imagery and remote sensing technologies, the next step is collecting relevant features i.e., Feature Selection which reduces dimensionality and improves accuracy, and Model selection like different types of models like decision tree, support neural network, and neural network which can be trained on the pre-processed data for accurate predictions. It is the process of selecting and transforming the data that can be easily analyzed.

B.K. Singh et al. [10] suggested Extreme Learning Machine (ELM) and the study area located in Lam Dong, Vietnam. It firstly acquires the data of forest fire and then normalizes and then divides the datasets it develops the ELM model and decides on neurons from the hidden layer. The Database has ten attributes and the confusion matrix was recorded for each. The confusion matrix was proposed for the ELM. The best precision result comes with the ROC curve and confusion matrix. Among the five activations tested the sigmoid function shows outperformance while the hardlim function has poor performance, so the sigmoid function is suggested for forest fire prediction.

# III. COMPARISON AMONG MODELS

Table 1 includes a comparison among models based on datasets, methods, algorithms, and results.

TABLE-1. Comparison Among Models				
References	Datasets/Study Areas	Methods and Algorithms	Outcomes	
Xufeng Lin et al. [1] 2023	Chongli District – remote	Pearson analysis,	Accuracy = 0.941	
	sensing data and	Multicollinearity Test,		
	meteorological data	Long-and Short-term Time-		
		series Network(LSTNet),		
		CNN, Recurrent		
		Component, Recurrent Skip		
		Component, and		
		Autoregressive Component		

### TABLE-1: Comparison Among Models



ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538 Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

Veerappampalayam	Satellites(Geostationary	Convolution Neural	Accuracy = 98.72 for Xception
Easwaramoorthy	weather satellites including	Network, VGG-16,	based model
Sathishkumar et al. [2]	MODIS, VIIRS, Copernicus	Xception, Transfer	
2023	Sentinel-2 and Landset-8),	Learning, Feature Extractor,	
	Images from Google and	Fire-Tuner, and Learning	
	Kaggle, The BoWFire dataset	Without Forgetting	
Chao Gao et al. [3] 2023	China Meteorological	Random Forest Algorithm,	Accuracy = between 86.01%
	DataSharing Network,	Backpropagation Neural	and 88.98%
	National Geographical	Network Algorithm, SVM,	AUC Value = between 0.930
	Information Resource	RF Importance Evaluation,	and 0.955
	Directory Website, and	and Logistic regression and	
	Geospatial Data Cloud of	ROC	
	China		
Bhogendra Mishra et al.	Kaggle	Maximum Entropy(Maxent)	Maxent = 90% area under very
[4] 2023	(Bioclimatic(worldclim),	and Deep Neural	low risk and $DNN = 83.78\%$
	Topographic(USGS,	Network(DNN)	area under very low risks.
	GTOP030), Vegetation-		DNN showed many area under
	related (GEOFABRIK, MODIS,		nigner fisks compared to
	Anthronogenia(SEDAC		Maxent (2.64% Versus 0.27%)
	CEOEADDIK) Survey		
	Departmental Napal		
	Livestock and Geowiki)		
Alsohotho V at al. [5]			
I AKShaina Verari 151	Images from Internet	Deep Learning and CNN	Accuracy = 93%
2022	Images from Internet	Deep Learning and CNN	Accuracy = 93%
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et	Indian Meteorological	Support Vector Machine,	Accuracy = 93% Parallel SVM model = 63.45
Akshatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021	Indian Meteorological Department and UCI	Support Vector Machine, Parallel Support Vector	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021	Indian Meteorological Department and UCI	Support Vector Machine, Parallel Support Vector Machine, and PySpark	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021	Indian Meteorological Department and UCI	Support Vector Machine, Parallel Support Vector Machine, and PySpark model	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021	Indian Meteorological Department and UCI Kaggle(natural park of	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM,	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021	Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM, Random Forest Regression,	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021	Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic)	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM, Random Forest Regression, and ANN	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021	Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic)	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM, Random Forest Regression, and ANN	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM, Random Forest Regression, and ANN Linear Regression, Ridge	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal	Deep Learning and CNNSupport Vector Machine, Parallel Support Vector Machine, and PySpark modelDecision Tree, SVM, Random Forest Regression, and ANNLinear Regression, Ridge Regression, and Lasso Regression	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM, Random Forest Regression, and ANN Linear Regression, Ridge Regression, and Lasso Regression	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal	Deep Learning and CNN Support Vector Machine, Parallel Support Vector Machine, and PySpark model Decision Tree, SVM, Random Forest Regression, and ANN Linear Regression, Ridge Regression, and Lasso Regression	Accuracy = $93\%$ Parallel SVM model = $63.45$ RMSE and SVM = $63.5$ RMSE MAE = $0.03$ , MSE = $0.0004$ and RMSR = $0.07$ Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression   ELM, Random Forest   Darmession	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et al. [9] 2019	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal Montesinho Natural Park in Portugal	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression   ELM, Random Forest   Regression, Linear   Decreasion and Support	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE
Akshatha V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et al. [9] 2019	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal Montesinho Natural Park in Portugal	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression   ELM, Random Forest   Regression, Linear   Regression, and Support   Vector Regression	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et al. [9] 2019	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal Montesinho Natural Park in Portugal	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression   ELM, Random Forest   Regression, Linear   Regression, and Support   Vector Regression	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et al. [9] 2019 B.K. Singh et al. [10] 2019	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal Montesinho Natural Park in Portugal Lam Dong, Vietnam	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression   ELM, Random Forest   Regression, Linear   Regression, and Support   Vector Regression   Extreme Learning   Machine(FLM)	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE Accuracy: SinC function = 85.42% Padial
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et al. [9] 2019 B.K. Singh et al. [10] 2019	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal Montesinho Natural Park in Portugal Lam Dong, Vietnam	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression, Linear   Regression, and Support   Vector Regression   Extreme Learning   Machine(ELM)	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE Accuracy: SinC function = 85.42%, Radial Basis Function = 84.95% and
Aksnatna V et al. [5] 2022 Kajol R Singh, and K.P et al. [6] 2021 Preeti T et al. [7] 2021 Ahmed M. Elshewey et al. [8] 2020 Mochammad Anshori et al. [9] 2019 B.K. Singh et al. [10] 2019	Images from Internet Indian Meteorological Department and UCI Kaggle(natural park of Montesano in European Republic) Montesinho Natural Park in Portugal Montesinho Natural Park in Portugal Lam Dong, Vietnam	Deep Learning and CNN   Support Vector Machine,   Parallel Support Vector   Machine, and PySpark   model   Decision Tree, SVM,   Random Forest Regression,   and ANN   Linear Regression, Ridge   Regression, and Lasso   Regression   ELM, Random Forest   Regression, Linear   Regression, and Support   Vector Regression   Extreme Learning   Machine(ELM)	Accuracy = 93% Parallel SVM model = 63.45 RMSE and SVM = 63.5 RMSE MAE = 0.03, MSE = 0.0004 and RMSR = 0.07 Accuracy score in training dataset = 1, 0.98 and 0.98 Accuracy score in testing dataset = 1, 0.95 and 0.81 Accuracy = 63.09511 RMSE Accuracy: SinC function = 85.42%, Radial Basis Function = 84.95% and Hardlin Function = 77.08%



International Journal for Research in Applied Science & Engineering Technology (IJRASET)

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538 Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

#### IV. CONCLUSION

The causes of forest fires have been increasing fairly, the problem is mainly caused by the growing population of humans. As humans will arrive in the forest frequently and collect wood, timber, etc, resources of the forest. 90% of forest fires in India are man-made, catastrophic wildfires are deadly costly, and destructive. We illustrated several researchers who are engaged in the field of forest fire Analysis and Prediction during the survey based on the available resources.

#### REFERENCES

- Xufeng Lin, Zhongyuan Li, Wenjing Chen, Xueying Sun and Demin Gao, "Forest Fire Prediction Based on Long- and Short-Term Time-Series Network", mdpi, vol. 14, Issue 4, pp. 1-18, Apr. 2023.
- [2] Veerappampalayam Easwaramoorthy Sathishkumar, Jaehyuk Cho, Malliga Subramanian and Obuli Sai Naren, "Forest fire and smoke detection using deep learning-based learning without forgetting", Springer Open, vol. 19, no. 9, pp. 1-17, Feb. 2023.
- [3] Chao Gao, Honglei Lin, and Haiqing Hu, "Forest-Fire-Risk Prediction Based on Random Forest and Backpropagation Neural Network of Heihe Area in Heilongjiang Province, China", mdpi, vol. 14, Issue 2, pp. 1-17, Jan. 2023.
- [4] Bhogendra Mishra, Saroj Panthi, Shobha Poudel, and Bhoj Raj Ghimire, "Forest fire pattern and vulnerability mapping using deep learning in Nepal ", Springer Open, vol. 19, no. 3, pp. 1-15, Jan. 2023.
- [5] Akshatha V and K R Sumana, "Analysis of Wildfire Detection using CNN Model", International Journal for Research in Applied Science & Engineering Technology (IJRASET), ISSN: 2321-9653, vol. 10, Issue VIII, pp. 241-245, Aug. 2022.
- [6] Kajol R Singh, K.P. Neethu, K Madhurekaa, A Harita and Pushpa Mohan, "Parallel SVM model for forest fire prediction", Elsevier, vol. 3, pp. 1-12, Jul. 2021.
- [7] Preeti T, Dr.Suvarna Kanakaraddi, Aishwarya Beelagi, Sumalata Malagi, and Aishwarya Sudi, "Forest Fire Prediction Using Machine Learning Techniques", Institute of Electrical and Electronic Engineers(IEEE), pp. 1-6, Jun. 2021.
- [8] Ahmed M. Elshewey and Amira. A. Elsonbaty, "Forest Fires Detection Using Machine Learning Techniques", Journal of Xi'an University of Architecture & Technology, ISSN No: 1006-7930, vol. XII, Issue IX, pp. 510 -517, Oct. 2020 [Google Scholar].
- B.K. Singh, Nikhilesh Kumar and Pratima Tiwari, "Extreme Learning Machine Approach for Prediction of Forest Fires using Topographical and Metrological Data of Vietnam", Institute of Electrical and Electronic Engineers(IEEE), pp. 104-102, Nov. 2019.
- [10] Mochammad Anshori, Farhanna Mar'i, Mukhammad Wildan Alauddin and Wayan Firdaus Mahmudy, "Prediction of Forest Fire using Neural Network based on Extreme Learning Machines (ELM)", Institute of Electrical and Electronic Engineers(IEEE), pp. 301-305, sept. 2019.











45.98



IMPACT FACTOR: 7.129







# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 🕓 (24\*7 Support on Whatsapp)