**Introduction:**

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Various countries have been battling with forest fire since a long time now. Such unfortunate incidents take place due to natural reasons like volcanic eruptions and lightning but mostly happens because of human activities such as unextinguished cigarette butts, fire camping and garbage deposit burning. Such incidents have become quite frequent over the last few years. As a result, a lot flora and fauna species are getting disappeared or imbalance the natural habitat and food chain. It also emits a lot of carbon emission to the environment, which leads to green-house effect and climate change, soil erosion . Therefore, it will be useful if the exact area that will be under the fire threat can be predicted beforehand.

Lot of studies have been carried out on this global problem, especially in the last few decades. Number of forest fires caused due to high voltage overhead electric powerlines in the Mediterranean forest has been explained in detail in research done by (Martinez-Canales, 1997) to prevent such incidents and minimize the loss due to it. Numerous studies have been done for detecting the fire. One of the early research have been done by (Cappellini et al., 1989) where fire detection was done at the early stages with the help of some TV cameras in real time. These camera helps to detect smoke during the daytime and flames during the nighttime. One more study on the detection of fire incidents in the boreal forest of Alaska was done by (Bourgeau-Chavez et al., 1993) using ERS-1 C-VV SAR imagery. It also determined the appearance of the basis of elapsed time, geomorphology of the area under fire, and metrological parameters. Similar study for detecting the forest fire in the eastern region of Russia has been done by (Kawano et al., 1999) using multi-dimensional satellite images. The method is based on the three-dimension histogram of the fire category. Not only in the field of detection, various studies have been done on modelling and forecasting of the fire. Likelihood of severe fires are determined from fire indices which are extracted through ground and remote satellite observation. These indices are collected for a period of 7years and are interpolated across various grids of United states to determine the density if the fire occurrence (Minardi et al., 1999). A detailed study on the type of the land and the extent of the forest fire has been done the 1997 Indonesian fire. A detailed information about the land cover were derived by comparing the land cover maps with SPOT satellite images. After superimposing the burn scar on a digitized land cover, it was evident that fire has occurred mostly on easy accessible areas such as agriculture lands and plantation areas(Lee et al., 1999). Surveys were conducted to better understand the effect of fire and the characteristics of the fire signatures with the help of three remote sensing system operating in two different spectrum(French et al., 1994).

Study on the field of forest fires are mainly concentrated on detecting the fire at an early stage, forecasting the frequency of the fire at some inaccessible areas, effect of fires on the vegetation, or accurate measurement of the burn scar. However, information about the scale of the forest fires from the first day of fire based on the meteorological details of the past few days and the readiness of the fire department on that day has not been explored much. Accurately predicting the size of the forest fire at an early stage will help the firefighting team to strategize fire extinguishing operation, positioning the crew member and equipment at the best possible position. This will reduce the spread of the fire and help in saving life of the local people and the fire fighters deployed on the site. This research will also help the local governing body to formulate rescue or evacuation operation for the people under the possible threat of fire. This will assist in granting permission to carry put local business at the fire vicinity and also restrict the tourist from entering the fire zone. This will also help in speculating the possible amount of carbon emission into the environment.

In ( 10.1007/s13762-017-1371-6) Geographical information system(GIS) is integrated with Evidential Belief Function(EBF) to determine probability of wildfire . Factors like topology, soil type, meteorological factors were taken as an input to this model. Based on the derived probability , areas were classified into moderate, high, and very high zones. In (Wotton and Martell, 2005) logistic regression has been used to find the probability that a lightening would cause an sustainable ignition as well the probability of the ignition being detected by the firefighting department. Predictors such as historical lightning strikes, fire weather/occurrence have been used. Since most of the fires are caused by the humans, a logistic generalized additive model is designed to find out the probability of an ignition at a 1km2 grid. Meteorological factors and socio-economic factors were used as the independent variables(Vilar et al., 2010). Forest department in few countries uses National Forest Fire Danger Rating System(NFFDRS) for predicting the severity of the fire. Among all, the Canadian NFFRDS(CFFRDS) has been widely accepted across the globe in terms of reliability and consistency.

For the last few years, there has been a lot of study conducted on this field using machine learning and especially Deep learning. Deep learning has been proved to be better in terms of accuracy , when dealing a huge amount of data for training and validation. The traditional machine learning models used for forest fire size predictions cannot process dataset with huge size and features. A research by Safi and Bouroumi (Safi et al., 2011) was one of the oldest study where the Neural network approach is applied the predicting the size of the forest fire. The values of the hyperparameters are determined heuristically. Deep neural network models such as LSTM(Long short-term memory) has been used to predict the size of the fire at the beginning of its occurrence. This model has been implemented as a time series data and it was able to predict the occurrence trends with an accuracy of 90.9% (Liang et al., 2019). In this research we have taken a step further in predicting the size of the wildfire by using the time series data of meteorological parameters such as temperature, relative humidity, wind speed, precipitation, visibility, due point, sea level pressure and building a time series forecasting model with Convolutional Neural Network.

The objective of the study to use 1-d Convolutional Neural network for on a time series weather related data and compare the results with few of the earlier proposed model on Back Propagation Neural network(BPNN), Recurrent Neural Network(RNN) and LSTM. The dataset has been collected for the state of Alaska, from Alaska Interagency Coordination center(AICC) website. The weather details have been captured from (<https://www.almanac.com/>) . Section 2 provides the detailed study about the literature review on this field of study . Section 3 provides the Implementation of the project along with the prerequisite, pre-processing, and model selection. Section 4 explains the comparison of all the models used in the previous section and quantify each model performance based on few evaluation parameters. Section 5 concludes this paper with the scope of future works .

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