

Deep learning approach to predict forest fires using meteorological measurements

Naaman Omar
*Department of Information
Technology*
Duhok Polytechnic University
Duhok, Iraq
naaman.omar@dpu.edu.krd
ORCID: 0000-0001-6513-1640

Adel Al-zebari
*Department of Information
Technology*
Duhok Polytechnic University
Duhok, Iraq
adel.ali@dpu.edu.krd
ORCID: 0000-0001-9236-1177

Abdulkadir Sengur
*Department of Electrical – Electronics
Engineering*
Firat University
Elazig, Turkey
ksengur@firat.edu.tr
ORCID: 0000-0003-1614-2639

Abstract— Forest fires are a serious environmental concern that causes economic and ecological harm as well as puts human lives in danger. Controlling such a condition necessitates quick identification. One option is to employ artificial intelligence (AI) techniques based on some measurements, such as those supplied by meteorological stations. Meteorological measurements namely temperature, relative humidity, rain, and wind are known to impact forest fires, and numerous fire indices, such as the Forest Fire Weather Index (FWI), rely on this information. In this paper, a deep learning approach namely the long short-term memory (LSTM) based regression method is used for efficient prediction of the forest fires. The LSTM approach is a recurrent neural network (RNN) that has become popular recently in the field of machine learning. A dataset that contains 12 features and 536 instances is used in the experimental works. The dataset is available in the UCI machine repository. The hold-out cross-validation method is used in the experiments and various metrics are used to evaluate the accuracy of the proposed model achievements. The results show that the proposed method produces reasonable predictions and outperforms traditional machine learning approaches.

Keywords- *Deep learning, Forest fire prediction, regression, meteorological data.*