

Prediction of Terrorist Activities in Nigeria using Bayesian Neural Network with Heterogeneous Transfer Functions

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Abstract : Terrorist attacks in liberal democracies bring about a few pessimistic results, for example, sabotaged public support in the governments they target, disturbing the peace of a protected environment underwritten by the state, and a limitation of individuals from adding to the advancement of the country, among others. Hence, seeking for techniques to understand the different factors involved in terrorism and how to deal with those factors in order to completely stop or reduce terrorist activities is the topmost priority of the government in every country. This research aim is to develop an efficient deep learning-based predictive model for the prediction of future terrorist activities in Nigeria, addressing low-quality prediction accuracy problems associated with the existing solution methods. The proposed predictive AI-based model as a counterterrorism tool will be useful by governments and law enforcement agencies to protect the lives of individuals in society and to improve the quality of life in general. A Heterogeneous Bayesian Neural Network (HETBNN) model was derived with Gaussian error normal distribution. Three primary transfer functions (HOTTFs), as well as two derived transfer functions (HETTFs) arising from the convolution of the HOTTFs, are namely; Symmetric Saturated Linear transfer function (SATLINS), Hyperbolic Tangent transfer function (TANH), Hyperbolic Tangent sigmoid transfer function (TANSIG), Symmetric Saturated Linear and Hyperbolic Tangent transfer function (SATLINS-TANH) and Symmetric Saturated Linear and Hyperbolic Tangent Sigmoid transfer function (SATLINS-TANSIG). Data on the Terrorist activities in Nigeria gathered through questionnaires for the purpose of this study were used. Mean Square Error (MSE), Mean Absolute Error (MAE) and Test Error are the forecast prediction criteria. The results showed that the HETFs performed better in terms of prediction and factors associated with terrorist activities in Nigeria were determined. The proposed predictive deep learning-based model will be useful to governments and law enforcement agencies as an effective counterterrorism mechanism to understand the parameters of terrorism and to design strategies to deal with terrorism before an incident actually happens and potentially causes the loss of precious lives. The proposed predictive AI-based model will reduce the chances of terrorist activities and is particularly helpful for security agencies to predict future terrorist activities.

Keywords : activation functions, Bayesian neural network, mean square error, test error, terrorism

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