ABSTRACT

Religious studies is one of the fields with abundant resources for the development of Natural Language Processing (NLP), considering that every religion has written scriptures that serve as a guide for its followers. In the context of Islam, the Qur'an and Hadith are the two main sources of law. A hadith refers to any statement, action, or approval of the Prophet Muhammad (peace be upon him) that has been narrated by his companions. Each hadith often contains more than one topic of discussion, which are interrelated in a hierarchical manner, ranging from general categories to more specific subtopics. This presents a unique challenge, especially for Muslims without formal education in the field of hadith studies. Therefore, this study aims to evaluate and compare the performance of three deep learning methods—Recurrent Neural Network (RNN), Convolutional Neural Network (CNN), and Convolutional Recurrent Neural Network (CRNN)—in performing hierarchical classification of hadith texts. The research evaluates each model's ability to identify the hierarchical structure of hadith topics based on multiple classification levels. In hierarchical hadith classification, the layered topic structure requires models to understand both sequential context and local patterns in the text. Hence, this study compares the performance of RNN, CNN, and CRNN in classifying hadiths based on multi-level topics. The results show that CNN excels in extracting relevant local features for classification, with the accuracy evaluation results showing that the CNN model provides the best performance with an F1-Score of 0.50 at Level 1 and 0.24 at Level 2, outperforming RNN and CRNN.

Keywords: *NLP, Hierarchical Classification, Hadith, Recurrent Neural Network*, *Convolutional Neural Network*, *Convolutional Recurrent Neural Network*