



A novel deep learning-based approach for detecting attacks in social IoT

R. Mohan Das¹ · U. Arun Kumar² · S. Gopinath³ · V. Gomathy⁴ · N. A. Natraj⁵ · N. K. Anushkannan⁶ · Adhavan Balashanmugham⁷

Accepted: 19 April 2023

© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2023

Abstract

In the innovative concept of the “Social Internet of Things” (IoT), the IoT is combined with social platforms so that inanimate devices can form their interactions with one another. Still, customers have a wary attitude toward this new standard. They worry that their privacy will be invaded and their information will be made public. IoT won’t become a frontrunner technology until we have tried true techniques to improve trustworthy connections between nodes. As a result, data privacy becomes extremely difficult, further increasing the difficulty of providing high-quality services and absolute safety. Several articles have attempted to analyze this issue. To categorize safe nodes in the IoT network, they suggested many models based on various attributes and aggregation techniques. In contrast, prior works failed to provide a means of identifying fraudulent nodes or distinguishing between different forms of assaults. To identify attacks carried out by hostile nodes and separate them from the network, we propose a novel Multi-hop Convolutional Neural Network with an attention mechanism (MH-CNN-AM). To achieve the best performance in the suggested research, performance measures including accuracy, precision, recall, *F1*-score, and MAE are studied and compared with the of existing methodologies.

Keywords Social IoT · Attacks · Security · Multi-hop convolutional neural network (MH-CNN-AM)

✉ R. Mohan Das
mohandas@newhorizonindia.edu

U. Arun Kumar
arun.udayakumarn@gmail.com

S. Gopinath
gopi.vasudev@gmail.com

V. Gomathy
gomathyvelmayil@gmail.com

N. A. Natraj
natraj@sidtm.edu.in

N. K. Anushkannan
anushkannan@kathir.ac.in

Adhavan Balashanmugham
adhavan@psgitech.ac.in

² Department of EEE, SRM Institute of Science and Technology, Ramapuram Campus, Chennai, Tamilnadu 600089, India

³ Department of ECE, Karpagam Institute of Technology, Coimbatore, Tamilnadu 641105, India

⁴ Department of EEE, Kathir College of Engineering, Coimbatore, Tamilnadu 641062, India

⁵ Symbiosis Institute of Digital and Telecom Management (SIDTM), Symbiosis International (Deemed University), Pune, India

⁶ Department of ECE, Kathir College of Engineering, Coimbatore, Tamilnadu 641062, India

⁷ Department of EEE, PSG Institute of Technology and Applied Research, Coimbatore, Tamilnadu 641062, India

¹ Department of EEE, New Horizon College of Engineering, Bengaluru, Karnataka 560103, India