Computing (2023) 105:675–688
https://doi.org/10.1007/s00607-021-00941-x

SPECIAL ISSUE ARTICLE

Anomaly detection in cloud environment using artificial intelligence techniques

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Received: 17 August 2020 / Accepted: 18 March 2021 / Published online: 28 March 2021

Abstract
Now days the usage of cloud environment is rapidly increasing in all the fields to run applications in virtual machines instead of physical hardware based machine. This increases the service availability and also reduces the cost. The usage of openstack cloud environment is also increasing both in academics and industry as it provides open source cloud services to run the application both for research and for production environment. One of the challenges in cloud environment is that the detection and prediction of the anomalies before they occur. In the traditional approach, the anomalies are detected manually by keeping track of threshold level and heartbeat. The recent research is happening on using machine learning techniques in detecting the anomalies before they occur. In this paper, we propose a model for anomaly detection in openstack cloud environment. In the proposed model, we used Stacked and Bidirectional LSTM models to build the neural network. For the experiment the data is collected from openstack using collectd. The collected data sets 10 features and class label. Using LSTM neural network, we were able to detect the anomalies in openstack environment. The proposed model achieved the detection accuracy of 94.61% for training set and 93.98% for the test set using binary cross entropy function as a loss function.

Keywords Cloud computing · Recurrent neural network · Anomaly · LSTM · Openstack · InfluxDB · Artificial intelligence

1 Introduction

Network function virtualization is a technique to virtualize network services on proprietary hardware. The usage of NFV (Network Function Virtualization) is gaining lot

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