CONTEXT-AWARE REASONING MODEL USING DEEP LEARNING AND FOG COMPUTING FOR WASTE MANAGEMENT IN IOTS ENVIRONMENTS

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Abstract

Recently, Internet of Things (IoTs) influences every aspect of human daily lives through intelligent
systems as healthcare, traffic management, and smart building. These IoTs systems depend on
contextualization of collecting data through context aware system to gain knowledge by using context
reasoning. context reasoning is a way for deducing knowledge and providing better understanding of the
collected raw data. Context reasoning is commonly carried out at the cloud due to its high processing
capabilities. However, the main challenges of using cloud are high latency time and resource consumption.
To meet these challenges, Fog computing is proposed as an intermediate layer between the IoTs devices
and the cloud layer to comply IoTs requirements of latency time reduction and resource consumption
by deploying services to the fog layer. In this paper a new context reasoning model is proposed based on
three previously defined Deep Learning (DL) models which are GoogleNet, ResNet101 and DenseNet201,
the results obtained in three cases are compared in cloud and cloud/fog environments. The conducted
simulation experiments with fog showed that the proposed cloud/fog model can reduce the time delay,
execution time, and energy consumption with good classification accuracy which is up to 96%. These
reduction values are 4%, 10%, and 94%, respectively, less than values by using cloud layer.

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