




Vol. x/ No. x/Spring 2024

Research Article

Spot Price Prediction of Resources in Cloud Computing by Proposing a New Structure in Deep Learning Method Considering the Level of QOS

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Received:

Revised:

Accepted:

Abstract

Cloud computing is a computing model that uses three instance, on-demand, reserved, and spot, to provide resources to users. The price of spot instances is on average lower than other patterns and fluctuates based on supply and demand. When a user requests a spot instance, they must provide an offer. Only if the price offered by the user is higher than the spot price, the user can use this type of resources. Therefore, predicting the price of spot instances is very important and challenging. Forecasting such dynamic time series that follow the nonlinear model requires intelligent tools such as neural networks to be able to predict the future values with the least error by observing the values of a time series. Therefore, the reliability and as a result the quality of the service is improved. For this purpose, we considered Amazon EC2 as an experimental platform and used the spot price history to predict the future price by building a new model based on deep learning. The obtained results showed that the model presented in the article based on the proposed structure of MGRU(modified GRU) can well predict nonlinear values and perform better than other methods used in this field.

Keywords: Spot price prediction, Cloud computing, Deep neural network, Modified GRU(MGRU).

Highlights

- Examining deep learning structures for predicting time series.
- Providing an efficient and powerful algorithm to analyze the historical developments of Amazon EC2 spot prices and predict the future price of resources.
- Presenting a proposed architecture based on modified GRU (MGRU).
- Forecasting price trends in the future with the aim of improving the quality of services.
- Accurate prediction of real-world time series with highly volatile data.

Citation: (in Persian).