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Benchmarking different deep regression models for predicting image rotation angle and robot 's end effector 's position (Conference Paper)

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Abstract

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Deep visual regression models have an important role to find how much the learning model fits the relationship between the visual data (images) and the predicted continuous output. Recently, deep visual regression has been utilized in different applications such as age prediction, digital holography, and head-pose estimation. Deep learning has recently been cutting-edge research. Most of the research papers have focused on utilizing deep learning in classification tasks. There is still a lack of research that use deep learning for regression . This paper utilizes different deep learning models for two regression tasks. The first one is the prediction of the image rotation angle . The second task is to predict the position of the robot 's end - effector in 2D space. Efficient features were learned or extracted in order to perform good regression . The paper demonstrates and compares various models such as a local Receptive Field-Extreme Learning Machine (LRF-ELM), Hierarchical ELM, Supervised Convolutional Neural Network (CNN), and pre-trained CNN such as AlexNet. Each model was trained to learn or extract features and map them to specific continuous output. The results show that all models gave good performance in terms of RMSE and accuracy. H-ELM was found to outperform other models in term of training speed. © 2019 IEEE.

Author keywords

Convolutional Neural Network | Deep Learning | Extreme Learning Machine | Hierarchical ELM | Local Receptive Field | Pre-trained model | transfer learning

Indexed keywords

Engineering controlled terms: Convolution | Deep learning | Deep neural networks | End effectors | Forecasting | Knowledge acquisition | Machine learning | Neural networks

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