ECBE329 Assignment 6

Group 8  
Ali Khan

Kyle Scheik

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**Selected Articles:**

**Ali:**

Shaoxiong Ji, Celina Ping Yu, Sai-fu Fung, Shirui Pan, Guodong Long, "Supervised Learning for Suicidal Ideation Detection in Online User Content", *Complexity*, vol. 2018, Article ID 6157249, 10 pages, 2018. <https://doi.org/10.1155/2018/6157249>

Hüsken, M., Jin, Y. & Sendhoff, B. Structure optimization of neural networks for evolutionary design optimization. *Soft Computing* **9,** 21–28 (2005). <https://doi.org/10.1007/s00500-003-0330-y>

**Kyle:**

Bashar, Abul, “Survey on evolving deep learning neural network architectures” , Journal of Artificial Intelligence and Capsule Networks, Vol01/ Issue.02, 73-82 (2019), <https://doi.org/10.36548/jaicn.2019.2.003>

**Zhang, Jiajia, et al. “Small Sample Image Recognition Using Improved Convolutional Neural Network.” *Journal of Visual Communication and Image Representation*, vol. 55, 19 July 2018, pp. 640–647., doi:10.1016/j.jvcir.2018.07.011.**

**Ben:**

Tan, Q., Huang, Y., Hu, J. *et al.* “Application of artificial neural network model based on GIS in geological hazard zoning”. *Neural Comput & Applic* **33,** 591–602 (2021). <https://doi.org/10.1007/s00521-020-04987-4>

Dehua Zhang, Sha Lou, “The application research of neural network and BP algorithm in stock price pattern classification and prediction”, Future Generation Computer Systems, 872-879, <https://doi.org/10.1016/j.future.2020.10.009>.

Selected Article

For this assignment we selected the article, “Small Sample Image Recognition Using Improved Convolutional Neural Network”, because of the interesting way it dealt with image recognition. This paper dealt with the challenge of image recognition, and in it the authors attempted to improve performance with a new approach. Image recognition is one of the most popular applications for neural networks as of late, and so the ability to classify and identify images effectively is of great use. In this paper, the authors adopted a hybrid system using a Convolutional Neural Network (CNN), and a General Regression Neural Network (GRNN), to achieve their desired result. In the novel method, a CNN is used to extract features from the image in question, and the GRNN acts as a classifier. This multistep approach allows for the unique advantages of each of these networks to be leveraged to provide greater accuracy in image recognition. While CNN trained via back propagation can be used for the task on its own, the authors note some disadvantages. The hybrid system proposed was able to perform the same task with higher accuracy. The CNN Used for feature extraction in this method is trained with gradient descent. It produces a feature map which is then sent to the GRNN for classification. The GRNN correlates the various features with provided data labels and results in the final product. The authors tested their method with data from the Oxford-IIIT Pet Dataset, and the Keck Gesture Dataset.

The authors found that the new method had improved accuracy compared to previous methods, However noted that where the novel method advanced in accuracy, it required a large amount of iteration to achieve these results. This was proposed to be an area for future improvement.