

Automatic Detection of Modulation Scheme Using Convolutional Neural Networks

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Research Article

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Abstract

This paper summarizes the intelligent detection of modulation scheme in an incoming signal, build on convolutional neural network (CNN). It describes the creation of training dataset, realization of CNN, testing and validation. The raw modulated signals are converted into 2D and put on to the network for training. The resulting prototype is adopted for detection. The results signify that the intended approach gives better prediction for the identification of modulated signal without need for any selective feature extraction. The system performance on noise is also evaluated and modelled.

Full Text

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Figures

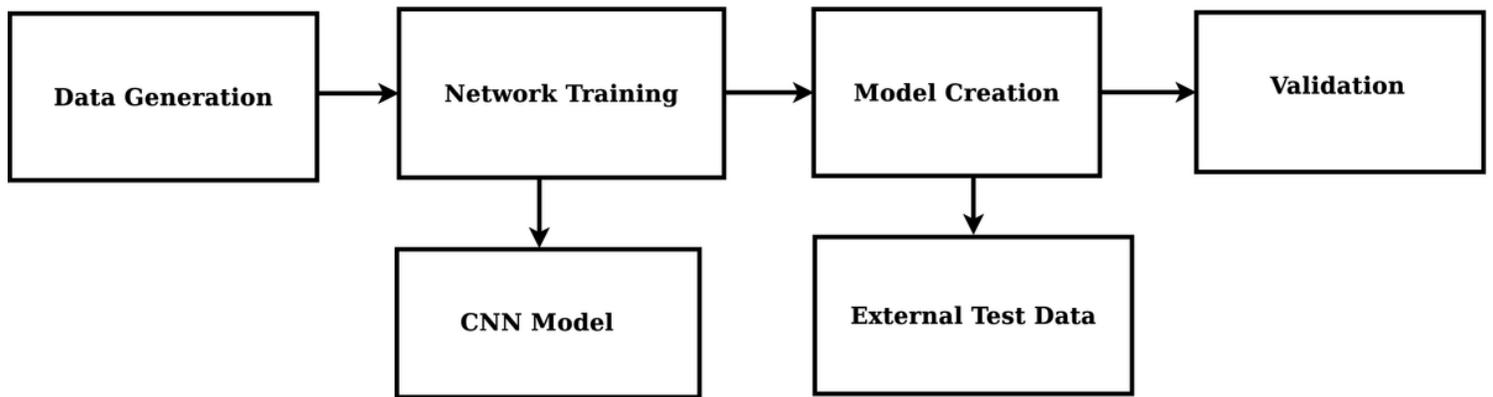


Figure 1

Methodology of work-This figure shows the various steps of our research,steps follows the data generation,CNN model creation and training,testing and validation labelfig: Methodology of work

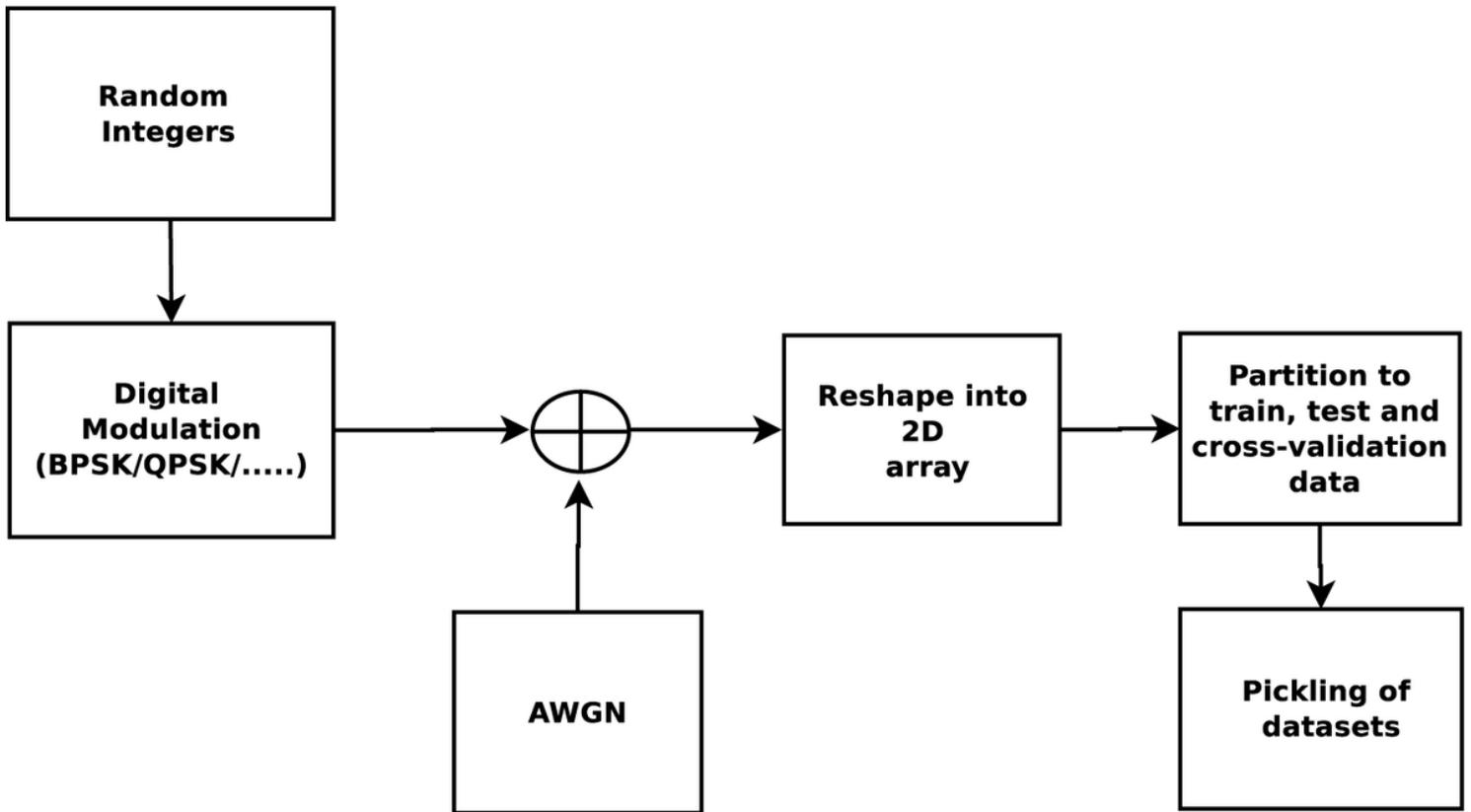


Figure 2

Generation of synthetic data -This figure depicts the procedure how the data is synthetically created includes modulation of random data, adding of channel noise, reshaping to two dimension,partition of data and pickling

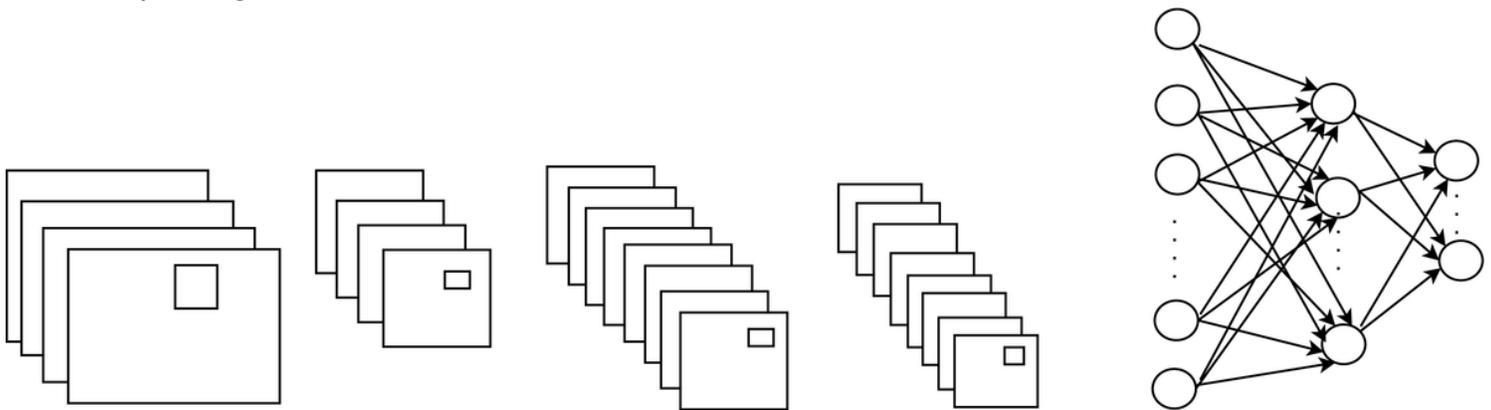


Figure 3

CNN network-This figure shows various layers in the CNN network includes convolution layer, max pooling layer and fully-connected layer

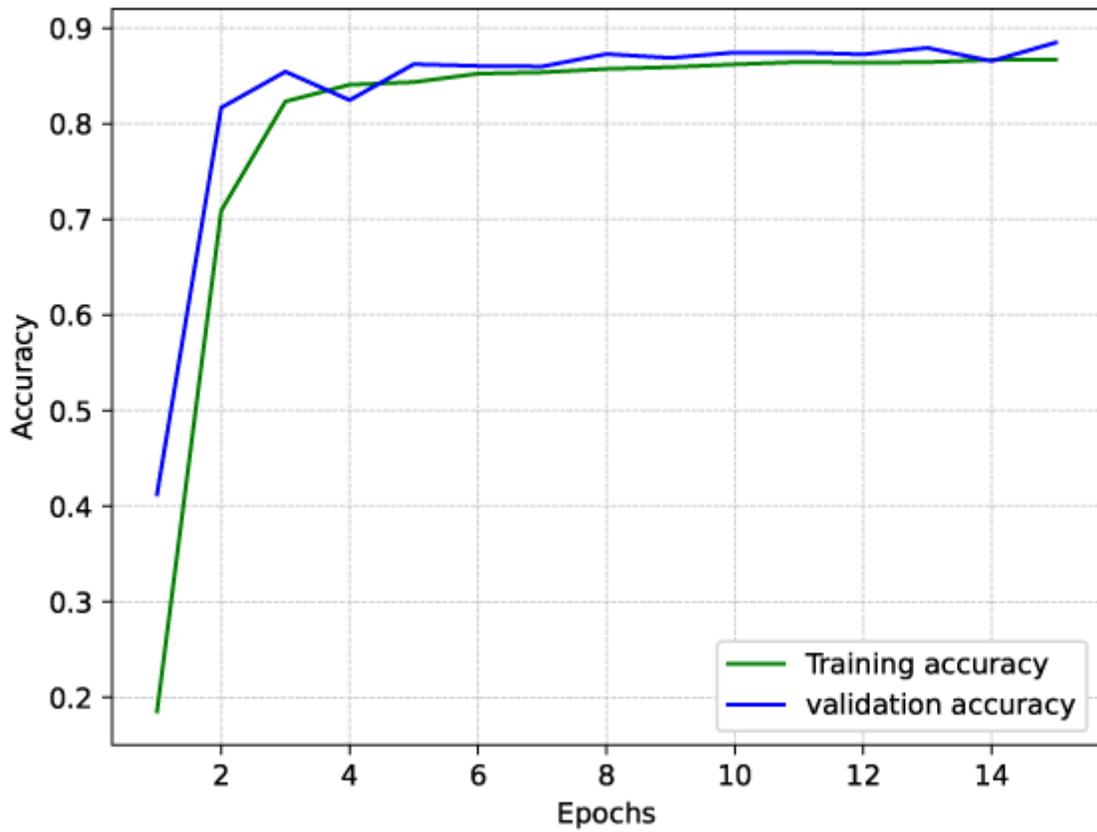


Figure 4

Training and validation accuracy-This figure shows the training and validation accuracy of the model

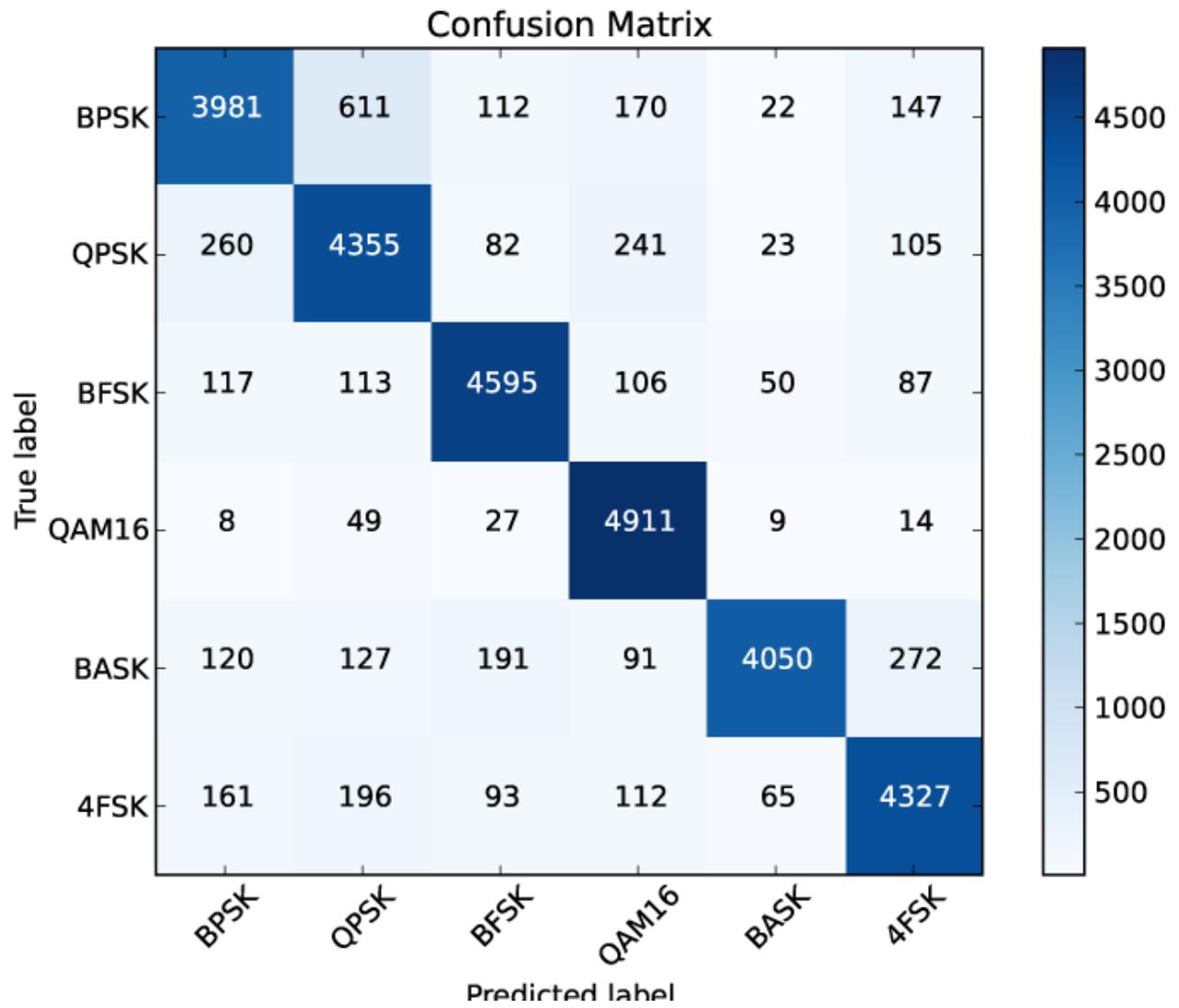


Figure 5

Confusion Matrix-This figure shows accuracy matrix obtained from the prediction of the externally data given

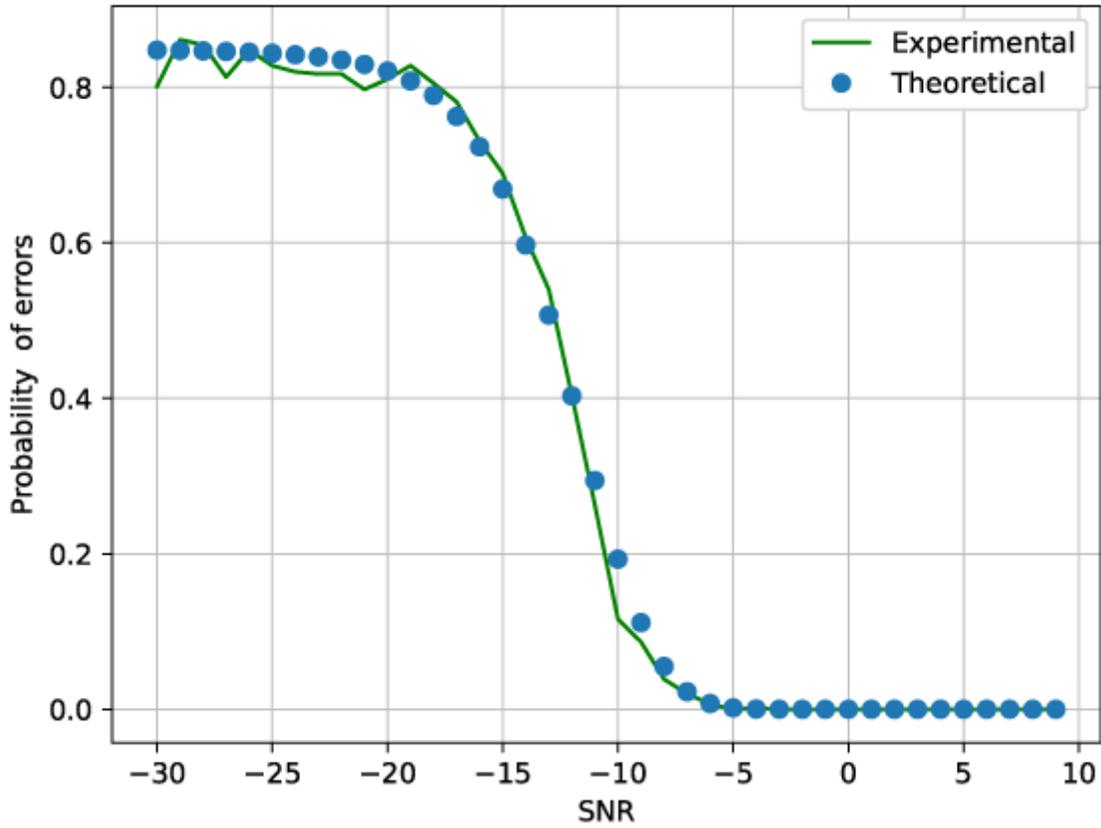


Figure 6

Probability of error vs signal to noise ratio (SNR) dB- This figure shows the error probability in the classification for each signal to noise ratio and also its associated theoretical model