IDENTIFICTION OF DIGITAL AND ANALOG COMMUNICATION TECHNIQUES

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OBJECTIVE: To identify different types of analog and digital communication techniques using CNN layers.

The traditional signal-based modulation recognition technology first designs and extracts the signal features, and then designs the classification rules to modulate the signal characteristics. The signal characteristics and classification rules of the hand design are usually limited in the complex channel environment. A deep learning-based modulation recognition technique is proposed for automatically learning classification rules from feature data to improve classification accuracy.

METHODOLOGY : The dataset is generated using MATLAB (.m files) of four different types of signal classification that are AM-DSB, AM-SSB, BPSK , PSK , QAm4 , QAM16 . The network layers used are convolutional , Dense and flatten with activation function as RELU . The code is compiled using optimizer and loss is calculated using MSE.

```
+ Code   + Text    ⏷ Copy to Drive

Layer (type)                    Output Shape         Param #     Connected to
=====================================================================================
reshape_1 (Reshape)             (None, 1, 2, 128)    0           reshape_input_1[0][0]
_____
zeropadding2d_1 (ZeroPadding2D) (None, 1, 2, 132)    0           reshape_1[0][0]
_____
conv1 (Convolution2D)           (None, 256, 2, 130)  1024        zeropadding2d_1[0][0]
_____
dropout_1 (Dropout)             (None, 256, 2, 130)  0           conv1[0][0]
_____
zeropadding2d_2 (ZeroPadding2D) (None, 256, 2, 134)  0           dropout_1[0][0]
_____
conv2 (Convolution2D)           (None, 80, 1, 132)   122960      zeropadding2d_2[0][0]
_____
dropout_2 (Dropout)             (None, 80, 1, 132)   0           conv2[0][0]
_____
flatten_1 (Flatten)             (None, 10560)        0           dropout_2[0][0]
_____
dense1 (Dense)                  (None, 256)          2703616     flatten_1[0][0]
_____
dropout_3 (Dropout)             (None, 256)          0           dense1[0][0]
_____
dense2 (Dense)                  (None, 11)           2827        dropout_3[0][0]
_____
activation_1 (Activation)       (None, 11)           0           dense2[0][0]
_____
reshape_2 (Reshape)             (None, 11)           0           activation_1[0][0]
=====================================================================================
Total params: 2830427
_____
```

In this Proposed Model 100 iterations were used.

RESULT : Variation of no. of iterations and loss in the function.

`<matplotlib.legend.Legend at 0x7f089a6d7ad0>`

Training performance

Confusion matrix