

What is our model?

Our model is a deep neural network model which has been trained on about 75945 posts from about 300 channels from different channel's categories in telegram. Its job is to get some features for each posts and to predict the total number of reactions that this post will get.

Features of our model :

The features of our model are 207 different features. The first 5 features are binary features which tells that does the post include image,link,video,audio or gif. The next 7 features are one hot features which tells us which day of the week does the post belong to. The next 21 features are again some one hot features which tells us which category does this post belong to.

These are the categories that we have :

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'general', 'engineering', 'technology', 'programming', 'movie', 'university',  
'love','music', 'student','book', 'food', 'dance', 'photography', 'health',  
'money', 'country','sport', 'spiritual', 'school', 'language', 'shop'
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After that we will divide each day in to 96 intervals of 15 minutes and we will use one hot features to determine which interval does this post belong to.

After that we will have 75 binary features that tells us which one of 75 reactions of telegram reactions are available in the channel that our post has been posted in.

The next feature is the number of subscribers of that channel.

The next one is average number of posts in a day in that telegram channel. At the end, we will divide a day into 12 intervals of 2 hours and we will use the average number of posts in the interval that the post belongs to in that channel.

Architecture of the model:

All the layers of our model are fully-connected layers. Our model has an input layer with 207 features, 2 hidden layers with 64 and 16 neurons and an output layer with 1 neuron.

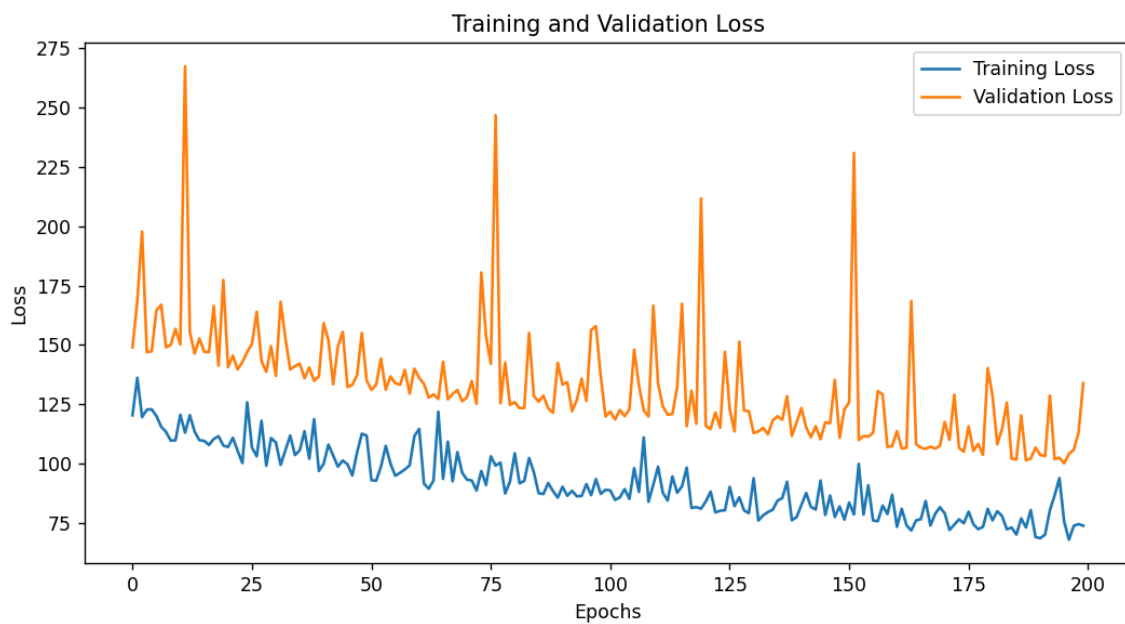
The activation functions of layers are leaky-RELU function with its alpha parameters equal to 0.1.

Training :

The loss function of our model is Mean-square-error loss function and the optimizer is adam optimizer. The training set contains 75945 posts and the batch-size of training is 1500. The validation set contains 18987 posts.

At first , the model has been trained 1000 epochs with the learning rate of  $10^{-5}$  . After that it has been trained 200 epochs with learning rate of  $10^{-6}$  and at the end it has been trained 100 epochs with learning rate of  $10^{-7}$ .

These are the plots of training and validation loss during 3 phases of training:





## Results :

To find the accuracy of our model, for each post in validation set, we have divided the absolute value of difference between prediction and actual value by the actual value and at the end we have divided this by the number of posts in validation set and multiplied it by 100. The accuracy of our model is about %90.

