

1. Implement a multichannel one-dimensional convolutional autoencoder driven multiclass support vector machine network (M-1DCAMSVM) for the seven-class classification task. The input and the class labels are given in .mat file format. There is a total of 17160 number of instances present in both input and class-label data files. The input data for each instance is a multichannel time series (12-channel) with size as (12 × 800). The class label for each multichannel time series instance is given in the class_label.mat file. The architecture for M-1DCAMSVM is given in Fig. 1. You can select the number of filters, filter size, pooling factor, the number of epochs, etc. as per your own choice. You can select the training and test instances using hold-out cross-validation (70% training, 10% validation, and 20% testing). For SVM, you can compare the performance using linear, polynomial, and radial basis function (RBF) kernel functions. [20 marks]

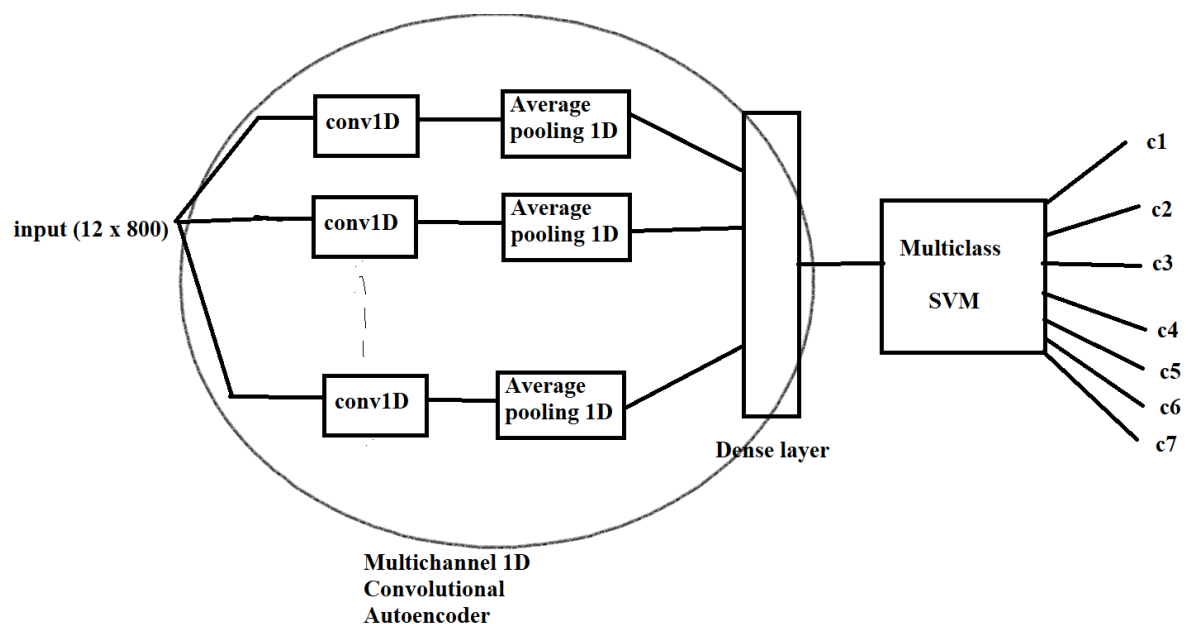


Fig.1 Architecture of M-1DCAMSVM.

Trick: First you will have to construct a multichannel 1D convolutional autoencoder and train this network using 70% of the instances. Then extract the feature vector in the dense layer of the encoder section. Use multiclass SVM to classify the feature vector obtained in the convolutional autoencoder dense layer part.