



(B.TECH) Semester-VII AY 2023-24

DL Lab Assignment No. 08

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Date: 25-11-23

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Problem Statement: Implement a prediction model using Deep Learning method.

Objectives:

1. Understand the architectural features of pre trained models
2. To implement the prediction model for data using pre trained architecture like AlexNet, VGG.

Theory:

Operations to be performed:

1. Import the required Python libraries and dataset.
2. Normalizing dataset.
3. Identifying the pretrained model to be used.
4. As per the need, fine tune the pretrained architecture.
5. Train the model with training dataset.
6. Predict the model with testing dataset.
7. Model performance visualization in terms of accuracy and loss.

Program code: (paste your program code)

Output: (paste output screen & graphs plotted)

FAQs:

1. Which are the ways to fine tune the pretrained architecture/ model?
2. What is the difference between Convolutional neural network and Recurrent neural network?
3. What is the difference between Recurrent neural network and Long Short-Term Memory Network?

FAQ

Q1. Which are the ways to fine tune the pretrained architecture/ model?

Ans-

1. **Feature Extractions:** You can use a pretrained model as a fixed feature extractor. Remove the top layers of the model and replace them with custom layers that are specific to your task. Freeze the weights of the pretrained layers and train only the new layers on your dataset.
2. **Fine-Tuning All layer:** In cases, you might want to fine-tune the entire pretrained model. This involves unfreezing all or some of the layers and training the model on your dataset. It's common to use a lower learning rate for the pretrained layers and higher learning rate for the new layers.
3. **Layer Insertion:** You can insert new layers between the pretrained layers to capture more task-specific features while keeping some of the original features. This approach is often used when the task is related to the original task the model was pretrained on.

Q2. Difference between Convolutional Neural Network (CNN) and Recurrent Neural Network (RNN).

Ans-

CNN	RNN
① Primarily used for image and grid data.	① Designed for sequential data
② Utilizes convolutional layers to automatically learn spatial features	② Uses recurrent layers to maintain memory of previous inputs.
③ Not designed for sequential data processing	③ Suitable for task that depends on the order and context of data, such as language modelling

<div> <div>Page No.</div> <div>Date</div> </div>	
Q3 Difference between Recurrent Neural Network (RNN) and Long Short-Term Memory Network (LSTM):	
Ans	
RNN	LSTM
<ol style="list-style-type: none"> ① Basic Recurrent architecture ② Suffers from vanishing gradient problem when learning long-term dependencies. ③ Limited ability to capture long-range dependencies in sequential data. 	<ol style="list-style-type: none"> ① A type of RNN with specialized cells designed to address the vanishing gradient problem. ② Uses a gating mechanism to control the flow of information and retain information over longer sequences. ③ Effective in capturing long-range dependencies and is well-known. Suited for tasks involving sequential data with long-term dependencies. ex: speech recognition.

Conclusion:

The architecture of pretrained model were studied and the implementation of prediction model performed successfully.