# CSL712– Advanced Machine Learning
## Lab 2

**Due on 27/11/2018 11.55pm**

**Instructions:** Upload to your moodle account one zip file containing the following. Please do not submit hardcopy of your solutions. In case moodle is not accessible email the zip file to the instructor at ckn@iitrpr.ac.in. Late submission is not allowed without prior approval of the instructor. You are expected to follow the honor code of the course while doing this homework.

1. This lab should be attempted individually.

2. A neatly formatted PDF document with your answers for each of the questions in the homework. You can use latex, MS word or any other software to create the PDF.

3. Include a separate folder named as 'code' containing the scripts for the homework along with the necessary data files.

4. Include a README file explaining how to execute the scripts.

5. Name the ZIP file using the following convention rollnumberhwnumber.zip

---

You will be experimenting with recurrent neural networks and LSTM models for this lab.

1. File train.txt contains a time series of 5000 data points. Out of those, there are five blocks of 20 missing data points. The objective is to train a neural network predictor with as small mean squared error over the missing points as possible. Implement a basic recurrent neural network and an LSTM model to predict the missing data points. Once you are satisfied with model selection and training, evaluate the performance of your network using the missing data which is in file test.txt. Write your script in such a way that the test data is not used in model selection at all, only at the final evaluation.

2. File F.txt contains J. S. Bach's last (unfinished) fugue with four voices. Value NaN (Not-a-number) denotes silence. The objective is to predict how this fugue might continue using a neural network. Note that there are four parallel interdependent signals (voices). The current value of any of those not only depends on the past values of the same voice, but the past values of all other voices and the current values of other voices. Discuss what kind of a network architecture might be appropriate for this kind of a prediction task. You may use

any public domain package for the prediction. Since we do not have any other evaluation criteria but aesthetics, use Matlab Audio Toolbox1 to convert the notes into playable wav/mp3 files. Submit the audio file with your report.