SMAI-M20-L36: Programming and Practice of NN in PyTorch

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Programming in PyTorch

Recap:

- **Matrix Factorization and Applications:** (i) SVD, (ii) Eigen Decomposition (iii) Matrix Completion (iv) LSI (v) Recommendations

- **Dimensionality Reduction and Applications:** (i) Feature Selection and Extraction (ii) PCA (iii) LDA (iv) Eigen face

- **Supervised Learning:** Formulation, Conceptual Issues, Concerns etc. (i) Loss Functions and Optimization (ii) Probabilistic View, Bayesian View, MLE (iii) Eigen Vector based optimization (iv) Gradient Descent: Stochastic and Batch GD (v) Classification and Regression

- **Classifiers:** (i) Nearest Neighbour, (ii) Notion of a Linear Classifier (iii) Perceptrons (iv) Bayesian Optimal Classifier (v) Logistic Regression (vi) Multiclass classification architectures (v) Decision Trees (vi) SVMs (hard margin, soft margin, kernel) (vii) Kernel trick and kernelized algorithms

- **Neural Network Architectures and Learning** (i) Neuron model, Single Layer Perceptrons (ii) SLP(iii) MLP (iv) Backpropagation (v) Chain rule (vi) Activations (vii) challenges in optimization (viii) Momentum (ix) Convolutional Layer (x) Recurrent/Feedback networks (xi) Auto-encoder and unsupervised learning

- **Beyond Simple Supervised Learning** (i) Paradigms of Learning (ii)

This Lecture:

1. See the two associated videos:
   1. https://youtu.be/s6aVkulQgd0
   2. https://youtu.be/xRa-hO54dh0
2. Learn how to work with the following associated note books:
   1. run on collab ?
   2. `https://colab.research.google.com/drive/1leWjPMRbIW4_4W8yVCvliYEceiVF6DPv?usp=sharing`
   3. `https://colab.research.google.com/drive/1OWOhsRO2LKIEHFUiLMJn1Sea-qc_tFgv?usp=sharing`
3. Ask queries and clarifications.