Deep Learning for Natural Language Processing

Overview

Why Natural Language Processing is important?

Natural Language Processing consists in designing automatic systems that can mimic human capability in understanding and producing language. It has numerous useful applications such as analyzing customer reviews, translating documents or allowing to chat with a smartphone. The intuitivity of natural language makes it a definite contender for interacting with smart appliances, if not robots, that will flood the market in the forecoming future. Mastering natural language processing will become increasingly important for engineers to process the huge quantity of interactions produced on social networks. On the other hand, it is also a fundamental and central element in artificial intelligence and it is a source of unsolved problems for researchers to explore.

What is deep learning?

Deep learning is a branch of machine learning which allows training large neural networks in the form of end-to-end differentiable function compositions. It has achieved state of the art performance in many machine learning applications such as automatic speech recognition or computer vision, due to its capacity to automatically craft feature representations of the input which were so far hard to model for experts. It can also handle much larger datasets than conventional approaches and relies less on human knowledge for generalizing to unseen conditions. In the same way deep learning has been a game changer for those applications, it is now unavoidable in natural language processing applications.

What theoretical models and applications will be covered by this class?

This class will tackle deep learning for natural language processing. It will start with an overview of current natural language processing challenges and an initiation to machine learning. A model for extracting features from words, word embedding, will be presented. Then, most relevant deep learning models for NLP will be detailed: multilayer perceptrons, convolutional neural networks, recurrent neural networks. A range of network topologies will be explored in the light of applications such as language modeling, sentiment analysis, machine translation.

What are the requirements for attending the class?

- Advanced programming
- Basic knowledge of python for data manipulation
- Basic algebra, in particular matrix manipulation
- Basic machine learning

Objectives

The primary objectives of the course are as follows:

i)   Expose participants to current research in natural language processing
ii) Give participants hands-on knowledge of a range of deep learning approaches
iii) Allow participants to explore effective approaches to solve a range of practical NLP applications

Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

Modules	1: Introduction to Natural Language Processing 2: Training Neural Networks 3: Implementation Basic Neural Networks 4: Convolutional Basic Neural Networks 5: Sentiment Analysis on Twitter 6: Recurrent Neural Networks, LSTM Units 7: Language Modeling 8: Sequence to Sequence Learning 9: Machine Translation 10: Current Trends in Natural Language Processing
You Should Attend If…	You are a graduate student or an Engineer interested in AI/ Linguistics / NLP You are an Electronics engineer interested in Artificial Intelligence You are a PhD Scholar or Research Scientist or a Young Faculty interested in Artificial Intelligence/ Linguistics / NLP
Fees	**Participants from Abroad**: US $600 **Industry/ Research Organizations**: Rs. 6000/- **Faculty Members / Researchers:** Rs. 3000/- **Students (pursuing PhD/ Masters / Bachelors courses):** Rs 2000/- **NIT Mizoram**: Free (Faculty / Student / Researcher) *The above fee include all instructional materials, computer use for tutorials, free internet facility. The participants will be provided with single bedded accommodation on payment basis.* To register or for any questions please send an email to partha.cse@nitmz.ac.in/ parthapakray@gmail.com

The Faculty

Dr. Benoit Favre is an associate professor at Aix-Marseille University (AMU) in France since 2010. He is a member of the Natural Language Processing (NLP) group of LIF / CNRS, and a member of the computer science department at AMU. His research encompasses automatic understanding of high-level information in multimodal documents and multimodal interactions. His work lies at the frontier of natural language processing, spoken language processing, machine learning and more recently artificial vision. His objective is to enable computers to understand complex natural interaction situations between human beings. In order to reach that objective, he develops three complementary areas of research: semantic content analysis and modeling, multimodal system fusion, and rigorous evaluation of related technologies in realistic applications. He has published more than 80 papers on topics along those research directions. He is a member of the International Speech Communication Association, and a member of IEEE Signal Processing Society. He has won multiple scientific evaluation campaigns on automatic summarization, text generation, information extraction and person recognition. He has participated to numerous French and International projects with academia and industry. He has a rich experience of teaching to all university levels in topics such a programming, language theory, and natural language processing.

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Dr. Partha Pakray is the Head & Assistant Professor in the Department of Computer Science & Engineering at National Institute of Technology (NIT) Mizoram. His research interest is Natural Language Processing (Textual Entailment, Question Answering, Question Generation, Semantic Textual Similarity, and Information Retrieval).

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At

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Course Co-ordinator

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