Natural Language Processing and Sentiment Analysis

Overview

Current human-centric paradigm of information technology places user experience and human-computer interaction in the centre of attention of developers in small and large companies. The trend is led by such software giants as Google and Microsoft. The most natural way information can be exchanged between humans and computers, as well as between humans themselves, is natural language—the language we use for everyday communication. There is a great variety of scenarios where computer's ability to deal with human language can play crucial role in information technology. An example is machine translation, which enables computer-mediated exchange of information, written or spoken, between people speaking different languages. This is especially important given a huge misbalance between languages in which information is produced and in which the users would prefer, or just be able, to consume it: while the main body of information in Internet is produced in English or a few major languages, the main body of Internet users are not native speakers of those languages or even don't understand them. Machine translation technologies enable those users to access the rich information present in Internet. In addition, machine translation technologies promote mutual understanding and tolerance between peoples, cultures, and religions, as well as break the digital divide between rich and poor countries and strata of society, opening equal access to education.

Other important applications of natural language processing technologies include information retrieval: the ability for an average user to find the needle of their information need in the haystack of Internet; question answering and text mining as particular ways of information retrieval; text summarization: technology that permits the user to obtain the main information contents of large amounts of texts in short time; and information extraction: a way for computers to acquire knowledge from texts present in Internet; as well as practical applications such as plagiarism detection.

A very important practical application of natural language processing that recently attracted attention of practically all researchers in this field is opinion mining. Given the huge amount of user-contributed texts generated daily in social networks, blogs, e-commerce sites, and other user-editable web fora, it has become crucial for the companies, governments, and political parties to watch this text flow for useful information. Opinion mining techniques imply improved income for the companies, which adjust their products according to the opinions of millions of users; improved quality of life for all of us, the consumers of those products; and wiser purchasing choices for the consumers through intelligent recommender systems. In the domain of politics, opinion mining implies real-time democracy: the ability for the governments and political parties to correct their actions according to social approval or disapproval, just allowing the citizens to directly influence the actions of the government.

Sentiment analysis is the technology that is pre-requisite for many of opinion mining techniques, to such degree that some researchers identify sentiment analysis with opinion mining. This technology allows to detect emotions and sentiment that the author of a text felt towards the subject described in the text. Knowing the emotions that people feel about products or their specific aspects, actions of the government, or issues of public debate such as abortion or religion, allow the companies or governments to infer public approval or

disapproval, and to act accordingly. Apart from opinion mining, sentiment analysis techniques have other important applications, such as student state control in intelligent tutoring systems and distance educations scenarios, bullying prevention in social networks, and suicide mood detection, among many other applications.

In this course, the audience will familiarize itself with basic natural language techniques. In the second part of the course, advanced sentiment analysis techniques will be presented.

Objectives

The primary objectives of the course are as follows:

i) Exposing participants to the fundamentals of natural language processing,
ii) Providing a description of the main applications of natural language processing,
iii) Describing the main methods and techniques used in development of such applications,
iv) Communicating to the participants advanced techniques used in sentiment analysis applications of natural language processing.

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: Internal Language Processing Tasks: Tagging and Lemmatizing, Syntactic Analysis, Semantic Representations, Discourse Analysis** **3: Language Modelling: Language Units and Vector Space Models. Text similarity measures** **4: Techniques used in Applications: Information Retrieval, Question Answering, Text Summarization, Text Classification** **5: Machine Translation. Advanced Natural Language Processing Applications** **6: Introduction to Sentiment Analysis and Its Applications. Aspect-Based Opinion Mining** **7: Sentiment Lexicons and Lexicon-Based Sentiment Analysis Methods. Sentic Computing** **8: Corpus-Based and Hybrid Sentiment Analysis Methods** **9: Advanced Natural Language Processing: Continuous Vector Spaces and Word Embeddings** **10: Sentiment Analysis Using Neural Networks**
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

Prof. Alexander Gelbukh is a research professor and head of the Natural Language Processing Laboratory of the Center for Computing Research of the National Polytechnic Institute, Mexico; Senior Researcher of the International Laboratory for Intelligent Systems and Structural Analysis, Higher School of Economics, Russia; Visiting Professor of the Institute for Modern Linguistic Re-search, Sholokhov Moscow State University for the Humanities, Russia; Invited Professor of the PhD program on Systems and Industrial Engineering (DIS), National University (UN), Bogotá, Colombia; and a member of the research team of the Sentic Lab at Nanyang Technological University, Singapore. He is member of the Mexican Academy of Sciences, founding member of the Mexican Academy of Computing, and a National Researcher of Mexico. He has been President of the Mexican Society of Artificial Intelligence and founding president of the Mexican Association for Natural Language Processing. He is the Editor-in-Chief of the International Journal of Computational Linguistics and Applications and Polibits, research journal research journal on computer science and computer engineering with applications; He has been editor of 73 research books and journal special issues. He is author of over 500 refereed research publications in natural language processing, computational linguistics, and artificial intelligence, among which 5 books. He has been advisor of 25 PhD theses in natural language processing and artificial intelligence. His awards include Diploma for Research from the National Polytechnic Institute (bestowed upon one researcher a year, once in the lifetime), a number of awards for best papers, and a number of awards for best thesis in artificial intelligence at national level.
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Dr. Partha Pakray is the Head & Assistant Professor in the Department of Computer Science & Engineering at National Institute of Technology 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

National Institute of Technology Mizoram

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