

# Akshay Parekh, Ph.D.

Consultant Data Scientist (NLP Applied Research)

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I have been working as an NLP Applied Research Scientist at Advanced Analytics and Data Science (AADS), Eli Lilly & Co., Bangalore, since June 2022. I have worked on several projects involving Generative AI, Knowledge Graphs, and Information Extraction. My current work focus on building and designing a GenAI authoring framework that can become base layer for all the authoring projects.

I completed my Ph.D. from IIT Guwahati in 2023. My PhD research work centers around Natural Language Processing (NLP), Information Extraction (IE), and Deep Learning (DL), with a primary focus on Large-scale Relation Classification (RC) from noisy datasets.

I enjoy playing Table Tennis & Football. I also like to travel, trek, and explore hidden places and local food. I have keen interest on Finance and Startup Industry.

## EDUCATION

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- **Indian Institute of Technology Guwahati** Guwahati, India  
*Ph.D., Thesis Topic: Large Scale Relation Extraction, Advisors: Dr. Ashish Anand & Dr. Amit Awekar Jul 2016 – 2023*
- **Center for Development in Advanced Computing (CDAC)** Hyderabad, India  
*Diploma in System Software Development(DSSD); CGPA: 73.25% (Batch Topper) Feb 2014 – Aug 2014*
- **G. H. Rasoni College of Engineering** Nagpur, India  
*Bachelor of Engineering in Computer Science & Engineering; CGPA: 72.40% Jul 2009 – May 2013*

## INDUSTRY EXPERIENCE

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- **Advanced Analytics & Data Science (AADS), Eli Lilly & Co. - LCCI** Bangalore, India  
*NLP Data Scientist Feb 2022 - Present*
  - **Consultant Data Scientist:**
    - \* **AI Authoring:** Using generative AI, Large Language Models (LLMs), and domain-specific fine-tuning for drafting first-draft of manuscripts, reports, presentations, and other documents. Using state-of-the-art research work and paid/open-source tool for building intelligent document parser.
    - \* **Generative AI:** Large Language Models - Training, Fine-Tuning, and Application development (Question Answering, Summarization, Natural Language Query Parsing); Information Extraction; Semantic Search
    - \* **Knowledge Graphs:** Building Knowledge graph for enterprise data; Leveraging NLG for Information Extraction; Fine-tuning LLMs for Relation Extraction and generating GraphDB queries
  - **NLP Research Intern:** Biomedical Information Retrieval, Unsupervised Key-Phrase Extraction, Transformers, BioClinicalBERT, Biomedical Named Entity Recognition
- **IBM Research Labs** Bangalore, India  
*Research Intern May 2019 - Aug 2019*
  - **Relation Extraction for Ontology Learning:** Relation Extraction, NLP, DL & Ontology Graphs

## STARTUP EXPERIENCE

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- **Clearfeed.ai** Bangalore, India  
*Consultant Data Scientist Oct 2021 - Jan 2022*
  - **Dataset Preprocessing & Preparation:** Preparing dataset from large open source slack dumps.
  - **Text Classification:** Urgency Detection, Bug/Error Report Identification, Thread Identification
  - **Summarization:** Generating summaries of threaded conversation; Generating title for a thread.
- **Digitales Communications Pvt. Ltd.** Mumbai, India  
*Software Engineer / Data Engineer Jan 2015 - Jun 2015*
  - **Shopista:** Web Scraping, Information Extraction & Android UI Designer

## PUBLICATIONS

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### Patent Application

#### Neural-Based Ontology Generation and Refinement

- *Balaji Ganesan, Riddhiman Dasgupta, **Akshay Parekh**, Hima Patel, Berthold Reinwald*  
*Application No.: 16/937641*

*US Patent*

### Conference

#### Taxonomical hierarchy of canonicalized relations from multiple Knowledge Bases.

- ***Akshay Parekh**, Ashish Anand, Amit Awekar*  
*CoDS-COMAD 2020*

#### Improving Relation Classification using Relation Hierarchy.

- ***Akshay Parekh**, Ashish Anand, Amit Awekar*  
*NLDB 2022*

#### Document Structure aware Relational Graph Convolutional Networks for Ontology Population.

- *Abhay M Shalghar, Ayush Kumar, Shobha G, Balaji Ganesan, Aswin Kannan, **Akshay Parekh***  
*DLG4NLP Workshop at ICLR 2022*

#### Relation Classification Model Performance as a Function of Dataset Label Noise.

- ***Akshay Parekh**, Ashish Anand, Amit Awekar*  
*CoDS-COMAD 2023*

### arXiv

#### A Neural Architecture for Person Ontology population.

- *Balaji Ganesan, Riddhiman Dasgupta, **Akshay Parekh**, Hima Patel, Berthold Reinwald*  
*arXiv:2001.08013*

#### Budget Sensitive Reannotation of Noisy Relation Classification Data Using Label Hierarchy.

- ***Akshay Parekh**, Ashish Anand, Amit Awekar*  
*arxiv:2112.13320*

#### Noise in Relation Classification Dataset TACRED: Characterization and Reduction.

- ***Akshay Parekh**, Mayank Baranwal, Shivang Dalal, Ashish Anand, Amit Awekar*  
*arxiv:2311.12298*

## PROJECTS

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- **Relation Extraction for Ontology Creation:** Internship project at IBM Research Labs, Bangalore. In this project, we developed an end-to-end model to extract relations between real-world entities from texts for ontology creation. We based our model on On2vec and used TACRED and other industry datasets for evaluation.
- **Generating Knowledge Graph from Wikipedia Infobox:** This is part of my initial work for my Ph.D. thesis work. In this project, I extract all the infobox from the Wikipedia XML dump. Categorize infobox template types in Person, Organization, and Location. Parse all the infobox that falls into one of the categories. Also, generate a list of relations for each of the 3 types. Finally, extract information in the form of triple (e1, r, e2)
- **Packet Filtering Firewall for Linux Kernel:** Course project for DSSD, developed in C/C++ using iptables, netfilter, and Linux Kernel module.

## TALKS

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- **IEEE Computing Society & Coding Club, GHRIET, Nagpur. (October 2023):** Webinar: Generative AI and its Significance
- **Workshop: AI in Healthcare 2019, IIT Guwahati:** Hands-on session on Deep Learning
- **Management Development Programme on AI in its possible implementation in the Indian context, IIT Guwahati (20 November 2019):** Hands-on Session on Introduction to Python for Data Analysis and Text Processing.
- **TEQIP: DL for NLP, IIT Guwahati (19 November 2019):** Hands-on Session on Introduction to Tensorflow==1.x.

- **RSF, EEE, IIT Guwahati (16 November 2019), IIT Guwahati:** Hands-on Session on Python for Machine Learning.

## TECHNICAL SKILLS

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- **Languages:** Python, C
- **Web-Technologies:** HTML, CSS
- **Data Analysis and Visualization:** Numpy, Pandas, Matplotlib, Seaborn
- **ML-DL:** Scikit-learn, PyTorch
- **NLP & Knowledge Graphs:** NLTK, spacy, gensim, transformers, langchain, neo4j, & cypher
- **Operating System:** Windows, Linux(Ubuntu)
- **Tools:** Ipython, Jupyter, Latex

## KEY COURSES

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- **IITG CS512:** Design & Analysis of Algorithms
- **IITG CS570:** Fundamentals of Information Retrieval
- **IITG CS565:** Intelligent Systems & Interfaces
- **IITG CS561:** Artificial Intelligence

## CERTIFICATIONS

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- **Deep Learning Specialization:** DeepLearning.AI, Coursera
- **Natural Language Processing Specialization:** DeepLearning.AI, Coursera
- **Introduction to Generative AI:** Google Cloud, Coursera
- **Generative AI with Large Language Models:** DeepLearning.AI, Coursera

## ACHIEVEMENTS

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- **Eli Lilly & Co., Lilly Innovation Award 2023:** Winner
- **Persistent Systems Pvt. Ltd., SemiColon 2012, Hackathon:** Winner