Nithish Kannen

EECS 5th-Year @ IIT Kharagpur

(91)-72999 28229 | nithishkannen@gmail.com | nitkannen.github.io/ | nitkannen | nithishkannen | @nithishkannen

Education

Indian Institute of Technology, Kharagpur — *Kharagpur, India*

Dual Degree (BTech. + MTech.) in Electrical Engineering - Major CPI: 8.79/10 — *2018 - 2023*

Minor in Computer Science and Engineering, Micro in Artificial Intelligence and Applications

Experience

Amazon Alexa AI — *Berlin, Germany*

Applied Scientist Intern — *Jun 2022 - Sep 2022*

- Objective: *Mult-Task Learning of a Controllable Novel Utterance Generator as Data Augmenter for Intent Classification and Slot Labelling*
- Proposed a unified Seq2Seq **mixture-of-tasks** approach for intent classification, slot filling, and utterance generation leveraging templated **prompts**
- Generated novel utterances paired with a **quality-filter mechanism** before data augmentation leveraging the model's annotation capabilities.
- Proposed data augmentation strategy improved Exact match, IC accuracy and SL F1 by **1%**, **2.4%** and **0.9%** respectively. Participated in the MMNLU Challenge on the MASSIVE dataset and currently positioned 3rd globally. A manuscript describing our approach is under preparation.

IBM Research — *Bangalore, India*

NLP Research Intern — *May 2021 - Aug 2021*

- Objective: *Targeted Extraction of Missing Temporal Facts from Textual Resources for Improved Temporal Knowledge Base Question Answering*
- Built an end-to-end pipeline that performs a **Knowledge Base** guided textual look-up to extract temporal facts for compensating missing KB facts
- Devised a novel **Semantic Parsing (AMR)** approach to decompose complex multi-hop questions into one-hop questions
- Used **DPR** and **SBERT** for retrieving and ranking text. Fine-tuned **ROBERTA** for QA and used **Facebook BLINK** module for entity linking
- Increased the F1 score of **0.44** using the earlier KB pipeline to **0.62** using the proposed approach which achieves SOTA on a benchmark Temporal KBQA dataset. Manuscript under review at **ACL (ARR) 2023** Conference. Work received the **BEST INTERN** award from Director of IBM Research, India

CNeRG Lab, IIT Kharagpur — *Kharagpur, India*

Student Researcher | Aspect Based Sentiment Analysis — *October 2021 - Present*

- Objective: *A Tagging Free Encoder-Decoder Framework for Aspect Sentiment Triplet Extraction* — *Guide: Prof. Pawan Goyal*
- Proposed a novel **prompt-based contrastive learning** pre-training approach to enable aspect-level sentiment u nderstaning for ASTE.
- The proposed pre-training framework for ASTE achieved **state-of-the-art** results on ASTE benchmarks. Paper submitted to the **ACL Rolling Review**.

iNLTK: Natural Language Toolkit for Indic Languages — *Bangalore, India*

Open Source Contributor https://github.com/goru001/inltk — *Sep 2021 - Dec 2021*

- iNLTK aims to provide out of the box support for various NLP tasks that an application developer might need for Indic languages. Github Stars: 725
- Extended language support by re-training tokenizer and fastai's classifier. Trained and deployed a **multilingual language model** using sentencepiece

GoGaga (incubated by Facecook Inc.) — *Bangalore, India*

Software Development Intern — *Jun 2020 - Aug 2020*

- Architected a robust **recommender system** to suggest prospective profiles to users based on cosine similarity match of implicit features and history
- Trained a **toxicity filter** using **LSTM** and **Glove embeddings** to detect threats and toxic comments in user chat history queried from **MongoDB**
- Leveraged **VGG-16** to train an image classifier for minimising fake profiles. Achieved a **32%** increase in successful matches through recommendation

University of Turku — *Turku, Finland*

Research Intern — *Apr 2020 - Jun 2020*

- Preprocessed a **Time Series** dataset of over 1M datapoints using windowing and normalising. Extracted features using Signal Processing techniques
- Experimented with **ExtraTrees, SVM, Adaboost** and compared performance of DL architectures like **CNN, LSTM** and **Convolutional LSTMs** in Pytorch
- Achieved a macro F1 score of **0.97** on SHL classification challenge and prepared an exhaustive classification report on the effect of body positioning

Publications and Preprints

- *CABACE: Injecting Character Sequence Information and Domain Knowledge for Enhanced Acronym Extraction*
  Nithish Kannen, Divyanshu Sheth, Abhranil Chrandra, Subranel Pal | Accepted in SDU at **AAAI 2022 Conference** (Oral Presentation - top 10%)
- *CONTRASTE: Prompt-Based Contrastive Pre-Training for Aspect Sentiment Triplet Extraction*
  Nithish Kannen, ,Rajdeep Mukherjee, Pawan Goyal | Under review at **ACL**.
- *KBT-TempQA: Targeted Extraction from Textual Resources for Improved Temporal KBQA*
  Nithish Kannen, , *, *, * | Under review at **ACL**.
- *Determination of the Effective Smartphone Position for Human Activity Recognition using Deep Learning*
  Nithish Kannen, Abdulhamit Subasi | **Book Chapter** in **Advanced Signal Processing IOP 4.0** (accepted)

Projects

Bachelors Thesis | Multilingual NLP

Dept. of Computer Science and Engineering, IIT Kharagpur

- Objective: *Towards Improved Language Generation in Low Resource Languages using **Meta Learning*** — *Guide: Prof. Pawan Goyal*
- Analysed robustness of QA and Question Generation systems by probing response to shuffled contexts, incomplete questions and question negation
- Studied research papers and conducted experiments on question generation task of TydiQA dataset using **MAML** with **MT5** meta model as a baseline.

Semester Project | Artificial Intelligence(https://github.com/nitkannen/Multi-Agent-Path-Planning-MAPD-)

Dept. of Computer Science and Engineering, IIT Kharagpur

- Objective: *An efficient Multi-Agent-Pickup-Delivery algorithm using* ***Graph Theory*** *Guide: Prof. Partha P. Chakrabarti*
- Proposed a novel Multi-Agent Path Finding Algorithm to perform a set of pickup-delivery tasks in a pre-defined warehouse map using **Multi-Label A***
- Performed agent-task pair scheduling using **IDA*** algorithm and implemented **Floyd Warshall** for computing heuristics on the implicit graph

Competitions

Bridgei2i Automatic Sentiment and Headline Generator (NLP)

9th Inter IIT Technology Meet, IIT Guwahati

- Selected among 10 candidates out of 400+ applicants as part of the Bronze winning KGP contingent. Worked on code mixed tweets (Eng & Devanagiri)
- Boosted the classification F1 from **0.92** to **0.96** using **domain-specific language modelling** and **coreference resolution** for brand separation

Acronym Extraction and Disambiguation - Shared Task @ AAAI 2022

(https://sites.google.com/view/sdu-aaai22)

Scientific Document Understanding Workshop at AAAI 2022

- Spearheading a team of 3 working on Acronym Extraction. Experimenting with **SciBert**, **LegalBert** and **SpanBERT** for modelling a tagging problem
- Currently 1st position on leaderboard in French dataset and within top 4 in all datasets. Experimented with Encoder-Decoder and attention-based approaches as alternate methods to solve extraction task. Proposed system manuscript accepted in SDU Workshop at **AAAI 22** Conference.

Skills

Programming Language	C++, Python, C, MATLAB, Assembly Language
Softwares & Tools	PyTorch, Tensorflow, Git, Numpy, Pandas, Spacy, OpenCV, Huggingface, SQL, Scipy, AWS, PowerBI, PyMongo, Linux
Data Visualisation	Seaborn, Matplotlib, TableAU
Technologies & Expertise	Natural Language Processing, Deep Learning, Machine Learning, Competitive Programming, Time Series, Object Oriented Programming, Open Source, Sensor Analytics, Embedded Systems, Android Development, Signal Processing, DSA
Languages	English, Hindi, Tamil

Coursework & Certifications

Institute	**Major & Additional Courses:**, Algorithms, Probabilty & Statistics, Machine Learning, Deep Learning, Image Processing, Artificial Intellience & Applications, Natural Language Processing, Computer Architecture & Operating Systems, Embedded Systems, Transform Calculus, Signal Processing, Signals & Networks, Digital Electronics
MOOC	**Applied Data Structures & Algorithms**, AlgoZenith
MOOC	**Machine Learning**, Coursera, Stanford University
MOOC	**Deep Learning Specialisation**, Coursera
MOOC	**Computer Vision A-Z: OpenCV, SSD & GANs** , Udemy
MOOC	**Advanced NLP & RNNs**, Udemy
Institute	**Image Processing Workshop (IEEE certified)**, Technology Robotix Society, IIT KGP

Academic Achievements

- Secured 99.96 percentile score in **Jee Main 2018** and **Jee Adv 2018** examination attempted by over 1.5 million engineering aspirants in India
- Secured **Best Maths Student** award in National Mathematics Olympiad (2015-2016). Awarded to only 30 students in India
- Selected to attend **Research Summer School** at **Google Research India** in the NLU track. One among 50 selected nationally.
- Received 100% scholarship for ML Nanodegree in Udacity through **AWS Machine Learning Scholarship** Program. One among 300 selected globally
- Secured a rank of **467** in Leetcode Biweekly 53. Secured ranks of **1391** and **2324** in **Google Kick Start** round D and C respectively
- Selected for Research Internship in **IBM Research Lab** during summer 2021, one among 22 selected nationally.
- Received the **BEST POSTER** award for work done during IBM Research Internship from the **Director of IBM Research India.**

Extracurricular Activity

Kharagpur Data Analytics Group (KDAG) *Kharagpur, India*

Core Member *Jun. 2020 - PRESENT*

- Registered society dealing with Data Analytics, Machine Learning & Deep Learning. Mentoring freshers through workshops and competitions
- Conducted knowledge meetings and released campus wide blogs & tutorials to get started with ML. Organized BiWeekly research paper reading

IIT Tech Ambit *Kharagpur, India*

Senior Editor (https://iit-techambit.in/author/nithish/) *May. 2020 - Present*

- Official tech magazine of the IITs, developed at IIT Kharagpur that identifies research carried out by the stakeholders of IITs and their impact
- Authored numerous articles for monthly magazines on various topics. Interviewed stakeholders and achievers within KGP and outside