# 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: 8.82/10 — *2018 - 2023*

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

## Experience

**Amazon Alexa AI** — *Cambridge, UK*

Applied Scientist — *Jun 2023 - Present*

- Objective: *Efficient Pointwise-Pairwise Learning-to-Rank Frameworks for Text-based Recommendation*
- Working as part of the Alexa Information AI team on problems related to text-based News Recommendation and Ranking with Multi-task learning
- Proposed a novel combination of pointwise and pairwise learning to rank paradigms for text-based recommendation using LLMs.
- Presented several recent advances in NLP related to instruction tuning and adversaries in prompt-based learning at the reading group at Alexa AI Info.

**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. Manuscript under review.

**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. Work published at **EMNLP 2023** Main Conference and 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: *Prompt-based Contrastive Pre-training for Aspect Based Sentiment Analysis* — *Guide: Prof. Pawan Goyal*
- Proposed a novel **prompt-based contrastive learning** pre-training approach to enable aspect-level sentiment understanding for ABSA tasks.
- The proposed pre-training framework for ASTE achieved **state-of-the-art** results on ASTE benchmarks. Paper published at **EMNLP 2023** Findings.

**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
- 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

- *Best of Both Worlds: Towards Improving Temporal Knowledge Base Question Answering via Targeted Fact Extraction*
  **Nithish Kannen** , Udit Sharma, Sumit Neelam, Dinesh Khandelwal, Shajith Ikbal, Hima Karanam, Venkata Subramaniam | **EMNLP 2023**.
- *CONTRASTE: Prompt-Based Contrastive Pre-Training for Aspect Sentiment Triplet Extraction*
  Rajdeep Mukherjee, **Nithish Kannen**, Pawan Goyal | **Findings of EMNLP 2023**.
- *CABACE: Injecting Character Sequence Information and Domain Knowledge for Enhanced Acronym Extraction*
  **Nithish Kannen**, Divyanshu Sheth, Abhranil Chrandra, Subranel Pal |SDU @ **AAAI 2022 Conference** (Oral Presentation - top 10% )
- *KBT-TempQA: Targeted Extraction from Textual Resources for Improved Temporal KBQA*
  **Nithish Kannen** , Udit Sharma, Sumit Neelam, Dinesh Khandelwal, Shajith Ikbal, Hima Karanam, Venkata Subramaniam | Under review.
- *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

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|---|---|
| **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

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|---|---|
| **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** | **Deep Learning Specialisation**, Coursera |
| **MOOC** | **Computer Vision A-Z: OpenCV, SSD & GANs** , Udemy |
| **MOOC** | **Advanced NLP & RNNs**, Udemy |

## 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