

Curriculum Vitae

Gangeshwar Krishnamurthy

Research Engineer
Human-Centric AI Group (CHEEM)
Institute of High Performance Computing, A*STAR, Singapore

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RESEARCH INTERESTS

Natural Language Processing, Machine Learning, Affective Computing, and Multimodal Interaction

EDUCATION

Bangalore Institute of Technology, Bangalore, India

August 2013 - July 2017

Bachelor of Engineering in Computer Science and Engineering

Affiliated to **Visvesvaraya Technological University, Belagavi**

Class Rank: 10 out of 250 - First Class with Distinction

Thesis: Sentence Unit Detection and Punctuation Restoration.

Advisors: Prof. Chng Eng Siong (NTU, Singapore) & Prof. Shankar Gowda (BIT, Bangalore)

PUBLICATIONS

1. **On Human-like Performance Artificial Intelligence - A Demonstration Using an Atari Game**
S.B. Ho, X. Yang, **G. Krishnamurthy**, T. Quieta and F. Liausvia
Accepted at The 5th International Conference on Artificial Intelligence and Security (**ICAIS 2019**), New York, USA [**Best Paper Award**]
2. **Cross-Modal Matching for Affective Mining in Multimodal Videos**
G. Krishnamurthy*, D. Hazarika*, S. Poria, R. Zimmermann
* *Equal Contribution.*
Submitted for review.
3. **Multi-task Learning for Detecting Stance in Tweets**
D. Hazarika*, **G. Krishnamurthy***, S. Poria, R. Zimmermann
* *Equal Contribution.*
Published at 20th International Conference on Computational Linguistics and Intelligent Text Processing (**CICLing 2019**), La Rochelle, France. (*Journal: Springer LNCS*)
4. **Variational Autoencoder-based Fusion for Multimodal Sentiment Analysis**
N. Majumder, S. Poria, **G. Krishnamurthy**, R. Mihalcea, A. Gelbukh and N. Chhaya
Submitted for review.
5. **Modeling Inter-Aspect Dependencies for Aspect-Based Sentiment Analysis** [PDF]
D. Hazarika, S. Poria, P. Vij, **G. Krishnamurthy**, E. Cambria and R. Zimmermann
In Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (**NAACL-HLT**), pp. 266-270.
6. **A Deep Learning Approach for Multimodal Deception Detection** [PDF]
G. Krishnamurthy, N. Majumder, S. Poria and E. Cambria
Published at 19th International Conference on Computational Linguistics and Intelligent Text Processing (**CICLing 2018**), Hanoi, Vietnam. (*Journal: Springer LNCS*)

RESEARCH EXPERIENCE

Institute of High Performance Computing, A*STAR

October 2017 - Present
Singapore

Research Engineer

Research Group: Human-Centric AI (CHEEM), A*AI Initiative

Research Advisors: Dr. Kenneth Kwok, Prof. Soujanya Poria, Dr. Ho Seng Beng

Fake News and Propaganda Detection

August 2019 - Present

Advisor: Dr. Yang Yinping

- Building a challenging new dataset for Fake news detection in the context of ASEAN countries.
- Built novel algorithms to analyse the psychological effect of a news with propaganda on its readers.
- Currently placed 3rd on the SemEval 2020 Task 11 leader-board.

Multimodal Sentiment Analysis [\[code\]](#)

October 2017 - Ongoing

Advisor: Prof. Soujanya Poria & Prof. Rada Mihalcea

- Lead the project on building strong baselines for sentiment and emotion recognition in different scenarios such as monologue or dialogue which are widely used by the community.
- Employed cognitive approaches to model emotional dynamics in a conversation.
- Investigating and developing novel fusion techniques for multimodal data.
- Under-submission in NAACL 2019 and another paper in preparation.

Human-like AI Framework

October 2017 - January 2019

Advisor: Dr. Ho Seng Beng

- Lead a team of engineers to build a general Artificial Intelligence framework that is human-like, based on rapid causal learning.
- Applied the framework on Space Invaders game in Atari 2600 from the Arcade Learning Environment.
- Achieved a human expert level score of 1000 with being 144 times faster and 500 times data efficient than deep reinforcement learning as demonstrated by Google DeepMind.
- The work is a combination of novel symbolic learning and classical AI planning algorithms.
- One paper accepted at ICAIS 2019 and another paper in preparation for Nature Journal.

Commonsense Based Question Answering

October 2018 - Ongoing

Advisor: Dr. Kenneth Kwok

- Proposed new approaches to model commonsense knowledge for Question Answering system with commonsense knowledge reasoning.
- Investigating use of script knowledge base for narrative story understanding. (SemEval 2018: Task 11)

Aspect-based Sentiment Analysis

Dec 2017 – Feb 2018

Advisor: Prof. Soujanya Poria

- Proposed and investigated a novel method to model inter-aspect dependencies in aspect-based sentiment analysis.

Multimodal Deception Detection [\[code\]](#)

Dec 2017 – Feb 2018

Advisor: Prof. Soujanya Poria

- Built simple yet effective model to discover the extent to which different modalities contribute to predicting deceptive behavior.
- Investigated the contribution of modalities and fusion techniques in the performance.
- Achieved SOTA performance on Multimodal Deception Detection dataset.

Nanyang Technological University

January 2017 - April 2017

Research Assistant

Singapore

Research Group: Speech and Language Technologies

Sentence Boundary Detection and Punctuation Restoration

Advisor: Prof. Chng Eng Siong

- Aim of the research project was to detect sentence boundaries in a sequence of unpunctuated text from ASR output using both lexical and prosodic features.
- Developed a novel method of using Encoder-Decoder (Sequence to Sequence) based models with Phased-LSTM as cell units.
- Investigated the use of prosodic features extracted from input audio to ASR to improve the accuracy of our model.

Query by Example: Spoken Term Detection [\[code\]](#)

Advisor: Prof. Chng Eng Siong

- Built and deployed an end-to-end system to search a query audio in corpus audio in a multi-lingual and multi-speaker environment using various features of an audio such as MFCC, Filter Bank and Bottle-neck.
- The novelty of system was in usage of SPRING-DTW algorithm for similarity measure which improved the accuracy of current state-of-the-art system by 4.5%.

INDUSTRY EXPERIENCE

Microsoft

July 2016 - September 2016

Software Development Engineer, Intern

Bangalore, India

Charted the following projects with Universal Store Team on their advertisement platform, BingAds, to increase Return On Investment of advertisers.

Classification of Advertisements

- Analyzed the effect of classifying advertisements related to games into their subcategories using a SQL-like language named Scope on Petabytes of data.

Advertisements based on user search history

- Devised a new approach to serving ads using Bing Search history of dominant demographic profiles for each game in the Windows Store for billions of users.
- All code was reviewed, perfected, and pushed to production (on Petabytes of data).

Grinions

January 2016 - March 2016

Full Stack Developer

Bangalore, India

- Led the Engineering team at Grinions, a start-up in the social networking space.
- Owned the design, development & deployment of the alpha and beta version of the group-sourcing platform, with focus on scalability, availability, and security.
- Built using Python and deployed on Google App Engine. Implemented RESTful API endpoints for modularity.
- Number of users: 3+ Million.

Solarify

July 2015 - November 2015

Full Stack Developer

Bangalore, India

- Responsible for the design and development of the architecture of web app.
- Built using Python and deployed on Amazon Web Services.

AWARDS & HONORS

- Awarded the “**AI Niche Skill Allowance**” by A*STAR in recognition of my contributions to AI research.
- “**The Best Paper**” Award at the ICAIS 2019.
- Secured **first prize** in National Level Future Space Scientist Competition by ISRO & Oracle Corporation
- Secured **second prize** in Hackadroid Hackathon by Google Bangalore (Google Fit API Hackathon)
- Won **first prize** in ACTapult Mobile App Development Challenge by ACTTV Corporation.
- **Finalist** at Student Web Pages Contest by ThinkQuest (Oracle) - International
- Honorable mention as “**The Best Team**” at GSC BrainWaves (Societe Generale Hackathon)
- “**Third Runner**” Prize at State Level Abacus Competition.

ACADEMIC ACHIEVEMENTS

- Ranked in the **Top 10** among 250 students during undergraduate studies.
- **Top 1%** scorers in Mathematics from 2013 to 2015.
- Ranked in National **Top 5%** (amongst 1,400,000 candidates) in JEE Mains 2013.
- **Top scorer** among students in Computer Science and Chemistry in Kendriya Vidyalaya - Bangalore Region in 2013.
- Awarded “**Best Student Project**” by Kendriya Vidyalaya for Computer Science project in 12th Grade.
- Awarded “**Best Technology User**” by Kendriya Vidyalaya Sangathan.

TALKS & TEACHING EXPERIENCE

Intro to Artificial Intelligence [Slides]

Bangalore Institute of Technology

October 30, 2016

Bangalore, India

Android Application Development Workshop

Bangalore Institute of Technology

Sponsored by Google and Udacity.

January 2015 – April 2015

Bangalore, India

Get started with Java

Bangalore Institute of Technology

February 26 - 27, 2015

Bangalore, India

SERVICES

PC Member:

- **ACL 2018:** First Workshop and Grand Challenge on Computational Modeling of Human Multimodal Language.
- **IEEE** Computational Intelligence Magazine (CIM)

Reviewer:

- **WWW 2019:** The Web Conference 2019.
- **ISWC 2018:** 17th International Semantic Web Conference - Research Track.
- **CICLing 2018:** 19th International Conference on Computational Linguistics and Intelligent Text Processing, 2018.

MEMBERSHIP

Member, Association for Computational Linguistics (ACL)

Member, Google Developers Group (GDG) – Bangalore.

Member, DataKind – Bangalore Chapter.

POSITIONS OF RESPONSIBILITY

President

Google Students' Club (Sponsored by Google)

August 2014 - July 2017
Bangalore Institute of Technology

President

Android Students' Club

February 2015 - July 2017
Bangalore Institute of Technology

REFERENCES

Prof. Soujanya Poria

Assistant Professor

Singapore University of Technology and Design, Singapore

Email: soujanya_poria@sutd.edu.sg

Dr. Kenneth Kwok

Principal Scientist, IHPC

Program Manager, Human-Centric AI (CHEEM),

Artificial Intelligence Initiative (A*AI), A*STAR, Singapore

Email: kenkwok@ihpc.a-star.edu.sg

Dr. Ho Seng Beng

Deputy Department Director,

Institute of High Performance Computing,

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Email: hosb@ihpc.a-star.edu.sg