

Jasivan Alex SIVAKUMAR

Department of Computer Science,
University of Sheffield, UK
E-mail: jasivakumar1@sheffield.ac.uk

Webpage: jasivan.github.io
Twitter: [@jasivan_s](https://twitter.com/jasivan_s)
LinkedIn: [Jasivan Sivakumar](#)

QUALIFICATIONS

- Sep 21 - Dec 25 **PhD Computer Science** (Supervised by [Dr. Nafise Sadat Moosavi](#))
 > Natural Language Processing Group, University of Sheffield, United Kingdom
 > Research title: *Numerical Reasoning for General-Purpose Language Models*
 > Focus: AI, ML, NLP, NLG, LLMs, Reasoning, Number Representation, Tokenisation
- Sep 20 - Sep 21 **MA Computational Linguistics - Distinction**
 > University of Wolverhampton, United Kingdom
- Oct 12 - Jul 16 **Bachelor (MMath) Mathematics - First Class**
 > University of Warwick, United Kingdom

PUBLICATIONS

- Jul 24 (preprint) **Sivakumar, J., & Moosavi, N. (2024).** [How to Leverage Digit Embeddings to Represent Numbers?](#) [Under review]
 > Designed a mathematically informed number representation by aggregating digit ones.
 > Evaluated the alignment of novel number representations with numerical proximity.
 > Explored incorporating new number representations at encoding and in loss function.
- Jun 24 (preprint) **Pastorino, V., Sivakumar, J., & Moosavi, N. (2024).** [Decoding News Narratives: A Critical Analysis of Large Language Models in Framing Detection](#) [Under review]
 > Explored LLMs capability to distinguish between framed and neutral news articles.
 > Evaluated effect of different few-shot examples and impact on out-of-domain news.
 > Created a new dataset for frame detections and analysed misclassifications.
- Jul 23 (ACL) **Sivakumar, J., & Moosavi, N. (2023).** [FERMAT: An Alternative to Accuracy for Numerical Reasoning](#). In Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers). ACL.
 > Designed a mathematically informative multi-view test sets for numerical reasoning.
 > Published a method for automatic data-augmentation of worded arithmetic problem.
 > Demonstrated that diversity in language significantly improved performance.
 > Explored data-leakage to justify improvement of BART and FLAN type LLMs.
- Dec 21 (IALP-IEEE) **Sivakumar, J., et. al. (2021, December).** [A GRU-based pipeline approach for word-sentence segmentation and punctuation restoration in English](#). In 2021 International Conference on Asian Language Processing (IALP). IEEE.
 > Trained GRU models using PyTorch for punctuation retrieval of concatenated strings.
 > Created a binary classification system to identify insertions of punctuation.
 > Generated synthetic training and testing data from punctuated text.
 > Investigated automatic evaluations metrics against human perception.

PROFESSIONAL ACTIVITIES

- Jul 24 - Oct 24 **Amazon - Applied Scientist Intern** (Alexa International - United States)
 > Created benchmark using AWS tools with human-in-the-loop approach for relevancy.
 > Presented documentation to key stakeholder to explain and motivate benchmarking.
 > Collaborated with developers to push revisions to production including code reviewing.
- Jan 24 - Jun 24 **Consultancy - Student Marketing / Elevate** (Sheffield, United Kingdom)
 > Discussed with clients to understand their daily activities and workforce distribution.
 > Researched and explained a RAG solution to automate high volume query response.
 > Explored and presented a Topic Modelling solution to cluster document content.

SKILLS

Programming

- ▷ Python (PyTorch, Huggingface, AWS, scikit-learn, NLTK)
- ▷ MATLAB
- ▷ Bash (HPC)
- ▷ Version control (git/github)
- ▷ Latex

Languages

- ▷ French (Native)
- ▷ Tamil (Native)
- ▷ English (Native)
- ▷ Spanish (Fluent)
- ▷ German (Conversational)

RESEARCH ACTIVITIES

- Sep 21 - Present **NLP for Endangered Language Revitalisation in Colombia**
▷ Collected and digitised text using OCR for Palenquero, an endangered language.
▷ Deploying low-resource language NLP research to develop pedagogical resource.
- Nov 21 - Jun 22 **Speech Technology and NLP to improve Oral History Search functionality**
▷ Explored existing NER systems to identify domain specific terms.
▷ Automated annotated transcriptions to improve search and retrieval of video frames.
- Sep 20 - Sep 21 **Semantic Sentence Embeddings for Natural Language Inference**
▷ Trained BERT embeddings using siamese network contrastive loss over NLI tasks.
▷ Inductively biased embeddings with semantic parse trees over Graph Neural Network.
- Sep 15 - May 16 **A Mathematical Approach at Analysing the Influence of English on French**
▷ Generated a diachronic dataset of French news articles to observe language evolution.
▷ Modelled adoption of English lexica into French with stochastic/differential equations.

ACADEMIC ACTIVITIES

- Jan 24 - Present **Reviewer for ARR/ACL/EMNLP/NAACL/LREC/COLING**
▷ Reviewed for multiple tracks: Less-Resourced/Endangered/Less-studied Languages; Lexicon and Semantics, and Social Media Processing; NLP and LLM Applications, Reasoning, Question Answering, and Sentence-level Semantics; Resources and Evaluation; Bio lay summarisation.
- Jan 22 - Sep 24 **Human Annotator**
▷ Followed annotation guidelines and provided feedback for experiments relating to: **Psychology** (Eye-tracking from reading), **Human-Robot Interaction** (Perception of robot feature and interaction), **Text** (Hate Speech detections, Misinformation), Named Entity Recognition, **Speech** (Intelligibility), **Vision** (Naming Images, Bias from Visual Posters).
- Nov 23 - Jun 24 **Supervisor for final year research project in number representation**
▷ Weekly supervision for number decoding project, helped with latest deep learning techniques both theoretically and practically.
- Jun 23 **Invited Talk - 3rd Speech and Language Technology CDT Conference**
▷ Presented FERMAT research in main talk event.
- Nov 22 - Feb 23 **Examiner for Text Processing and Professional Issues**
▷ Assessed student code and marked reports, provided feedback on assignments.
- Jul 22 **12th Lisbon Machine Learning Summer School**
▷ Attended lectures on linear classifiers, seq2seq models, neural networks and talks from industry and academia on novel research, networked with other attendees.
- Jan 22 - Jun 22 **Teaching Assistant for Foundations of Computer Science**
▷ Taught fundamental mathematics: probability, linear algebra and number theory.
- Jan 21 - May 21 **Machine Learning Tutorial for Postgraduate Computational Linguists**
▷ Explained mathematics using linguistics examples for kNN, decision trees, Naive Bayes, linear regressions, regularisation, beam search, EM algorithm, gradient descent, entropy.