

Hrishikesh Rajesh Terdalkar

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SUMMARY

I am deeply passionate about the potential of **Natural Language Processing** and its application in addressing language diversity, particularly in the context of low resource languages, including **Sanskrit** and other **Indian languages**. My research interests also include related areas such as **Information Retrieval**, **Artificial Intelligence**, **Data Mining**, and **Machine Learning**. I strive to leverage innovative approaches to overcome the unique challenges faced by these languages, enabling better language understanding, information retrieval, and knowledge extraction from unstructured data. With a strong theoretical and practical foundation in NLP, I am dedicated to contributing to cutting-edge technologies and methodologies that can make a tangible impact. I am enthusiastic about interdisciplinary collaboration, working alongside esteemed researchers and mentors, and pushing the boundaries of what is achievable in NLP research for the benefit of Indian languages and beyond.

EDUCATION

Ph.D. in Computer Science and Engineering

Indian Institute of Technology Kanpur
CGPA: 8.67

2014 – 2023* (under submission)
Kanpur, Uttar Pradesh, India

M.Sc. in Computer Science

Chennai Mathematical Institute
CGPA: 8.88

2011 – 2013
Chennai, Tamil Nadu, India

B.Sc. (Hons.) in Mathematics and Computer Science

Chennai Mathematical Institute
CGPA: 7.69 (Overall), 9.14 (Computer Science)

2007 – 2010
Chennai, Tamil Nadu, India

Higher Secondary School Certificate (Standard XII)

Maharashtra State Board of Secondary and Higher Secondary Education
Percentage: 86.50

2007
Pune, Maharashtra, India

Secondary School Certificate (Standard X)

Maharashtra State Board of Secondary and Higher Secondary Education
Percentage: 95.33

2005
Pune, Maharashtra, India

THESES

Ph.D. Thesis

Sanskrit Knowledge-based Systems: Annotation and Computational Tools

Supervisor: Arnab Bhattacharya

- Development of **knowledge-based systems** in **Sanskrit** with the ultimate goal of **question-answering** in Sanskrit. Contributions include a framework for the **automated construction** of **knowledge graphs**; two web-based **annotation tools**: (1) *Sangrahaka*: for **knowledge-graph focused annotation** and **querying**, and (2) *Antarlekhaka*: for general purpose **natural language annotation** of **multiple tasks** in a **sequential** manner; a system to identify **Sanskrit meters** and utilize Sanskrit prosody for **post-OCR correction**; several **web-interfaces** including three ancient **Indian alpha-numeric systems**; **tools** including a **Telegram bot** for Sanskrit grammar, and **software libraries** related to *computational aspects of Sanskrit*.
- All contributions available at <https://sanskrit.iitk.ac.in>

M.Sc. Thesis

On Symmetric Key Cryptography

Supervisor: Rajeeva Karandikar

- Study and implementation of various stream ciphers and block ciphers. (RC4, HC128, RC5, IDEA).

PUBLICATIONS

- “Antarlekhaka: A Comprehensive Tool for Multi-task Natural Language Annotation”. **Hrishikesh Terdalkar**, Arnab Bhattacharya. In Proceedings of the 3rd Workshop for NLP Open Source Software (NLP-OSS) @ EMNLP, Singapore, December 2023. Association for Computational Linguistics (ACL).
- “Chandojnanam: A Sanskrit Meter Identification and Utilization System”. **Hrishikesh Terdalkar**, Arnab Bhattacharya. In Proceedings of the Computational Sanskrit & Digital Humanities: Selected papers presented at the 18th World Sanskrit Conference (WSC), pages 113–127, Canberra, Australia (Online), January 2023. Association for Computational Linguistics (ACL).

- “*Semantic Annotation and Querying Framework based on Semi-structured Ayurvedic Text*” . **Hrishikesh Terdalkar**, Arnab Bhattacharya, Madhulika Dubey, Ramamurthy S, Bhavna Naneria Singh. In Proceedings of the Computational Sanskrit & Digital Humanities: Selected papers presented at the 18th World Sanskrit Conference (WSC), pages 155–173, Canberra, Australia (Online), January 2023. Association for Computational Linguistics (ACL).
- “*A Novel Multi-Task Learning Approach for Context-Sensitive Compound Type Identification in Sanskrit*” . Jivnesh Sandhan, Ashish Gupta, **Hrishikesh Terdalkar**, Tushar Sandhan, Suvendu Samanta, Laxmidhar Behera, Pawan Goyal. In Proceedings of the 29th International Conference on Computational Linguistics (COLING), pages 4071–4083, Gyeongju, Republic of Korea, October 2022. International Committee on Computational Linguistics.
- “*Sangrahaka: A Tool for Annotating and Querying Knowledge Graphs*” . **Hrishikesh Terdalkar**, Arnab Bhattacharya. In Proceedings of the 29th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), pages 1520–1524, Athens, Greece (Online), August 2021. Association for Computing Machinery (ACM).
- “*Framework for Question-Answering in Sanskrit through Automated Construction of Knowledge Graphs*” . **Hrishikesh Terdalkar**, Arnab Bhattacharya. In Proceedings of the 6th International Sanskrit Computational Linguistics Symposium (ISCLS), pages 97–116, IIT Kharagpur, India, October 2019. Association for Computational Linguistics (ACL).

TALKS AND POSTERS

- “*Āyurjñānam: Exploring Āyurveda with Knowledge Graphs*” . **Hrishikesh Terdalkar**, Vishakha Deulgaonkar, Arnab Bhattacharya. (NYCIKS), 2023. **Best Poster Award**.
- “*Vaiyyākaraṇaḥ: A Sanskrit Grammar Bot for Telegram*” . **Hrishikesh Terdalkar**, Mahesh A V S D S, Shubhangi Agarwal, Arnab Bhattacharya. The 18th World Sanskrit Conference (WSC), 2023.
- “*PyCDSL: A Programmatic Interface to Cologne Digital Sanskrit Dictionaries*” . **Hrishikesh Terdalkar**, Arnab Bhattacharya. The 18th World Sanskrit Conference (WSC), 2023.
- “*Jñānasaṅgrahaḥ: A Collection of Computational Applications related to Sanskrit*” . **Hrishikesh Terdalkar**, Arnab Bhattacharya. The 18th World Sanskrit Conference (WSC), 2023.
- “*KaTaPaYadi System*” . **Hrishikesh Terdalkar**, Arnab Bhattacharya, Demonstration. The 6th International Sanskrit Computational Linguistics Symposium (ISCLS), 2019.

EXPERIENCE

Student Researcher

Aug 2022 – current

- Working in the project ‘An Interpretable Unified Framework Text-to-text Translation among Indian Languages using Sanskrit-based Interlingua Representation’, under Ministry of Electronics and Information Technology (MeitY), Government of India.

Student Researcher

Jun 2022 – current

- Working in the project ‘Automated Question-Answering System for Ramayana’ under Indian Knowledge Systems (IKS) division of All India Council for Technical Education (AICTE), Government of India.
- Developing and maintaining a comprehensive NLP annotation tool Antarlekhaka.

Webmaster

Jan 2023 – current

- Managing website for the conference ISCLS 2024.

External Reviewer

2020-2023

- CoDS-COMAD (2020, 2021, 2023), CIKM (2021, 2022), AAAI (2022), ARR (2022), DASFAA (2022)

Webmaster

Dec 2014 – Jan 2016

- Managed website of CSE Department, IIT Kanpur.

Project Associate

Jul 2013 – Apr 2014

- Worked on the project “*Localization in Wireless Sensor Networks*” at CSE, IIT Kanpur.

TEACHING

Senior Tutor

Jan 2017 – Nov 2020

- Managed (Prutor) backend administration for 5 semesters at IIT Kanpur.
- Duties also involved heading the tutor team, setting question papers and grading.

Teaching Assistant

Aug 2014 – Nov 2020

- CS315: Principles of Database Systems (Jan-Apr 2019, Jan-Apr 2021)
- CS685: Data Mining (Aug-Nov 2018)
- CS774: Optimization Techniques (Aug-Nov 2016)
- ESC101: Introduction to Programming (Aug-Nov 2014)

Teaching Assistant (MOOC)

May 2017 – Sep 2017

NPTEL

- NOC17-CS33: Fundamentals of Database Systems

ACHIEVEMENTS

- **Best Poster Award** at National Youth Conference on Indian Knowledge Systems 2023 **NYCIKS 2023** (Roorkee).
- **Financial support** from Research-I Foundation to attend **ISCLS 2019** (Kharagpur) and **WSC 2023** (Online).
- **Financial support** under ACM SIGSOFT CAPS Virtual Program to attend **ESEC/FSE 2021**.
- **Travel grants** from ACM India to attend **CoDS-COMAD 2017** (Goa), **CoDS-COMAD 2018** (Kolkata) and **CoDS-COMAD 2019** (Hyderabad).
- **TCS Research Scholar Program** Fellowship (Cycle 11), 2015.
- **Kishore Vaigyanik Protsahan Yojana (KVPY)** Fellowship, given by Indian Institute of Sciences (IISc), 2007.
- **National Talent Search (NTS)** Scholarship, given by National Council of Educational Research and Training (NCERT), 2005.


TECHNICAL SKILLS

Languages	: Python, C, C++, Shell Scripting, Haskell, R, PHP, JavaScript, HTML, CSS
Databases	: MySQL, Neo4j, MongoDB
libraries	: Flask, SQLAlchemy, Pandas, Scikit-learn, Gensim, NLTK, spaCy, PyTorch, NumPy
Dev Tools	: git, Python packaging, Make, docker
Typesetting	: LaTeX, Markdown, reStructuredText


PROJECTS

GitHub Profile Statistics

★ 120+ ⓘ 40+ ↻ 2800+

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PyPI Profile

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Sanskrit Language Model

ongoing

- Train language models for Sanskrit using a large corpus

Antarlekhaka

 [Antarlekhaka/code](#)

- Annotation of a comprehensive set of computational linguistic tasks.
- General purpose, multi-task, sequential annotation.

Sangrahaka

 [hrishikeshrt/sangrahaka](#)

- Annotation towards creation of knowledge graphs.
- Querying of knowledge graphs using natural language query templates.

Jnanasangraha

 <https://sanskrit.iitk.ac.in/jnanasangraha>

- Collection of several web-based Sanskrit computational tools.

- Includes three of ancient Indian alpha-syllabic numeral systems, a Sankrit prosodical meter identification and utilization system and various utility functions related to Sanskrit alphabet.

Vaiyyakarana

📧 [vyakarana_bot](#)

- Telegram bot for the learners of Sanskrit grammar.

Sanskrit Audio Alignment

🌐 https://hrishikeshrt.github.io/audio_alignment

- Interface for Sanskrit corpus recitation using forced-alignment to align text and audio.

EXTRACURRICULAR

- I like to provide support to students who require academic assistance and have volunteered as an academic mentor at CSE, IIT Kanpur.
- I am a frequent blood donor with 42 donations so far and actively promote blood donation. I have also served as the Overall Co-ordinator and PG Wing Head of *Raktarpan*, IIT Kanpur and helped organize more than 20 blood donation camps in and around campus.
- I am interested in Sanskrit language and grammar. I hold a Diploma in Sanskrit Language under the Non-Formal Sanskrit Education programme offered by Central Sanskrit University. I have also completed Kovida, an advanced-level correspondence course offered by Samskrita Bharati.
- I love bicycling and have completed multiple 50km and 100km rides.

REFERENCES

Arnab Bhattacharya

Professor, Indian Institute of Technology Kanpur

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Pawan Goyal

Associate Professor, Indian Institute of Technology Kharagpur

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Professor, University of Hyderabad

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