NIKHIL SAINI

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Field of Study: Computer Science & Engineering

Examination	University	Year	CPI / %
Post Graduation	IIT Bombay	2021	9.20
Graduation	FTE, MSU, Baroda	2018	72.80

FIELDS OF INTEREST

- Machine Learning
- Natural Language Processing
- Speech
- Algorithms

PUBLICATIONS

- **EACL 2021: Disfluency Correction using Unsupervised and Semi-supervised Learning**
  Nikhil Saini, Drumil Trivedi, Shreya Khare, Tejas Dhamecha, Preethi Jyothi, Samarth Bharadwaj, Pushpak Bhattacharyya
  To appear in the Proceedings of EACL (16th Conference of the European Chapter of the Association for Computational Linguistics), 2021.

- **ACL 2020: Generating Fluent Translations from Disfluent Text Without Access to Fluent References: IIT Bombay@IWSLT2020**
  Nikhil Saini, Jyotsana Khatri, Preethi Jyothi, Pushpak Bhattacharyya
  Proceedings of the 58^{th} Annual Meeting of the Association for Computational Linguistics: System Demonstrations

- **PDGC 2020: Load Balancing in Heterogeneous Distributed Systems Using Singleton Model**
  Nikhil Saini, Jeet Rabari, Mamta C. Padole, Vaibhav Solanki
  In 2020 Sixth International Conference on Parallel, Distributed and Grid Computing

MASTER'S THESIS & RESEARCH PROJECTS

- **Spoken Language Translation & Disfluency Correction**
  Master's Thesis | Guide: ***Prof. Preethi Jyothi & Prof. Pushpak Bhattacharyya*** *(Jun 2020 - Ongoing)*
  - **Objective:** Speech to Speech Indian Language translation under **MeitY.**
  - **Current Work:** Multilingual Speech to Tech Translation.
  - Converted Bi-LSTM Pytorch codebase of Unsupervised Style Transfer into Transformer architecture.
  - **Future Scope:** Speech modality for disfluency correction & Speech to Text Translation in Indian Languages.

- **Spoken Language Translation**
  Master's Seminar | Guide: ***Prof. Preethi Jyothi & Prof. Pushpak Bhattacharyya*** *(Jan 2020 - May 2020)*
  - Did a literature survey on Text to Text and Speech to Text Machine Translation.
  - **Participated in IWSLT 2020**, Conversational Speech Translation Task, and **published** in the ACL workshop.
  - Implemented Transformer based Encoder-Decoder architecture to translate from disfluent Spanish text to fluent English and obtained a **BLEU Score 28.1 beating NAIST's submission** on ASR input text.

- **Unsupervised Neural Machine Translation**
  R&D Project | Guide: ***Prof. Pushpak Bhattacharyya*** *(Jan 2020 - May 2020)*
  - Surveyed state-of-the-art UNMT approaches like CLWE, DAE & Backtranslation.
  - Obtained **BLEU Scores** on Indian language pairs with **28.54** on Hindi-Punjabi pair.
  - Used Transfer Learning, Supervised, Semi-Supervised techniques to increase UNMT BLEU scores.
  - Implemented a **web-service** to translate among Indian Languages using UNMT pre-trained models.
  - Concluded the failure of SOTA architectures on low resource Indian languages, opening new fields of research.

- **Preordering in Neural Machine Translation: Helpful or Not?**
  R&D Project | Guide: ***Prof. Pushpak Bhattacharyya*** *(Jul 2019 - Nov 2019)*
  - Studied Statistical, Phrase-Based & Neural Machine Translation approach.
  - Obtained a **BLEU Score 14.25** with no preordering & **12.63** with Hindi tuned preordering in English-Hindi language pair using NMT.
  - Concluded that preordering source side sentences improves the translation quality in Phrase-Based Statistical Models but not in NMT for English-Indian direction.

UNDERGRADUATE & COURSE PROJECTS

- **ASR for Low Resource Indian Languages**
  CS753: Automatic Speech Recognition | *Instructor:* ***Prof. Preethi Jyothi*** *(Nov 2019)*
  - **Objective**: To recognize speech in Indian languages by using CNN-LSTM Encoder-Decoder architecture.
  - Used Transfer Learning & Speaker adaptation techniques to recognize speech in Indian languages.
- **Cardiovascular Disease Classification**
  CS725: Foundations of Machine Learning | *Instructor:* ***Prof. Ganesh Ramakrishnan*** *(Nov 2018)*
  - **Objective**: To implement a Convolutional Neural Network to classify heartbeat audio sounds.
  - Used Transfer Learning on the spectrogram to do a four-class classification of audio files.
- **Instant Messaging Application similar to Slack**
  CS699: Software Lab | *Instructor:* ***Prof. Umesh Bellur*** *(Nov 2018)*
  - **Objective:** To implement a web-browser based instant messaging app similar to Slack.
  - Implemented functionalities like creating new workspace/channel for secure communication between authorized users, registering via mail, reply to & deletion of previous messages, etc.
- **Lucid Simulations: Simulating CS Fundamentals**
  B.Tech Major Project | *Instructor:* ***Prof. Anjali Jivani*** *(Apr 2018)*
  - **Objective:** An interactive simulation website designed for learning Computer Science concepts.
  - Used JavaScript to model simulations of **44** concepts in DSA, OS, AI/ML & Computer Graphics.
- **Load Balancer for Applications**
  B.Tech Course Project | *Instructor:* ***Prof. Mamta C. Padole*** *(Apr 2018)*
  - **Objective**: To implement a Load Balancer using JAVA Technology.
  - Used Remote Method Invocation, Multicasting & TCP to balance load amongst servers.

WORK EXPERIENCE

- **Computer Center, IIT Bombay** *Research Assistantship (System Administrator)* *(Jul 2018 - Ongoing)*
  - Responsible for monitoring & maintaining over **750 Cisco & Extreme switches** and over **150 VMs** running various services via Zabbix Monitoring System.
  - Booked Scheduler: Maintaining & upgrading the web service to allow institute-wide lab bookings.
  - Developed Network Troubleshooting App: Version 1.0.
  - **Current Work:** Implementation of **ELK Stack** to search, analyze, and visualize logs from multiple live internal servers/services.

MAJOR COURSES TAKEN

- Automatic Speech Recognition
- Advanced Machine Learning
- Foundations of Machine Learning
- Algorithms & Complexity
- Computing Systems
- Blockchain

POSITIONS OF RESPONSIBILITY

- **Student Companion - Institute Student Companion Program** *(IIT Bombay, Jul 2019 - Jun 2020)*
  - Coordinated orientation of 1867 PG freshmen with a team of 177 student companions and coordinators.
  - Facilitated 6 freshmen on a one-to-one basis, helping them on academic and non-academic fronts.
- **Organizer, Smart India Hackathon** *(IIT Bombay, Jul 2019)*
  - Coordinated with a team of 30 members for conducting SIH 2019 organized by Computer Center.
- **Paramarsh: Non-Tech Fiesta** *(FTE, MSU, 2015)*
  - Organized a national level, non-technical college fiesta with a team of 86 members.

TECHNICAL SKILLS

- **Programming Languages:** C, C++, Python, Bash
- **Tools:** Pytorch, TensorFlow, Vim, Git, LaTeX
- **Libraries:** OpenNMT-py, Fairseq, Moses, Kaldi, pandas, NumPy
- **Frameworks:** Django, Bootstrap

ACHIEVEMENTS

- Cleared **TCS CodeVita** Round I & received **Offer Letter**. *(2017)*
- **Published** a book on Operating Systems in ICE GATE Institute for CS/IT students. *(2018)*
- Won **Gold** in Intra-departmental Basketball as **Captain**, IIT Bombay. *(2020)*
- Won **Gold** in Intra-departmental Volleyball, IIT Bombay. *(2019)*
- Won **Bronze** in Inter-departmental Volleyball PGGC Sports, IIT Bombay. *(2019)*
- **First Rank** in class in XII standard, C.B.S.E. *(2014)*