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Research Interests

Areas Programming Languages, Software Engineering, Systems.
Topics ML4SE, Program Synthesis, Program Analysis.

Education

Aug'16–May'20 **PES University, Bangalore,**
B.Tech in Computer Science and Engineering (Honors).
GPA – 9.51/10.0

Experience

Jul'20– **Microsoft Research, Research Fellow**, Bangalore, India.
Domains: Software Engineering, Machine Learning, Data Science, Systems
Advisors: Chetan Bansal, Dr. Suman Nath, Dr. Thomas Zimmermann

Jan'20–Jun'20 **Microsoft Research, Research Intern**, Bangalore, India.
Domains: Software Engineering, Machine Learning, NLP
Advisors: Chetan Bansal, Dr. Nachiappan Nagappan, Dr. Thomas Zimmermann

Jul'19–Jun'20 **PES Center for Pattern Recognition, Research Assistant**, Bangalore, India.
Domains: Machine Learning, Healthcare Systems
Advisors: Dr. Gowri Srinivasa

Jun'19–Aug'19 **Deloitte Touche Tohmatsu LLC, ML Intern**, Bangalore, India.
Domains: Cyber Security, Data Science, Machine Learning
Advisors: Dr. Vikram Venkateshwaran

Patents

Jun 19, 2020 **Automatic Recognition of Entities Related to Cloud Incidents**, *USPTO*.

Jun 28, 2021 **Automation of Troubleshooting Guides using Meta-Learning**, *USPTO*.

Aug 26, 2021 **Performing Quality-Based Action(s) Regarding Engineer-Generated Documentation Associated with Code and/or Application Programming Interface**, *USPTO*.

Sep 24, 2021 **Crash Localization using Crash Frame Sequence Labeling**, *USPTO*.

Achievements

2016–2020 **Prof CNR Rao Scholarship**, *CS Department, PES University*, (6x recipient).

2020 **Dr. MRD Merit Scholarship**, *CS Department, PES University*.

Publications

- Under Review **AutoTSG: Learning and Synthesis for Incident Troubleshooting**, [pdf].
Manish Shetty, C. Bansal, S. Upadhyayula, A. Radhakrishna, A. Gupta
Preprint, under review, 2022 (12 pages)
- ICSE'22 **DeepAnalyze: Learning to Localize Crashes at Scale**, [pdf].
Manish Shetty, C. Bansal, S. Nath, S. Bowles, H. Wang, O. Arman, S. Ahari
International Conference on Software Engineering, 2022 (12 pages)
Acceptance Rate $\approx 26\%$ (197/751)
- EMSE **SoftNER: Mining Knowledge Graphs From Cloud Incidents**, [pdf].
Manish Shetty, C. Bansal, S. Kumar, N. Rao, N. Nagappan
Empirical Software Engineering (SEIP Special Issue) (15 pages)
- ICSE'21 **Neural Knowledge Extraction from Cloud Service Incidents**, [pdf].
Manish Shetty, C. Bansal, S. Kumar, N. Rao, N. Nagappan and T. Zimmermann
International Conference on Software Engineering - SEIP, 2021 (12 pages)
Acceptance Rate $\approx 33.8\%$ (41/121)
Nominated for the IEEE Software Distinguished Paper Award (5/41) 🏆
Featured in *VentureBeat, TechZine, etc.* 📰
- EMBC'21 **A Machine Learning Understanding of Sepsis**, [pdf].
Manish Shetty, V. Menon, P. Athri, G. Srinivasa
IEEE Engineering in Medicine and Biology Society (5 pages)
- CONECCT'21 **Exploration and Comparison of Modern AI Algorithms to Predict Drug Efficacy**, [pdf].
Manish Shetty, A. Kasi, R. Neil, V. Murali, P. Athri, G. Srinivasa
IEEE International Conference on Electronics, Computing and Communication Technologies, 2020
(5 pages)

Talks

- 2021 **"DeepAnalyze: AI Assisted Crash Dump Analysis"**.
○ Lab Sabha, Microsoft Research India, Oct'21 (virtual)
○ Conference Presentation, ICSE 2022, May'22 (virtual)
- 2021 **"A Machine Learning Understanding of Sepsis"**.
○ Conference Presentation, EMBC 2021, Oct'21 (virtual)
- 2020-2021 **"Neural Knowledge Extraction from Cloud Service Incidents"**.
○ Applied Sciences & Engineering Group, Microsoft Research India, Nov'20 (virtual)
○ Conference Presentation, ICSE SEIP 2021, Jun'21 (virtual)

Academic Service

- 2022 **Reviewer**, *ICLR 2022*.
- 2022 **Reviewer**, *IET Software*.
- 2021 **Shadow Program Committee**, *MSR 2021*.
- 2021 **Reviewer**, *JSERD*.

Selected Projects

- Feb'21– **Learning to Localize Crashes at Scale**, *Microsoft Research*.
- Designed & developed **DeepAnalyze** - a deep learning system to localize crashing faults from crash stacks.
 - Empirically analyzed the complexity and heterogeneity of large-scale crashes.
 - Conceptualized a **novel sequence labeling formulation** utilizing both semantic and context stack information.
 - Showed the effectiveness of **transfer learning** to build models for **cross-application** scenarios with minimal data.
 - This work was accepted at **ICSE 2022**.
- Dec'21–May'21 **Mining Knowledge Graphs From Cloud Incidents**, *Microsoft Research*.
- Extended *SoftNER* by mining and scoring **binary entity relations**.
 - Used entities and relations to construct an incident **knowledge-graph**.
 - Used clustering and a custom **path based score** to identify entity-incident relevance.
 - This work is *Under Review at EMSE (SEIP Special Issue)*.
- Jan'20–Feb'21 **Neural Knowledge Extraction from Cloud Service Incidents**, *Microsoft Research*.
- Designed & built **SoftNER**– a framework for weak-supervised knowledge extraction from incident reports.
 - Framed the problem as a domain agnostic **named-entity recognition** task.
 - Proposed a **type-aware Multi-task neural architecture** for knowledge extraction.
 - Integrated into Microsoft's IcM system and has enriched over 10K+ incidents.
 - This work was accepted at **ICSE (SEIP) 2021** and featured on **VentureBeat**.
- Jan'20–Jun'20 **A Machine Learning Understanding of Sepsis**, *PES University*.
- Predicted two outcomes in sepsis patients - **Sepsis and Comorbidity Severity**.
 - Used **local interpretable model-agnostic explanations** to analyze models.
 - Harmonized consistencies/contradictions about Sepsis, between humans and models.
 - This work was accepted at **IEEE EMBC 2021**

Relevant Courses

Undergraduate Deep Learning, Machine Learning + Practicum, NLP, Linear Algebra, Software Engineering, Operating Systems, Networking, Cloud Computing, Data Science, Discrete Math and Logic, Algorithms + Practicum, Advanced Algorithms

Skills

Languages Python, C/C++, C#
Frameworks Keras, PyTorch, Tensorflow, scikit-learn, OpenCV, NLTK
WebD HTML/CSS, JavaScript, Django, Jekyll
Utilities Anaconda, Git, Jupyter Notebook

References

Chetan Bansal, *Principal Research SDE*, Microsoft Research, Redmond, [🌐].
Dr. Nachiappan Nagappan, *IEEE & ACM Fellow*, Meta (Facebook), Seattle, [🌐].
Dr. Tom Zimmermann, *IEEE & ACM Fellow*, Microsoft Research, Redmond, [🌐].
Dr. Suman Nath, *Partner Research Manager*, Microsoft Research, Redmond, [🌐].
Dr. Gowri Srinivasa, *Professor*, PES University, Bangalore, [🌐].