Manish Shetty M

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Education

PES University (Bangalore, India) Aug'16 – May'20
B.Tech in Computer Science and Engineering (*Honors*)
Cum. GPA: **9.51**/10.0 (3.98/4.0)

Experience

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

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

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

Deloitte Touche Tohmatsu LLC, *ML Research Intern* (Bangalore, India) June'19 – Aug'19
Domains: Cyber Security, Data Science, Machine Learning
Advisor: Dr. Vikram Venkateshwaran

Publications

`ICSE 2022` **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 ≈ 26% (197/751)

`Under Review` **SoftNER: Mining Knowledge Graphs From Cloud Incidents** [preprint]
Manish Shetty, C. Bansal, S. Kumar, N. Rao, N. Nagappan
Under Review at EMSE (SEIP Special Issue) (15 pages)

`ICSE 2021` **Neural Knowledge Extraction from Cloud Service Incidents** [pdf] [talk]
Manish Shetty, C. Bansal, S. Kumar, N. Rao, N. Nagappan and T. Zimmermann
International Conference on Software Engineering - SEIP, 2021 (12 pages)
Acceptance Rate ≈ 33.8% (41/121)
Nominated for the IEEE Software Distinguished Paper Award (5/41) 🏆
VentureBeat: "Microsoft's SoftNER uses unsupervised learning to help triage cloud service outages" 🏆

`EMBC 2021` **A Machine Learning Understanding of Sepsis** [pdf] [talk]
Manish Shetty, V. Menon, P. Athri, G. Srinivasa
International Conference of the IEEE Engineering in Medicine and Biology Society (5 pages)

`CONECCT 2021` **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)

Selected Projects

Learning to Localize Crashes at Scale, Microsoft Research — Feb'21 – present

- Designed and 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.
- Working on deploying an online-learning pipeline for continuously improving DeepAnalyze in the wild.
- Working on creating a library of tools for related tasks like faulty thread localization, problem bucketization, etc.
- This work was accepted at ***ICSE 2022*** [??].

Knowledge Fabric for Incident Management, Microsoft Research — Jan'20 – Feb'21

- **Neural Knowledge Extraction from Cloud Service Incidents**
  - Designed & built ***Soft*NER** – a framework for weak-supervised knowledge extraction from incident reports.
  - Framed the problem as a domain agnostic and extensible **named-entity recognition** task.
  - Proposed a **type-aware Multi-task neural architecture** for knowledge extraction.
  - *Soft*NER is now integrated into Microsoft's IcM system and has enriched over 10K+ incidents.
  - This work was accepted at ***ICSE (SEIP) 2021*** [??] and featured on ***VentureBeat***.
- **Mining Knowledge Graphs From Cloud Incidents**
  - Extended *Soft*NER by mining **binary entity relations** and scoring them using **normalized PMI**.
  - Used entities and relations to construct an incident **knowledge-graph**.
  - Used a combination of clustering and a **novel path based score** to identify entity-incident relevance.
  - This work is *Under Review at EMSE (SEIP Special Issue)* [??].

A Machine Learning Understanding of Sepsis, PES University — Jan'20 – Jun'20

- Proposed an approach to predict two outcomes in sepsis patients - **Sepsis and Comorbidity Severity**.
- Used **local interpretable model-agnostic explanations** and other methods to analyze models.
- Harmonized consistencies/contradictions about Sepsis, between expert human knowledge and that of a model.
- This work was accepted at ***IEEE EMBC 2021*** [??].

Talks

"Neural Knowledge Extraction from Cloud Service Incidents"

- Applied Sciences & Engineering Group, Microsoft Research India — Nov'20 (virtual)
- Conference Presentation, ICSE 2021 — Jun'21 (virtual)

"DeepAnalyze: AI Assisted Crash Dump Analysis"

- Lab Sabha, Microsoft Research India — Oct'21 (virtual)

"A Machine Learning Understanding of Sepsis"

- Conference Presentation, EMBC 2021 — Oct'21 (virtual)

Patents

1. Automatic Recognition of Entities Related to Cloud Incidents — (USPTO) June 19, 2020
2. Automation of Troubleshooting Guides using Meta-Learning — (USPTO) June 28, 2021
3. Performing Quality-Based Action(s) Regarding Engineer-Generated Documentation Associated with Code and/or Application Programming Interface — (USPTO) Aug 26, 2021
4. Crash Localization using Crash Frame Sequence Labeling — (USPTO) Sept 24, 2021

Awards and Achievements

6X recipient of **Prof CNR Rao Scholarship** 🏆 – CS Dept, PES University

1X recipient of **Dr. MRD Merit Scholarship** 🏆 – CS Dept, PES University

Academic Service

Conference Reviewer – ICLR'22, MSR'21

Journal Reviewer – JSERD

Shadow Program Committee – MSR'21

Relevant Courses

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 • Engg Math I & II

References

› Chetan Bansal	Principal Research SDE, Microsoft Research, Redmond [🌐]
› Dr. Nachiappan Nagappan	*IEEE & ACM Fellow*, Software Engineer, Facebook, Redmond [🌐]
› Dr. Thomas Zimmermann	*IEEE Fellow*, Sr. Principal Researcher, Microsoft Research, Redmond [🌐]
› Dr. Suman Nath	Partner Research Manager, Microsoft Research, Redmond [🌐]
› Dr. Gowri Srinivasa	Professor, PES University, Bangalore [🌐]