Manish Shetty M

Research Fellow, Microsoft Research India
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https://manishshettym.github.io
github.com/manishshettym
Google Scholar

Education

PES University, Bangalore *Aug'16 – May'20*

B.Tech in Computer Science and Engineering (*Honors*) | *Specialization in Data Science*
Cum. GPA: **9.51**/10.0 (3.98/4.0)
6X recipient of **Prof CNR Rao Scholarship**, Computer Science, PES University
1X recipient of **Dr. MRD Merit Scholarship**, Computer Science, PES University

Work 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, Dr. Nachiappan Nagappan

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

5. **Large-scale Crash Localization using Multi-Task Learning** [preprint] **(Under Review)**
Manish Shetty, C. Bansal, S. Nath, S. Bowles, H. Wang, O. Arman, S. Ahari
Under Review at ICSE 2022 (12 pages)

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

3. **Neural Knowledge Extraction from Cloud Service Incidents** [pdf] [talk] **(ICSE 2021)**
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)
Featured in VentureBeat: "Microsoft's SoftNER AI uses unsupervised learning to help triage cloud service outages"

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

1. **Exploration and Comparison of Modern AI Algorithms to Predict Drug Efficacy** [pdf] **(CONECCT 2020)**
Manish Shetty, A. Kasi, R. Neil, V. Murali, P. Athri, G. Srinivasa
IEEE International Conference on Electronics, Computing and Communication Technologies, 2020 (5 pages)

Academic Service

- **Reviewer** *International Conference on Learning Representations 2022* **(ICLR'22)**
  Recommended from reviewer mentee pool for excellent review.
- **Shadow Program Committee** *Mining Software Repositories Conference 2021* **(MSR'21)**
- **Reviewer** *Journal of Software Engineering Research and Development* **(JSERD)**

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*

Talks & Presentations

- *"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)

Selected Projects

- **Learning to Localize Crashes at Scale** *Feb'21 – present*
  Advisors: Chetan Bansal, Dr. Suman Nath, *Microsoft Research*
  - Designed and developed ***DeepAnalyze*** - a deep learning based solution 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 is *Under Review at ICSE 2022.*
- **Knowledge Fabric for Incident Management**
  Advisors: Chetan Bansal, Dr. Nachiappan Nagappan, and Dr. Thomas Zimmermann, *Microsoft Research*
  - **Neural Knowledge Extraction from Cloud Service Incidents** *Jan'20 – Nov'20*
    - 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 9K+ incidents.
    - This work was accepted at ***ICSE 2021*** and featured on ***VentureBeat***.
  - **Mining Knowledge Graphs From Cloud Incidents** *Dec'20 – Feb'21*
    - 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** *Jan'20 – Jun'20*
  Advisors: Dr. Gowri Srinivasa, *PES University*
  - Proposed an approach to predict two outcomes in sepsis patients - **Sepsis Severity** 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***.
- **Exploration and Comparison of Modern AI Algorithms to Predict Drug Efficacy** *Sept'19 – Feb'20*
  Advisors: Dr. Gowri Srinivasa, *PES University*
  - Worked on improving the critic in **ReLeaSE - Reinforcement learning framework for de-novo drug design**.
  - Improved learning using path-context based encoding and data-augmentation for canonical SMILES.
  - This work was accepted at ***IEEE CONNECT 2020***.

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 [🌐]