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Manish Shetty M

Research Interests

Areas Programming Languages, Software Engineering, Systems.

Topics Program Analysis, Program Synthesis, ML4SE.

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

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 ≈ 26% (197/751)

Under Review **SoftNER: Mining Knowledge Graphs From Cloud Incidents**, [pdf].
Manish Shetty, C. Bansal, S. Kumar, N. Rao, N. Nagappan
Under Review at EMSE (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 ≈ 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)

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 *Soft*NER 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 ***Soft*NER**– 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***

Talks

2021 **"DeepAnalyze: AI Assisted Crash Dump Analysis"**.
- Lab Sabha, Microsoft Research India, Oct'21 (virtual)
- Conference Presentation, ICSE 2022, *TBD (upcoming)*

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 Committe**, *MSR 2021.*

2021 **Reviewer**, *Journal of Software Engineering Research and Development (JSERD).*

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, [🌐].