Sangeeth **Kochanthara**

PhD Candidate - software & systems engineering, software architecture, mining repositories

contact

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research interests

software & systems engineering

software & system architecture

safety

formal methods: timed regular expressions, timed automata

technical skills

Languages
C, C++, Java, Python, R

Databases
PostgreSQL, MySQL

Tools
Antlr, SOOT, JAVA MOP

Standards
ISO 26262, ISO 21448

work experience

Mar'17- now **PhD Candidate** Eindhoven University of Technology (TU/e), Netherlands
Supervisors: Prof. Mark van den Brand, Dr. Yanja Dajsuren, Dr. Loek Cleophas

- Identify challenges to elicit safety requirements in the automotive domain and propose future research directions
- Propose a (safety) requirements elicitation and architecture assessment method for the new generation of automotives (in collaboration with **TomTom**)
- Assess perception system of an open-source, industrial, automated driving stack for its use in Dutch highways (in collaboration with **Siemens**)
- Characterize open source automotive software landscape
- Design and implement a tool to automatically generate safety monitor module in Matlab/Simulink model of a connected automated driving system
- Propose a method to transform timed regular expressions (specifications) to deterministic timed automata (monitor) and its formal proof

Jan - Jun'15 **Research intern** CISTER research lab - University of Porto, Portugal
Supervisors: Dr. Geoffrey Nellisen, Dr. David Pereira, Dr. Rahul Purandare

- Create a novel domain specific language, REVERT to specify timed properties of safety critical systems
- Develop a platform-agnostic, correct-by-construction transformation from the REVERT language to runtime monitor
- Develop a tool chain for REVERT specification to monitor translation

2014 - 2016
2021 - 2022 **Teaching assistant** IIIT-Delhi, India; TU/e, Netherlands

- Instructions, lab, exams, and evaluation for: introduction to programming (C, Python), technical communication, mobile computing, logic & set theory

education

2014-2016 **Master of Technology**
Computer Science and Engineering **Gold Medalist** IIIT-Delhi, India

2008–2012 **Bachelor of Technology**
Computer Science and Engineering University of Calicut, India

highlights

- Collaboration with companies (Siemens, TNO automotive, TomTom), universities , and an academic research lab
- Mentored 7 bachelor and 3 masters students
- Experience as team-leader and team-player in multi-cultural and multi-disciplinary teams
- Scientific writing, communication, and outreach experiences (including publications, talks, posters, and organizing social & scientific events)
- Experience in cutting edge standards and theirs compliance in the automotive domain (ISO 26262 and ISO 21448)

publications

- **Sangeeth Kochanthara**, Yanja Dajsuren, Loek Cleophas, Mark van den Brand. "Painting the Landscape of Automotive Software in GitHub". In International Conference on Mining Software Repositories (**MSR'22**) - One in **only 5** selected for journal extension
- **Sangeeth Kochanthara**, Niels Rood, Arash K. Saberi, Loek Cleophas, Yanja Dajsuren, Mark van den Brand. "A Functional Safety Assessment Method for Cooperative Automotive Architecture". In Journal of Systems and Software (**JSS'21**)
  In European Conference on Software Architecture (**ECSA'21**) - Journal first track
  Invited to Journal first track in IEEE International Conference on Software Architecture (**ICSA'22**)
- **Sangeeth Kochanthara**, Niels Rood, Loek Cleophas, Yanja Dajsuren, Mark van den Brand. " Semi-automatic Architectural Suggestions for the Functional Safety of Cooperative Driving Systems". In IEEE International Conference on Software Architecture (**ICSA'20**) - New and Emerging Ideas track
- **Sangeeth Kochanthara**, Geoffrey Nellisen, David Periera, Rahul Purandare. "REVERT: Runtime Verification for Real-Time Systems". In IEEE Real-Time Systems Symposium (**RTSS'16**) - Work-In-Progress track.
- **Sangeeth Kochanthara**, Geoffrey Nellisen, David Periera, Rahul Purandare. "REVERT: A Monitor Generation Tool for Real-Time Systems". In IEEE Real-Time Systems Symposium (**RTSS'16**) - Tool Demonstration track.
- **Sangeeth Kochanthara**, Tajinder Singh, Alexandru Forrai, Loek Cleophas. "Safety of Perception Systems for Automated Driving: A Case Study on Apollo" submitting to ACM Transactions on Software Engineering and Methodology (**TOSEM'22**)
- **Sangeeth Kochanthara**, Loek Cleophas, Yanja Dajsuren, Mark van den Brand. "Requirements Engineering for Safety of Automotive " submitting to IEEE Transactions on Software Engineering (**TSE'22**)
- **Sangeeth Kochanthara**, Jeroen Keiren, Loek Cleophas, Venkatesh Vinayakarao, Mark van den Brand. "Deterministic timed automata and timed regular expressions" submitting to Journal of the ACM (**JACM'22**)
- **Sangeeth Kochanthara**, Yanja Dajsuren, Loek Cleophas, Mark van den Brand. "Automotive Software in Open-Source: A first study". submitting to Empirical Software Engineering journal (**ESE'22**)

code contributions

- Scripts to extract insights from system call logs QNX RTOS - total size of DB - 2.2 TB - **PostgreSQL, Python, Shell script, R**
- Scripts to mine GitHub repositories and GHTorrent data - **MySQL, Python, R**
- A tool chain for automatic translation from REVERT domain specific language to a runtime monitor - **Java, Antlr** - 5000+LOC
- Springer scraper - a web scraper to scrape abstract and other publicly available metadata from springer - **Python**
- Interface for monitoring, controlling and managing sensors and actuators networked using Zigbee - **Python, C, MySQL**
- Tool to automatically repair integer overflow errors in Java programs by instrumenting the byte-code - **SOOT**.

selected accomplishments

awards

- Gold medal for **Best Master's Thesis**
- ACM SIGSOFT CAPS and other travel grants to attend conferences: ISEC'17, ECOOP-ISSTA'18, ICSE'19
- GATE'14 scholarship (**top one percentile** among 200,000+ candidates)
- Council of Scientific & Industrial Research Junior Research Fellowship '14 - **Rank 74** (from 50,000+ candidates)

services, scientific & social outreach

- Student volunteer for conferences ICSE'19, ECOOP-ISSTA'18
- Reviewed: MASE-workshop'19, IEEE Transactions on Dependable and Secure Computing'19, African Conference on Software Engineering'20, Euromicro Conference on Software Engineering & Advanced Applications'22
- Co-organized user committee meetings of i-CAVE (project-6): 2 universities and 3 companies '17-'21
- Organizer of TU Eindhoven's PhD-PDEng council's Christmas events '20 & running event '21

references

- Prof. Mark van den Brand
  Chair, Software Eng., TU/e
  Visiting professor, Univ. of London
  m.g.j.v.d.brand@tue.nl
- Dr. Loek Cleophas
  Asst. Prof. Software Intensive Systems, TU/e
  Research fellow, Stellenbosch Univ.
  l.g.w.a.cleophas@tue.nl
- Dr. Yanja Dajsuren
  Asst. Prof. Software Eng., TU/e
  Director, PDEng Soft. Tech., TU/e
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