Safety, Security, Quality Artificial Intelligence versus Common Sense

Embedded Linux Conference
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About

- Siemens Corporate Technology: Corporate Competence Centre Embedded Linux
- Technical University of Applied Science Regensburg
  - Theoretical Computer Science
  - Head of Digitalisation Laboratory

Current Research Trends

- Empirical, quantitative, evidence based software engineering
- Automated software engineering/construction

Why investigate Linux?

- Among largest collective engineering undertakings of mankind
- Open, public development data beyond source code
- Understand development, integration, ...processes: Growing importance
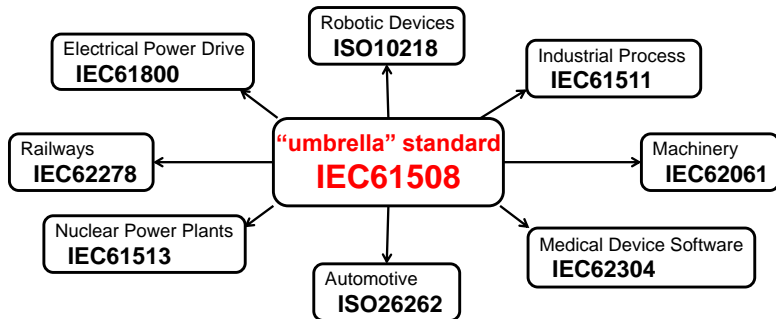
Routes to Safety

▶ Standard compliant development
▶ Proven in use
▶ Compliant non-compliant development

Civil Infrastructure Platform

- ▶ Maintain Linux systems for 10+ (hopefully 20+) years
- ▶ Supporter of Debian LTS
- ▶ Strong interest in repoducible builds
- ▶ Automated SW engineering!
- ▶ Quantifying processes: Trust, involvement, …

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SWE4ML vs. ML4SWE

Selecting Examples

- 100s of SW engineering papers published each year
- Debian often not explicitly mentioned
- Choice: Unfair & subjective!

Method

- Limit: WebOfScience + appropriate keywords
- Select subset

Result

- 34 representative papers
- Apologies for not covering them in detail

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Categories

- ▶ Quality and Reliability
- ▶ Communities, cooperation and processes
- ▶ Testing and analysing code at large scale
- ▶ Understanding licensing and code sharing
- ▶ Effort Estimation

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Quality and Reliability

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Communities, Cooperation, Processes

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Effort Estimation

Challenges

Conclusion

Thin Points and Fat Tails

Thanks for your interest!