1. Can you please introduce yourself and describe your job role in this company?

I am from academia, not from a company.

I am a professor of software engineering at “”, and a director of “”. My research interests include component-based software engineering, software architecture, software development processes, software engineering for large complex systems, and recently Software engineering for AI.

2. Since how many years you are working in this company?

a. At “” and “ ” from 2014,

3. Have you published any thesis in the machine learning domain?

Not a thesis but some papers:

You can find them at
https://scholar.google.com/citations?hl=en&user=yewx0GgAAAAJ&view_op=list_works&sortby=pubdate

Here are the ones of related to AI

On the experiences of adopting automated data validation in an industrial machine learning project

LE Lwakatare, E Rånge, I Crnkovic, J Bosch

2021 IEEE/ACM 43rd International Conference on Software Engineering …

Engineering ai systems: A research agenda

J Bosch, HH Olsson, I Crnkovic

Artificial Intelligence Paradigms for Smart Cyber-Physical Systems, 1-19

From a Data Science Driven Process to a Continuous Delivery Process for Machine Learning Systems

LE Lwakatare, I Crnkovic, E Rånge, J Bosch

International Conference on Product-Focused Software Process Improvement …

Large-scale machine learning systems in real-world industrial settings: A review of challenges and solutions

LE Lwakatare, A Raj, I Crnkovic, J Bosch, HH Olsson

Information and Software Technology 127, 106368

DevOps for AI–Challenges in Development of AI-enabled Applications

LE Lwakatare, I Crnkovic, J Bosch

2020 International Conference on Software, Telecommunications and Computer …

Refactoring software in the automotive domain for execution on heterogeneous platforms

H Andrade, I Crnkovic, J Bosch

2020 IEEE 44th Annual Computers, Software, and Applications Conference …

Summary of the 2nd Workshop on Gender Equality in Software Engineering (GE 2019)

I Crnkovic, K Kohl Silveira, S Sprenkle

ACM SIGSOFT Software Engineering Notes 45 (3), 25-27

Software challenges in heterogeneous computing: A multiple case study in industry

H Andrade, LE Lwakatare, I Crnkovic, J Bosch

2019 45th Euromicro Conference on Software Engineering and Advanced …

Software deployment on heterogeneous platforms: A systematic mapping study

H Andrade, J Schroeder, I Crnkovic

IEEE Transactions on Software Engineering

A taxonomy of software engineering challenges for machine learning systems: An empirical investigation

LE Lwakatare, A Raj, J Bosch, HH Olsson, I Crnkovic

International Conference on Agile Software Development, 227-243

4. Can you please share your experience in your current position?

Cooperation with several companies.

Many companies are fighting in managing data.

See paper (from google link):

On the experiences of adopting automated data validation in an industrial machine learning project

LE Lwakatare, E Rånge, I Crnkovic, J Bosch, 2021 IEEE/ACM 43rd International Conference on Software Engineering …

5. Do you have any experience in the previous company which is developing Machine Learning system? If so, then what was your old experience?

No

5. Is your company is service-based or product-based?

n/a

6. What software development model do you practice in your company in general, like an agile, waterfall, etc.?

Most of companies use DevOps and scrum for software development, and have different variants of ML-workflow.

7. Could you please share your experience with the interesting project that you have worked on recently?

See again:

On the experiences of adopting automated data validation in an industrial machine learning project

LE Lwakatare, E Rånge, I Crnkovic, J Bosch, 2021 IEEE/ACM 43rd International Conference on Software Engineering …

The main challenge was to purify data and to understand the problems – if they were a result of model, or of inappropriate data,

8. In your working experience, how many software architecture design techniques you worked with?

Different – for example ATAM, quality-driven SA, Heterogenous system and software architecture

9. Which common software architecture design technique you found being used in most companies through your experience?

I cannot say that there exists a common technique

10. According to your experience, which are your best software architecture design technique, and what are the benefits of using them?

I don't think there are the best – that depends on the product type, on the organization, business goals, etc.

11. Do you have any recommendations for software architecture design techniques of machine learning systems?

ML is a part of software systems so SA is more related to the system and software. It is important to ensure proper ML infrastructure and the training & deployment process and that might have impact on SA.

12. Which would be the best practice that could be useful/helpful in applying software architecture designing of machine learning systems?

That depends very much on the application domain.

For example Federated Learning require s distributed system/software architecture. Here we need to design a distributed, dynamic system. Experience for architecting distributing systems and cloud computing would be useful.

13. What are the most common software architecture design challenges in machine learning systems?

Establish ML infrastructure – how to manage data (store, access, update)

Establish run-time architecture (distributed execution of ML model), and establish relation to the ML infractucture.

14. What are the main architectural decisions on software architecture design of different machine learning systems?

That depends very much on the business goal, domain, requirements, etc.

The decisions are related:

1. how to manage and access data, how to define the ML development architecture, how to define the run-time architecture with heterogenous computing units (CPU + GPU), how to enable a continuous ML, etc.