

# Master Thesis Machine Learning Based Fatigue Life Prediction of Metallic Materials

## Description

## Company Description

At Bosch, we shape the future by inventing high-quality technologies and services that spark enthusiasm and enrich people's lives. Our promise to our associates is rock-solid: we grow together, we enjoy our work, and we inspire each other. Join in and feel the difference.

The Robert Bosch GmbH is looking forward to your application!

## Job Description

Mechanical components are mainly subjected to cyclic loading during their service life. Therefore, the fatigue assessment of these components is an important requirement and the main driver for the design of such parts. Various guidelines using analytical and empirical methods exist to assist in the evaluation of these components, on the other hand, data-driven approaches have become increasingly popular to estimate the fatigue behaviour of metallic components. However, major challenges arise due to low data availability and unknown data quality, requiring sensitive data management and ML model selection.

- In your Master thesis, you will extend an existing ML model by adding data, usable features and extending its methods to increase its accuracy.
- Your work will include data mining for more data that meets the required criteria.
- You will develop an automated process to check the applicability of new data.
- Last but not least, you will validate and optimize existing and new ML methods using Python.

## Qualifications

- **Education:** Master studies in the field of Mathematics, Computer Science, Engineering or comparable
- **Experience and Knowledge:** in data processing and analysis; uncertainty quantification; programming skills (Python with Scikit-learn, TensorFlow or [PyTorch](#), Git, Test Driven Dev)
- **Personality and Working Practice:** a communicative, efficient and structured team player with a strong sense of responsibility
- **Enthusiasm:** welcome to share your Git project with us
- **Languages:** fluent in German or in English

## Additional Information

**Start:** according to prior agreement

**Duration:** 6 months

Requirement for this thesis is the enrollment at university. Please attach your CV, transcript of records, examination regulations and if indicated a valid work and

## Hiring organization

Candidate-1st

## Employment Type

Full-time

## Beginning of employment

asap

## Job Location

Renningen, Germany

## Working Hours

40

## Base Salary

euro EUR 28K - 53K \*

## Date posted

June 4, 2024

residence permit.

Diversity and inclusion are not just trends for us but are firmly anchored in our corporate culture. Therefore, we welcome all applications, regardless of gender, age, disability, religion, ethnic origin or sexual identity.

**Need further information about the job?**

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#LI-DNI

**How the process will look like**

Your teammates will gather all requirements within our organization. Then, once priority has been discussed, you will decide as a team on the best solutions and architecture to meet these needs. In continuous increments and continuous communication between the team and stakeholders, you're part of making data play an even more important (and understood) part withing Brand New Day.

**Job Benefits**

EUR 28K - 53K \*