

WISSENSCHAFT UND WIRTSCHAFT IN EINEM JOB GEHT NICHT.

**DOCH.**

Finde es heraus am Fraunhofer IPT.

AS OF NOW, FRAUNHOFER IPT AT RWTH AACHEN OFFERS A

STUDENT ASSISTANT POSITION (M/W)

## **DEEP LEARNING IN PRODUCTION TECHNOLOGY**

In this work, software and deep learning algorithms will be developed, in order to examine sensor data of a demonstrator machine tool. In particular, the influence of the database system (e.g. SQL or Non-SQL, mongoDB or Redis) and of the deep learning framework (e.g. TensorFlow or ONNX) is in the foreground.

### Your Task

- Introduction in the use case of the demonstrator machine tool
- Deriving the requirements for the data acquisition, in order to enable deep learning analysis
- Development of deep learning algorithms for the analysis of correlations between measured and output variables
- Programming for the application of the required structure of the data acquisition on the demonstrator machine tool

### Your Skills

- You study Data Science, Informatics, Mathematics, Software Engineering or similar
- You do have extended knowledge in Numerical Methods in Engineering, Data Science and programming
- You have gathered first experience with Python
- You are curious, take initiative and show responsibility
- You are fluent in English and/or German

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## **DATA ENGINEER IN PRODUCTION TECHNOLOGY**

In this work, data infrastructures and data pipelines will be designed, in order to make the data of a demonstrator machine tool ready to be analyzed for different application purposes in the production. Sequences of processing and analysis steps should be applied to the raw data. For instance, outliers should be removed, Dimension should be reduced.

### Your Task

- Design the big data infrastructure and prepare it to be analyzed.
- Build complex queries to create "pipeline"
- Programming for the application of the required structure of the data acquisition on the demonstrator machine tool

### Your Skills

- You study Data Science, Informatics, Mathematics, Software Engineering or similar
- You do have extended knowledge in Database, Distributed System, Big Data Analytics
- You have gathered first experience with Python, SQL/NoSQL Databases, Apache Spark
- You are curious, take initiative and show responsibility
- You are fluent in English and/or German

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## **EXPERIMENTAL ANALYSIS OF THE THERMO-ELASTIC TOOL MACHINE BEHAVIOR**

The development of innovative methods for the correction of thermally induced positioning errors is a central topic of practical research in the field of machine tools. The accurate detection of the thermo-elastic deformation behavior of machine tools depends strongly on the sensor positions. In this work, experimental tests shall be performed (with the help of our technician) to investigate the thermo-elastic behavior of a demonstrator milling machine. A subsequent analysis of the measurement data should help to derive the best possible sensor positions.

### **Your Task**

- Introduction in the design and analysis of machine tools
- Design and integration of load and sensor units in the demonstrator machine tool
- Planning of experimental tests, in order to ensure a holistic investigation of all thermal sources
- Conducting experimental tests (with the help of our technician)
- Analysis of the measured data and derivation of optimal sensor positions

### **Your Skills**

- You study Mechanical Engineering, Mechatronics, Production Engineering or similar
- You do have extended knowledge in Mechanical Design, Mechanics and Heat & Mass Transfer
- You have gathered first experience with sensor technology
- You are curious, take initiative and show responsibility
- You are fluent in English and/or German

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## **APPLICATION DESIGN IN THE FIELD OF PLANT NETWORKING AND AUTOMATION**

At Fraunhofer Institute of Production Technology IPT we develop and design production machines for manufacturing in the sense of Industrie 4.0. This not only involves the development of new machines, but also the further development of existing machines to increase process transparency. In order to realize this, interfaces for process data acquisition to various proprietary systems and data processing algorithms, for example with deep learning algorithms, are required for the classification of different states. An essential goal is to be able to make a defined statement about the relationship between component quality, tool wear, process status and other physical parameters by the intelligent use of sensors and algorithms in the manufacturing process.

### **Your Task**

- Support in the design of control systems and retrofit applications for production machines
- Programming of interfaces and algorithms for data collection and utilization
- Use of databases
- Independent participation in the design of application architectures and in the execution and planning of experiments
- Evaluation and documentation of the results
- Research on the state of the art

### **Your Skills**

- You study Data Science, Informatics, Mathematics, Automation, Software Engineering or similar and you are passionate about technological challenges
- You do have extended knowledge in Numerical Methods in Engineering, Data Science and programming
- You have a good knowledge of network protocols, network infrastructure and you have already gained some experience with various communication interfaces
- You have gathered first experience with Python and C#
- You are curious, take initiative and show responsibility
- You are fluent in German and/or English