



SONY manufactures audio, video, communications, and information technology products for the global consumer and professional markets. With its music, pictures, games and online businesses Sony is uniquely positioned to become a leading personal broadband network company in the 21st century. Sony's European electronics operations cover a full range of activities from R&D, design, engineering and manufacturing to marketing, sales and service.

The **Stuttgart Technology Center (STC)** is the largest Sony Research Center outside of Japan and it is where innovations and future generations of products are being developed to meet the requirements and needs of the worldwide markets and customers.

Inside STC, in the **European Technology Center (EuTEC)** department, our engineers are providing advanced European Audio and Video Technology for worldwide and European specific CE devices. EuTEC focuses on technology innovations, research and development of Computational Imaging, Communications & Radar, Machine Learning and Signal Processing. The results of the research will define the core technologies for future products and new business opportunities for Sony

A working group inside EuTEC is the Machine Learning and Speech and Sound Group. For students with background in mathematics, computer science, signal processing or computational linguistics, we permanently offer internships / master thesis positions in the following three fields:

Internship / Master Thesis at Sony in Stuttgart, Germany

- 1) Audio signal processing**
- 2) Machine learning & Deep learning**
- 3) Text analysis and understanding & Natural language processing**

Below you can find examples of some of the topics that we had in the past or that we are currently offering for each of these fields, so that you can get an idea of the type of topics you would work on as Internship / Master Thesis student in our group:

- 1) **Audio signal processing:** example 1) **Audio Source Separation:** separate an audio signal into several sources (e.g. voices, instruments, background) by using their spectral properties; example 2) **Sound development for PlayStation:** investigation of new strategies for an improved listening experience for existing content.
- 2) **Machine learning and deep learning:** example 1) **Context Representation:** finding profile representations using combined sensor data; example 2) **Network Morphism:** modifying an already trained Deep Neural Network into a new one, preserving its functionality and accuracy; example 3) **Automatic Speech Recognition (ASR):** improving the language model of an ASR system; example 4) **Acoustic Scene Classification** using diverse machine learning algorithms; example 5) **Compressed Sensing** using a Deep Neural Network approach.
- 3) **Text analysis and understanding:** example 1) **Entity Topic Detection:** finding the most important *entities of interest* or *targets* in a document, paragraph or sentence; example 2) **Named Entity Linking:** disambiguating the entities in natural language text by linking them to their specific entries in a knowledge base; example 3) **Sentiment Analysis:** develop a system that, given a product review, detects the sentiments contained in it and the associated targets that are referred to, using machine learning and NLP techniques.

The positions are meant for students currently in their last years of study, without a finalized degree. We expect good mathematical skills and basic know-how in machine learning. Additionally, for the Signal Processing related activities (e.g. Audio Classification, Source Separation, Compressed Sensing, ...), a solid background in Signal Processing is required. For Machine Learning / Deep Learning related activities, previous hands-on experience in a machine learning project is required. For Text Understanding and Text Analysis activities, a background in NLP is needed. Furthermore, it is desirable that the applicant has some experience with *at least one* of the following programs/libraries/languages: Theano, Python, Matlab, C/C++, Java. Additionally, knowledge in script programming can be advantageous.

The internship / Master Thesis should last at least **six months** and can be started anytime from **February 2017**. A compensation of **1000 € per month** (gross) is paid. We are looking forward to your application and will be happy to reply to your questions and send you information about the possible topics for your Internship / Master Thesis. Please send your documents (including curriculum vitae, grades, and testimonials of your previous tasks) by email to one of the following addresses:

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