



## Internship offer – Denoising speech accelerometer signal with deep learning techniques

Founded in 2003, InvenSense Inc., a TDK Group Company, is the world's leading provider of MEMS sensor platforms. InvenSense's vision of Sensing Everything™ targets the consumer electronics and industrial markets with integrated Motion and Sound solutions. Our solutions combine MEMS (micro electrical mechanical systems) sensors, such as accelerometers, gyroscopes, compasses, and microphones with proprietary algorithms and firmware that intelligently process, synthesize, and calibrate the output of sensors, maximizing performance and accuracy. InvenSense's motion tracking, audio and location platforms, and services can be found in many of the world's largest and most iconic brands including smartphones, tablets, wearables, drones, gaming devices, internet of things, automotive products, and remote controls for smart TVs.

InvenSense is headquartered in San Jose, CA and has offices in Boston, China, Taiwan, Korea, Japan, France, Canada, Slovakia, and Italy. We're looking for top-notch students to join our global intern team. If you're interested in being a part of our journey and helping us grow to become the leading provider of SoC platform solutions, we definitely want to hear from you.

We are looking for motivated students to join our 2020 Summer Intern Program! Our intern program includes real work assignments, Intern Appreciation Day (interacting with CEO and VPs), Networking Lunch with hiring managers, technical talks, New Hire Panel with recent grads, play with technology, off-site fun events, and more!

### **Overview/Job Summary**

On True Wireless Stereo devices or earbuds, it is common to combine accelerometer data with microphone data in noisy or windy situations in order to improve global speech signal-to-noise ratio (SNR). Environmental noise and wind indeed have very little impact on Accelerometer signal. On the other hand, accelerometer speech signal usually suffers from constant but low SNR and a low frequency cut-off. Traditional denoising techniques don't make a good job at these low SNR and moreover cannot recover high frequencies or lost fricatives.

### **TDK – InvenSense**

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TDK Invensense is therefore looking for a 6-month internship in Grenoble to study deep learning denoising techniques and their potential applications on accelerometer speech signal to recover high frequencies and improve global SNR.

As part of the Software Engineering Team in Grenoble (France), your goal will be first to go through state-of-the-art denoising techniques, then based on literature to select one or two candidate deep learning algorithms. You will then try these on our accelerometer data and so will be expected to prepare data accordingly (eventually collect more data if needed), train a model and evaluate in some way that you will define performance of these deep learning algorithms compared to more classic denoising methods. This work covers multiple technical aspects and is a very good opportunity for someone who would either want to pursue an academic career in research or want to start as an R&D engineer right after the internship.

### **Expected Skills**

- Very good knowledge in audio signal processing
- Strong general statistics and machine learning background
- Experience with denoising techniques
- Good knowledge of Neural Networks, ideally including Auto Encoders and Generative Adversarial Networks
- Python expertise with Tensorflow experience.
- Matlab experience
- Very good English and communication skills

### **Offer details**

**Contract:** Internship

**Education level:** Final year student in Engineering School or Master Research specializing in signal processing/machine learning

**Dates:** 2023

**Duration:** 6 months

**Location :** Grenoble - France

Contact : remi.poncot@tdk.com

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