

Student projects at Soundsensing

For Data Science 2024/2025

We spend our large amount of our lives in buildings - in school, offices and stores. These buildings have a number of technical systems that need to operate to make our stay comfortable, convenient and safe - such as heating, cooling and ventilation systems.

Have you ever experienced being in a building with a malfunctioning air conditioning or heating? Then you know that it gets uncomfortable real fast!

Our goal at Soundsensing is to eliminate as many such malfunctions as possible. To do this, we use sensors to collect machine health data and Machine Learning to analyze the data. When abnormal or problematic conditions are detected, the system alerts the operations team in the building.

Our solution is used by many real-estate managers in Norway since early 2022. Now we want your help to make it better!



The data

As of August 2024, our sensors are currently installed in over 100 buildings in Scandinavia. Together they monitor over 1000 components. The data already covers more than 10'000 operating days, and this is growing continuously.

The technical systems and components covered are primarily rotating machinery used for Indoor Air Quality in buildings. This includes:

- Ventilation system: Fans/blowers and heat exchanger.
- Cooling systems: Pumps and compressors
- Heating systems: Pumps

In addition to the sensor data, we also have installation metadata and component/system information in the form of images, as well as some labels of known anomalies.



Project Topic Examples

System-aware Anomaly Detection

Current solution processes the data from each sensor independently.

But it is known that the motors that the sensors are mounted to are often related to each other, like being part of the same ventilation system or cooling system. In these cases, there might be relationships in the data that can be exploited to detect anomalies.

How can one combine data from multiple sensors in the same system/building, to provide better detection of problems?

Multi-modal sensing

The sensors used collect both temperature, sound and vibration. At the moment, each type of sensor data is treated independently. And temperature data is not used at all.

How can the different sensor modalities be combined in order to better detect problems?

Cross-building learning

Currently, learning of is done per-device, with no awareness of the other devices. However, the devices are installed on similar equipment, that exists in many buildings. These probably have some commonalities in behavior across different buildings, that may be useful.

How can one learn patterns across sensors in different buildings, in order to improve detection of problems?

Your profile

- Student based in Norway
- Working on a Bachelor or Master degree in Data Science (or similar)
- Familiar with core Data Science topics, like Exploratory Data Analysis, supervised learning and statistics
- Comfortable programming in Python
- Interested in time-series data

What we offer students

- Work in an area with big impact potential - all buildings in the world
- Interesting technical challenges within time-series analysis and Internet of Things
- Work on large real-world datasets
- Technical mentorship and guidance
- Work together at offices near Stortinget T. in center of Oslo
- Influence the direction of a small company

Previous student works

[*Sampling strategies to estimate Noise level with regards to the Energy-Accuracy Trade-Off*](#) (2020)

Emil Skar, co-founder and CTO of tech startup Sensorita

[*Determining the origin of impulsive noise events using wireless sound sensors*](#) (2021)

Fabian Nemazi, now Data Engineer consultant at Capgemini

Come work with us!

Does this sound interesting to you?

Get in touch with Jon Nordby - Head of Data Science at jon@soundsensing.no

