

## SEMINAR CRITIQUE REVIEW

(Of "Audio signal processing for Dynamic Noise Mapping in smart cities" presented by Francesc Alias on 22<sup>nd</sup> November 2017)

Review done by  
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The presenter started by introducing the concept of sound frequencies and the range of human hearing. He then proceeded to explain the range of different sound pressure levels that our ears find either comforting or painful based on the intensity of sounds with relevant diagrams and examples. Next the focus was gradually shifted to the concept of Audio Signal Processing regarding how acoustic information can deliver relevant data about the environment. Examples of different kinds of sound like speech, music and environmental sounds were provided and how machine learning can be employed to process these different kinds of audio signals was explained. The feature extraction of various sounds have been carried out by simulating different models. The most prominent model was that of the spectral analysis done by the cochlea of the human inner ear. Among all the approaches employed to achieve this modelling, the Mel-Frequency Cepstral Coefficients have shown good performance in automatic speech recognition tasks and have become the standard approach. Thousands of sound samples were analyzed to help with machine learning. Here the presenter could have explained the concept of Mel-frequency method in a little more detail as the information presented felt a little out of context because of lack of knowledge of the general audience in this particular field.

The impact of noise on environment was later discussed with emphasis on how high levels of traffic induced noise pollution have attributed to a higher growth in disease compared to air pollution. The presenter later explained how European Union came up with a way to mitigate the noise pollution by devising "Environmental Noise Directive 2002/49/EC" which includes preparing and publishing noise maps and noise management action plans every five years by its member states. Next the process of Noise map generation using noise level meters was explained. The slides that were being presented on this particular topic seemed cluttered with figures and contained too much unnecessary information to be followed by the audience. Next the concept of Wireless Sensor Network (WSN) was discussed which consists of spatially distributed autonomous sensors to monitor physical and environmental conditions. The Wireless Acoustic Sensor Networks (WASN) are responsible for monitoring noise levels in the city. Different types of such networks and the problems associated with setting up the networks were discussed clearly with great detail. The concept of DYNAMAP or Dynamic Acoustic Mapping was later introduced which consists of development of low cost sensor network for real time noise mapping. The different processes involved in this approach was presented in a clear fashion easy for the audience to grasp with good examples. The approach of Anomalous Noise Event (ANE) was given too much emphasis and without the adequate knowledge of the subject it became a little difficult to keep up with the pace of the presenter. The conclusion and future work of this field was presented in a very neat and legible fashion which clearly portrayed the potential this field carries and its huge impact on the environment.

From the presentation, the importance of noise mapping was made abundantly clear and the processes involved in mapping were properly explained. Noise have and will continue to play a vital role in shaping our smart cities and efforts need to be made to reduce the noise pollution and its impact on environment and our health.