

Remote Sensing and Prediction of Environmental Noise to Facilitate Addressing the Social and Health Issues of Noise - Pilot Study: Schools and Hospitals

Hassan Azad, University of Florida
PG, FY2021

- The goals of this project are a) to develop and deploy a remote noise sensing technology that is cost-effective, precise, and scalable, b) to collect and analyze the community response to environmental noise in terms of annoyance, work- and health-related issues during the period of remote noise monitoring, and c) to utilize computer simulations, advanced statistical and prediction models, and machine learning to analyze the measured data (historically and in real-time) in conjunction with the data from the surveys of noise annoyance.
- A smart technology for monitoring the traffic noise is developed and in place near Shands hospital and Trilogy school in Gainesville, Florida, since April 2022.
- The measured noise data is being transferred remotely in real-time to our server at the University of Florida where we can monitor the level of the noise around these two locations.
- This technology complies with the methods suggested by national standards in measuring environmental noise.
- This project has great potential to improve the well-being of individuals who reside, work, or spend time in the vicinity of the noisy environments. Identifying and Analyzing those harmful sites and making suggestions to treat them can reduce short- and long-term illnesses that environmental noise imposes on human life and, consequently, increases peace of mind and brings happiness to our societies while increasing the community's overall health.
- The proposed research project will create novel methodologies to measure, record, and analyze the environmental noise in large scales for cities using a combined remote sensing technology.
- We are also using the suggested noise measurement sensors (Class 1 or 2 condenser microphones) by the IEC and ANSI standards to maintain the highest level of accuracy in measurement.
- This project also integrates surveys of socio-acoustics impacts of noise with real-time measured data to adjust the noise monitoring program to address the community needs. The results of this integration will provide a foundation for developing new noise directives/strategic noise maps and improving the existing ones to better address the societal needs of the current and future smart and connected communities.
- Surveys of noise annoyance for these two locations are developed separately for the children, teachers, patients, and hospital staff based on reviews of similar studies and standard documents in this regard.
- The IRB is approved, and we are confirmed with the hospital and school to start the survey process.
- A separate but related research project funded by the University of Florida is being conducted which helps optimizing the developed smart technology in this project with respect to its network using advanced data analytics.
- This project can benefit education by elevating the learning outcome of students and the teaching capability of instructors.
- By make the developed technology available to the public, we will help the industry to grow by enabling in-house adaptations and assisting urban designers and city policy makers with their design decisions.
- By making the measurement data accessible to researchers, we will assist future research activities and collaborations in this area of research.
- Optimizing the data collection solution while the current technology is in place
- Conducting the surveys of noise annoyance in the proposed school and hospital
- Analyzing the noise data along with the human responses to noise to see if the developed technology can address the needs of the community
- Implementing any adjustment to the technology that makes it better serve the people