Contribution ID: **305** Type: **Paper presentation**

Cloud-Edge Architecture for Audio Signal Classification based on Mel Spectrograms

Friday 19 September 2025 11:18 (13 minutes)

Edge cloud applications have become vital as outdated cloud architectures face challenges in handling increasing data volumes, especially for audio signals. This article reports on a simple edge cloud architecture for real-time environmental audio classification to improve indoor security and availability. Audio signals are captured at the edge layer using a Raspberry Pi, then converted into Mel spectrograms using the Librosa Python library, and subsequently transmitted to a cloud-hosted convolutional neural network (CNN) trained on the FSD50K dataset. The application achieves 84\% overall accuracy with low latency, efficiently managing resource constraints, and scalability. This application presents real-time images and alerts, indicating the system's ability to detect and support emergencies on time for hearing-impaired users (clients).

Authors: Mr PĂTRAȘCU, Luca-Sebastian (National University of Science and Technology POLITEHNICA Bucharest); Mr BAJWA, Muhammad Khurram Zahur (University of Salerno, Italy); NEGRU, Cătălin (National University of Science and Technology POLITEHNICA Bucharest); MOCANU, Bogdan-Costel (University Politehnica of Bucharest); POP, Florin (University Politehnica of Bucharest, Romania / National Institute for Research & Development in Informatics –ICI Bucharest, Romania)

Presenters: Mr PĂTRAȘCU, Luca-Sebastian (National University of Science and Technology POLITEHNICA Bucharest); Mr BAJWA, Muhammad Khurram Zahur (University of Salerno, Italy)

Session Classification: Doctoral Symposium