



COLLEGE of ENGINEERING
AND PHYSICAL SCIENCES

SCHOOL OF COMPUTER SCIENCE

PhD Seminar 1

Thursday December 2, 2021 at 10:30am via Zoom

Qi Li

Complicated Background Noise Forensic

Advisor: Dr. Xiaodong Lin

Advisory: Dr. Andrew Hamilton-Wright

Advisory: Dr. Lei Lei [Engineering]

Abstract:

Historically, criminal investigations hinging on recorded audio data required manual application of forensic techniques to extract relevant information. These methods usually focus mainly on voices and speaker identification, but rarely focus on the wealth of forensic information available in the background noises present in the recording. In this seminar, I introduce methods of automatically extracting, separating, and classifying background noises, allowing for the difficult, time-consuming process of audio analysis to be handled by software. Once the audio has been classified and examined by proposed tools, the results can be used by investigators and forensic experts to aid in traditional investigative methods. Using location information as an example, I propose a fully automated location inference process based on background noise.

Detailed experimental results show that my scheme is effective and fast. My proposed framework intends to provide a neat, automated, and accurate analysis of the information present in background audio, and to provide a new source of forensic information for investigators to leverage. In contrast to existing similar work, my scheme not only realistically considers mixed human voice speech, but also considers the case of multiple background noise mixes. To the best of my knowledge, this is the first forensic work that considers background noise in a complex environment.