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Automated Identification of Vehicles using Acoustic Signal Processing

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Automated identification of unauthorised intruding vehicles approaching protected infrastructure is becoming increasingly important for security purposes. This three-year project, which is now in its second year, aims to develop a real-time acoustic vehicle type recognition system that will be predominantly composed of three main parts; acoustic signal pre-processing, feature extraction, and decision making (or classification). The main study area covers various signal processing techniques in time, time-frequency and potentially frequency domains with signal classification implemented using a range of artificial intelligence techniques such as artificial neural networks. So far the focus has been on time domain signal processing and neural network classification. Whilst the work is at an early stage, the time domain methods such as Time Domain Signal Coding (TDSC) and Co-Occurrence Matrix combined with neural networks have already shown some promise. The presentation will introduce the project, describe methodologies involved as well as the results to date for the novel acoustic identification of categories of vehicles.