**ABSTRACT**

Nowadays, traffic congestion poses critical problems including the undermined mobility and sustainability efficiencies. Mitigating traffic congestions in urban areas is a crucial task for both research and in practice. With decades of experience in road traffic controls, there is still room for improving traffic control measures; especially with the emerging technologies, such as artificial intelligence (AI), the Internet of Things (IoT), and Big Data. The focus of this thesis lies in the development and implementation of enhanced traffic signal control systems, one of the most ubiquitous and challenging traffic control measures.--🡪

This thesis involves the study of the principles of Active Noise Cancellation (ANC) and its Applications. Active Noise Cancellation is an alternative technique of estimating signals corrupted by additive noise or interference. Its advantage lies in that, with no a priori estimates of signal or noise, levels of noise rejection are attainable that would be difficult or impossible to achieve by other signal processing methods of removing noise. Its cost, inevitably, is that it needs two inputs - a primary input containing the corrupted signal and a reference input containing noise correlated in some unknown way with the primary noise. The reference input is adaptively filtered and subtracted from the primary input to obtain the signal estimate. Adaptive filtering before subtraction allows the treatment of inputs that are deterministic or stochastic, stationary or time-variable.

Computer simulations for all cases are carried out using Matlab software and experimental results are presented that illustrate the usefulness of Active Noise Canceling Technique.

The purpose of thesis is to study the adaptive filters (AF) theory for the noise cancellation problem. At first this thesis described about the nature of noises. It continues explaining about the digital filters and fundamental concept of DSP. Furthermore, the study describes the applications of adaptive filters. Moreover, the work focuses on one of the classes of application of the adaptive filters: the active noise cancellation. Least Mean Square (LMS) algorithm is studied and enhanced with adaptive filter. The simulation of the noise cancellation using LMS adaptive filter algorithm is developed.