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RF-based Traffic Detection and Identification

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Abstract:

Road traffic congestion estimation is a critical function that affects both developed and developing countries alike. We present Monitor as a novel RF-based traffic detection system that is capable of detecting the existence of objects, i.e. vehicles or humans within an area of interest. Compared to the current approaches for traffic estimation, Monitor is low-cost, does not disrupt traffic during installation, works for non-laned traffic, and does not require active user participation. Our approach is based on the fact that the presence of an object in an RF environment affects the signal strength, and hence can be used for detecting objects. We present the Monitor system architecture and how it uses statistical techniques, based on the mean and variance of the received RF signal strength, to detect the presence of objects. Implementation of Monitor on standard RF equipment shows its capability of detecting the presence of objects with high accuracy highlighting its promise for different vehicle-related applications and a wider range of domains including surveillance applications, border protection, and intrusion detection.