

TM18 Charactering Errors in Wireless LANs

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Problem Statement

An important characteristic of the IEEE 802.11 wireless LANs is that transmission errors occur regularly because of impairment (interference and noise). These transmission characteristics affect, the level of coding needed to protect frames from error, the range of wireless devices, the ability of wireless networks to meet delay requirements of media such as voice and whether reliable multicast protocols should multicast retransmissions or unicast them. Comparing the transmission characteristics observed by a station to those that are expected in its environment can also help in geolocating that station within the environment.

Objectives

1. Collecting a comprehensive set of data recording the behavior of operational wireless network.
2. Packet-level analysis.
3. Bit-level analysis of errors.
4. Signal-strength analysis.
5. Map the observed errors to specific mathematical model of the communications channel i.e. n-state Hidden Markov Model (HMM).

802.11 Wireless LAN (A brief introduction)

Wireless LAN is a technology that enables connecting computers to a network wirelessly with high bit rates, compared to IR and Bluetooth. The purpose of Wireless LAN was originally to enable in office working without the hassle of network cables, but it has since evolved and is still currently evolving very rapidly towards offering fast connection capabilities within large areas.

Our Approach

1. Modify 802.11a NIC drivers to retain error frames.
2. Extending the program developed by previous group.
3. Collect data through experiments (for 802.11a/b) across different environments.
4. Analysis of errored frames collected from above experiments.

Equipment Used

1. Laptop PCs.
2. Wireless NICs – 802.11a, 802.11b
(two of each)
3. Access Point.

