CS 284: PROJECT IDEAS

Simulation-based projects

If you choose to do a simulation project, you *must* create a new protocol or mechanism for doing something. You *cannot* simply evaluate existing protocols or do something that has already been done. Look through QualNet to see all the models that are available to you. Think about using different error models, application protocols, transport layers, physical layers, mobility models, etc.

- * Channel Assignment

  Develop a channel assignment solution for multi-radio mesh networks. Decide whether it should be centralized or distributed.

- * Rate Adaptation

  Develop a rate adaptation algorithm that differentiates between congestion-related losses and link quality-related losses.

- Path selection criteria

  Develop, implement and evaluate different path selection criteria for on-demand routing protocols to determine under what network conditions each one gives the best performance.

- MAC protocols

  Develop a new MAC protocol for mesh networks that outperforms 802.11.

- * Mobility models

  Develop a new mobility model for mobile networks, and compare its characteristics to existing models. Try to base your model on your intuition of real movement.

- Security

  Augment an existing ad hoc routing or multicast protocol so that it is secure against specified attacks from intruders.

- Security

  Develop a new routing protocol that is secure against specified attacks from intruders.

- * Delay Tolerant Networks

  Develop a solution for packet delivery in a delay tolerant network and compare the performance to previous solutions.

- * Addressing

  Develop a solution for addressing and routing based on a node's current location.

- Satellite Networks

  Customize any of the above ideas for satellite networks.

- * Green Networks

  Develop a solution for powering down access points/mesh routers when not in use.

Implementation-based Projects

If you choose an implementation-based project, you can either create some new software for iPAQs or laptops (your own laptops), or you can characterize existing software. Part of the challenge of the latter option will be in getting the software to run on the iPAQ. You can also use our IETF data sets, or other existing data sets, to study the performance of deployed wireless networks.

- Streaming Video

  Develop a mechanism for supporting streaming video for video conferences to small handheld devices. Investigate the capabilities and limitations of the handheld device. You may also consider what happens when traffic congestion increases at the access point.

- Media Server

  Develop a media server that determines the resources of the end device, and then adapts the media stream appropriately such that the end device can process it.

- Uni-directional Links

  Determine the frequency of occurrence of uni-directional links. This will include a comprehensive study of different metrics that result in the occurrence of these links.

- * Real-time Monitoring

  Develop a system for capturing and analyzing wireless transmissions in real-time. The system should display graphs of some selected set of data, such as transmissions, users, packet sizes, etc.

- * Data Analysis

  Analyze existing data sets from deployed wireless networks to develop models of traffic, user behavior, mobility, etc. Check http://moment.cs.ucsb.edu/conan for our IETF data sets, or http://crawdad.cs.dartmouth.edu/data.php or http://nile.usc.edu/MobiLib/ for data sets from the mobility community. Develop a simulation model that captures the statistical trends.