Mobile Peer-to-Peer Computing

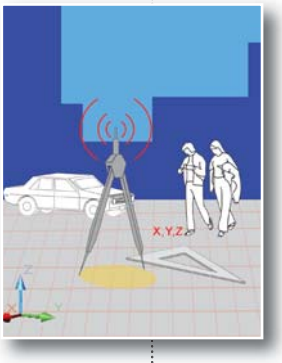
To enhance the data availability, the Telecommunications and Networks Laboratory (TNL) of FORTH-ICS proposed a novel mechanism that enables wireless devices to share resources. The focus is on threefacets of cooperation, namely information sharing, network connection sharing and message forwarding. Peers communicate via a wireless LAN and may have (intermittent) connection to the Internet. In the information sharing facet, peers query, discover and disseminate information. When the network connection sharing is enabled, the system allows a host to act as an application-based gateway and share its connection to the Internet. TNL designed, prototyped and evaluated an architecture and set of protocols, that enables this resource sharing in a self-organizing fashion without the need of an infrastructure. Examples of systems that use the peer-to-peer paradigm are the Multimedia Photo-Journal and the Collaborative Location-Sensing.

Multimedia Photo-Journal

The multimedia journal application enables users to build interactive multimedia journals that associate multimedia files, such as photographs, video, textual notes, with locations on Google maps. A user can add pictures to a certain point of the map by clicking on the map and browsing the image files corresponding to this location. Dynamically, the user can add, modify, or delete comments on a certain multimedia file, change its permission, and rate its content. Most importantly, the system allows file-sharing with other peers. A user can search for multimedia files using criteria based on location and rating. The local user can view the files, reviews and rates included in the response of a peer.

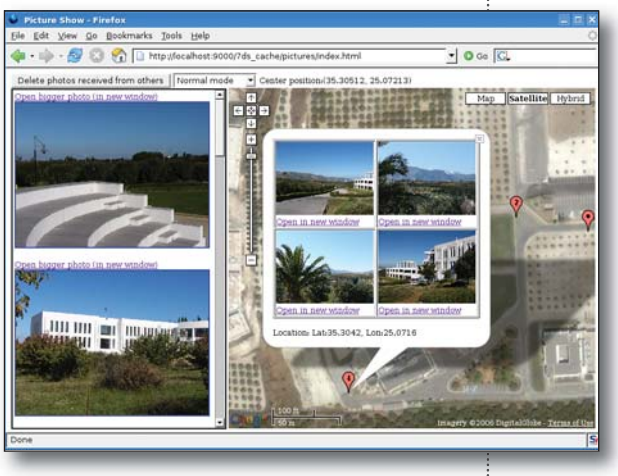
More info: http://www.ics.forth.gr/mobile/software.html

Collaborative Location Sensing (CLS)



Positioning is a critical component of the mobile and pervasive, computing. The Mobile Computing Activity at FORTH designed and evaluated the Cooperative Location-Sensing (CLS) system that adaptively positions wireless-enabled devices using the existing communication infrastructure (WiFi access points) without the need of specialized hardware or training. CLS employs the peer-to-peer paradigm enabling hosts to cooperate and share positioning information. It also allows the easy incorporation of external information (e.g., maps and spatial information, mobility patterns) to improve its accuracy.

More info: http://www.ics.forth.gr/mobile/overview.html



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TRAFFIC MEASUREMENTS AND MODELLING

Wireless networks are used for many different purposes and are based on a shared medium that is inherently more vulnerable than its wired counterpart. For that, TNL performs comprehensive measurements in a wide range of production environments to uncover deficiencies and identify possible optimizations and extensions. The availability of high-quality measurement and modelling studies would make possible the development of wireless networks that are more robust, easier to manage and scale, and able to utilize scarce resources more efficiently.

Our measurement and modelling efforts have focused on access patterns, e.g., client arrivals, roaming behaviour, and traffic load characteristics in wireless networks. For that, we used real-life traces collected from large-scale wireless networks. TNL has created one of the largest internationally archive of traces, models, benchmarks, simulation software, and mathematical tools for analyzing the performance of wireless networking protocols. Furthermore, TNL has a strong interest in collaborating with industrial partners to monitor and evaluate the performance of large-scale wireless networks and their underlying supporting mechanisms (for quality of service provisioning, handoffs, and admission control).

Information about the data repository for wireless networking traces:
http://netserver.ics.forth.gr/datatraces/

Information about the Mobile Computing Activity at FORTH:
http://www.ics.forth.gr/mobile/

TELECOMMUNICATIONS AND NETWORKS LABORATORY (TNL)

The Telecommunications and Networks Laboratory (TNL) of FORTH-ICS is actively involved in the areas of high-performance, wireless networking and mobile communications. In particular, research and development activities involve resource control and traffic engineering in wired and wireless networks, performance evaluation of networks with guaranteed Quality of Service (QoS), traffic measurement and analysis, voice processing, synthesis and compression, mobile positioning, and contactless smartcards. The Laboratory maintains a number of collaborative signal processing, sensor networks, fixed and wireless (based on IEEE 802.11) test beds for experimenting with new network technologies and protocols, and for performing measurement and analysis experiments of real network traffic. TNL collaborates closely with both national and international industries, including network manufacturers and telecommunication service providers, as well as with other research groups having interests in the above areas. Funding of this research has been provided by the European Commission, through ACTS (CASHMAN, MISA, REFORM, MONTAGE, ITHACI) and IST (M3I, SCAMPI) projects, by national programme funds (General Secretariat for Research and Technology - GSRT), and by industrial funded projects.

The work outlined above can be divided into four activities: (i) Telecommunications Activity, (ii) Mobile Computing Activity, (iii) Broadband and Wireless Networking Activity, (iv) Digital Signal Processing Activity.

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