NetRL in brief

NetRL brief description

NetRL, the Networks Research Laboratory, performs research in networking issues, such as protocols, algorithms, and mechanisms that support network control and the provision of quality of service in both fixed and wireless/mobile networks. The principal aim of our research is the development of protocols with a primary focus on flow and congestion control, mobility management, traffic engineering, resource allocation and radio resource management, and issues on multimedia distribution and video streaming in wireless environments. New networking architectures and techniques, as for example sensor networks and VANETS, are also being investigated. Also, the Web of Things and Smart Homes, with a focus on energy, are recent research activities of the Lab.

Research issues under consideration include: control structures and techniques based on non-linear, adaptive, and fuzzy-logic control theory, stability of congestion control mechanisms for arbitrary network topologies, network survivability, and optimization of resource allocation using computational intelligence. Various resource management algorithms enabling quality of service provisioning and mobility while optimizing resource efficiency in fixed and 3rd Generation mobile communication networks and beyond (e.g., enhanced-UMTS, MBMS). NetRL also pursues fundamental research on sustainable networking architectures (both infrastructure and infrastructureless) aiming at increasing operational efficiency either through better utilization of the wireless resources (especially spectrum and energy resources), novel routing/forwarding strategies and intelligent data propagation techniques. Security issues, especially in the context of ad-hoc and sensor networks are also of primary concern. Concepts of complex control and nature inspired techniques are adopted for network resilience and adaptivity, with emphasis on sensor networks. Game theoretic techniques for radio access network selection in 4G/Heterogeneous networks. Video distribution and streaming techniques for the efficient support of video streams focusing on network adaptation, content adaptation, and error resilience techniques.

Web-based energy-aware Smart Homes. Web of Things and the Web Home application framework. Internet Technologies and their applications in Mobile e-Services. are also studied. DITIS: a Collaborative Health Care System for the home treatment of patients, has received several awards, and is currently in use by a number of healthcare organisations, (PASYKAF for home care of cancer patients and LITO for cardiac patients). An OEM agreement is currently being signed with a major telecom network equipment manufacturer for worldwide commercialisation. Furthermore, smart houses are investigated in the context of elderly and cognitively impaired.

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The Laboratory currently consists of 17 personnel: 2 professors, 3 post doctorate scientists and 12 research assistants. It pursues collaboration with a number of research organizations, including the University of Southern California (USA), the Centre for Telecommunications and Information Engineering of Monash University, Melbourne (Australia), the ADETTI (Portugal), the Athens University of Economics and Business (AUEB), the Aristotle University of Thessalonica (Greece), the Technical University of Lisbon (Portugal), Portugal Telecom Inovacao (PTI), the University of Twente (Netherlands), the SINTEF (Norway), and Hutchison Whampoa Europe (UK).

Research in the Networks Research Laboratory is further enhanced with the use of new equipment and software supported by OPNET, CISCO, and Microsoft, as well as from UCY and the Cyprus Research Promotion Foundation. A LINUX based pilot network implementation supporting DiffServ, VoIP, SIP, IPv6 and MIPv6, as well as a pilot sensor network, are already utilized in a number of undergraduate and postgraduate projects. Research infrastructures also form part of our research, in collaboration with the Cyprus Academic and Research Network (CYNET).