

EE Department Seminar

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Yorgo I Stefanopulos Meeting Lounge (KB 217)

An Integrated Defence Architecture Against Denial of Service Attacks in a Self-Aware Network

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In recent years, Denial of Service attacks have evolved into a predominant network security threat. Due to the simplicity of the concept and the availability of attack tools, launching a DoS attack is relatively easy, while defending a network resource against it is disproportionately difficult. In this talk, I will present a comprehensive system for DoS defence that is specifically designed for networks exhibiting features of self-awareness and online monitoring. The first step of a protection scheme against DoS is the detection of its existence, ideally before the destructive traffic build-up. In our work, we propose a DoS detection approach which uses the maximum likelihood criterion together with the random neural network (RNN). In response to high probability of attack, the traffic is prioritised and rate-limited according to the measured probability. In a Self-Aware Network, packet routing is dynamic and depends on current network metrics, so both detection and response must run individually on each network node, since the nodes through which the attack traffic will pass, may change continuously. I will demonstrate the performance of the proposed defence mechanism as illustrated by the experimental results that we obtained on a real networking testbed that runs the Self-Aware CPN routing protocol.

Gülay Öke obtained her BS, MS and PHD from Boğaziçi University, Department of Electrical and Electronics Engineering in 1994, 1997 and 1997, respectively. She worked as a teaching assistant in Boğaziçi University, Department of Mathematics from 1994 to 2004. In 2004-2005 she was an instructor at the same department. In 2005-2009, she carried out her postdoctoral studies at the Intelligent Systems and Networks Group, Department of Electrical and Electronic Engineering, Imperial College, London. Since 2009, she works as an assistant professor at the Department of Control Engineering, İstanbul Technical University.