7COM1076 – Wireless Mobile & Multimedia Networking (Semester A 2020/21)

Summary of topics on Wireless and Mobile Networking

Mobile IP

Motivation, components and their definitions, mobile IP architecture, data delivery (tunnelling, proxy ARP), agent discovery procedure, agent registration procedure (updating of mobility binding), route optimization (in handover, in triangle routing), security concerns, refer to lectures slides for details. Be able to demonstrate the protocol by a given example.

Ad Hoc Networks

Features, applications, differences from cellular networks, issues, routing approaches, table-driven/proactive routing protocol & on-demand/reactive routing protocol comparison, DSDV (features, operations, performances, route discovery, route maintenance in case of link breakage, advantages & disadvantages), DSR (features, operations, performances, route discovery, route maintenance in case of link breakage, advantages & disadvantages). Be able to describe DSDV and DSR by a given example topology. Performance comparison of DSDV and DSR.

WiFi Networks

MACA, MACAW(RTS-CTS-DATA-ACK exchange, DS, RRTS, use of backoff counter, backoff Copy, backoff MILD) Definitions of all the schemes and how they work. Hidden terminal & exposed terminal problems, and how they are solved by MACA. WiFi protocol architecture and functionalities of each layer. WiFi MAC layer (uses RTS/CTS exchange, PCF and DCF). How polling is used in WiFi. How spread spectrum is used in WiFi.

Internet of Things

IoT applications (smart healthcare, smart city, smart home, smart industry etc.), IoT architectures (5 layer architecture), IoT elements (identification, sense, communication, computation, services, semantics), IoT protocol (RPL, DODAG, IEEE 802.14.5, how a DODAG graph is buit), IoT big data challenge (storage, computation), Cloud Computing (SaaS, PaaS, IaaS), IoT Use Cases, Fog computing

Cellular Networks

Cellular concept: features, basic hexagonal cell structure, frequency reuse, system capability increase, system overview (steps in call control through MTOS), 1st generation (AMPS) and its use of channels (control channel and traffic channel), 2nd generation TDMA (GSM), system architecture (BSS, HLR & VLR, etc), GSM's use of channels, 2nd generation CDMA (IS-95) and its use of channels (how DSSS is used in IS-95). 4G (WiMAX and LTE features and comparison), 5G (network architecture, Nanocore (nanotechnology, cloud computing, all IP platform), Service-driven 5G architecture, CloudRAN, Adhoc networking within 5G