Wireless Multimedia Systems

Fall 2009 (Topic 1: Introduction)

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Notice: (*you can not miss two classes without notice in advance)

(* no late homework will be accepted).

1. **Today's topic:**

   Reading

   (S .2001) M. Satyanaraynan, " Pervasive Com puting: V ision and Challenges ", I EEE P ersonal Communication Magazine, (August 2001), pp.10-17

   (Bi2001) Q i Bi, G eorge I. Zysm an, and Ha nk Me nkes, " Wireless M obile Com munications at th e Start of the 21 Century ", IEEE Communication Magazine (January 2001), pp. 110-116

   a) *Overview of the class*

   What is going to be covered, new wireless technology trend

   b) *Mobile Computing/Pervasive Computing*

   The evolution of Computing: Personal Computing-> Network Computing -> Mobile Computing

   Unification of Computing and Communications

   c) *Wireless Communication Systems*

   (i) Wireless Mobile Communication System

   (ii) Wireless Broadband Communication System

   (iii) Satellite Communication Systems

   Comments:

   Modern Wireless Communication Systems:

   Mid 1990s, the cellular communication explosive growth

   600 million users in 2001, 2 billion by the end of 2006 (30% of the world's population).

   1800~2000 MHz frequency bands: TDMA/FDD (GSM), CDMA/FDD (WCDMA)

   the success of cellular leads to the development of newer wireless systems:

   Next ge neration cellular netw ork for hi gh sp eed da ta c ommunications traffic (multimedia)

   2G-> 2.5G -> 3G -> 4G

   Wireless Replacement:

   allow w ireless netw orks t o re place fibe r op tic or copp er lines be tween fi xed po ints several kilometers apart (fixed wireless access)

   LMDS (Local Multipoint Distribution Service, 802.16 WMAN)

   One solution to provide last mile broadband solution

Fixed wireless communication systems are able to take advantage of the very well-defined, time-invariant nature of the propagation channel between the fixed transmitter and fixed receiver (LOS, line-of-sight)

Satellite Communication for broadband Solutions

WLANs (Wireless Local Area Networks, 802.11)

Replacement for wires within homes, buildings, and office settings

PAN (Bluetooth, Ultra-wideband short range communication)

Replace troublesome appliance communication cords within a person's personal workplace

Fast Deployment/Flexibility Ad hoc Network/Mesh Network

From Packet Radio Network (for military usage) to Bluetooth/WLAN ad hoc connection (for connecting to the printer and video conference)

*d) **Fundamental Problems***
   (a) System Configurations (Cellular & Ad Hoc, Centralized & Distributed)
   (b) System Layer Function Box

2. *Other Topic:*

   Propagation Channel Model

   Channel Coding

   The Cellular Concept

   Multiple Radio Access

   Multiple Division Techniques

   Channel Allocation

   Mobile Communication System

   Existing Wireless System

   Satellite System

   Network Protocol

   Ad Hoc and Sensor Networks

   Wireless LANs and PANs

3. **Text Book and Reading Assignment:**

   Based on paper reading and handouts.

4. **Grading**

   40% Midterm

   30% Final Exam

   30% Homework & Attendance

5. **Next Topic: Mobile Radio Propagation (Slow Fading and Fast Fading)**