A NEW HOD BASED INTRUSION DETECTION SYSTEM FOR WIRELESS SENSOR NETWORK

IK2206: Internet Security and Privacy

Sumanta Saha
Md. Safiqul Islam
Md. Sakhawat Hossen
WIRELESS AD HOC NETWORK

- Wireless ad hoc networks are autonomous nodes that communicate with each other in a decentralized manner through multi-hop radio network
  - Mobile ad hoc networks (MANET)
  - Wireless sensor networks (WSN).

IDS in WSN-Sumanta, Safiql, Sakhawat
WIRELESS SENSOR NETWORK
COMMON SECURITY VULNERABILITIES

- Lack of infrastructure
- Shared wireless medium
- Cooperative nature between the nodes
- Easy physical accessibility
- Dynamic network topology
- Operational constraints
  - Low Battery Life
  - Small Memory
  - Limited Processing Capability
TYPES OF ATTACKS

- Sleep Deprivation Torture
- Network Partition Attack
- Wormhole Attack
- Sybil Attack
- Sinkhole Attack
- Selective Forwarding
“Intrusion detection and response is the task of monitoring systems for evidence of intrusions or inappropriate usage and responding to this evidence.” - Network Security Bible

- Wireless IDS needs to face more threats than wired IDS
  - Broadcast media
- Even more special IDS required for WSN
  - Low processing power
  - Limited battery backup
OUR PROPOSED MODEL

Figure 1: Hierarchical Overlay Design
OUR PROPOSED MODEL (CONT'D.)

- GSM cell based.
- Four Layer architecture
- Sensor Node - Sensing the environment
- Cluster Node - Monitoring Sensor nodes, Data collection
- Regional Node - Monitoring three neighbor cluster nodes
- Base station - Monitors Regional nodes and distributes collected data
OUR HOD ARCHITECTURE

Figure 2: Four Layer Architecture
MONITOR NODE

Figure 3: Monitor Node
ID MECHANISM

- Multi Layer IDS.
- Robustness
- Physical Layer – RSSI (Received Signal Strength Indicator).
- MAC Layer – SMAC and TDMA
- Network Layer – Route tracing
- Application Layer – Three Layer Watchdog
APPLICATION LAYER

- Three level watchdog
  - Base Station
  - Regional Node
  - Cluster Node
IDS in WSN-Sumanta, Safiqul, Sakhawat

Figure 4: Intrusion Detection System
FUTURE WORK

- Election procedure to select cluster and regional node
- Building our own Simulator
Discussion and Questions