



# SNS COLLEGE OF TECHNOLOGY

*(An Autonomous Institution)*

*Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai*

*Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &*

*Accredited by NBA (B.E - CSE, EEE, ECE, Mech&B.Tech.IT)*

**COIMBATORE-641 035, TAMIL NADU**



## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

### 19ECE306- SMART IoT APPLICATIONS

#### III ECE / V SEMESTER

#### UNIT V

## 5.7 . Policies and Context Switching

In smart environments, context-aware policies govern the behavior of devices based on specific situations. Below is an overview of these policies, how they change with context, and examples illustrating their application.

### 1. Overview of Policy and Context Switching in Smart Environments

Policies in smart environments ensure that IoT devices respond appropriately based on changing contexts. These contexts can vary based on the user's location, the device in use, and potential emergencies. Policy definitions are essential in controlling device interactions, access permissions, and data privacy within smart environments.

### 2. Types of Context Situations

In the SecKit GUI, various context situations are designed to apply policies based on detected conditions. Examples of defined situations include:

- **Proximity Detection:** Detects entities within a 20-meter range.
- **Driving Context:** Detects when a person is driving towards home and associates them with their smart home and vehicle.

- **Health Emergency:** Activates during health incidents, identifying the affected individual and initiating emergency protocols.

### 3. Example of Context-Specific Policies

In context-aware systems, policies are often nested. These nested policies have a hierarchy of rules and algorithms, such as “Allow overrides,” to prioritize certain actions. For example, if an emergency occurs, the rule may permit access to restricted data or devices otherwise inaccessible to untrusted entities.

**Normal Mode:** A homeowner has control over all IoT devices. Devices such as the smart lock can notify the homeowner if a visitor requests access.

**Emergency Mode:** If the homeowner's health deteriorates and an emergency call is made, the IoT system enters a health emergency context:

- Emergency services like an ambulance can request gate access, triggering the system to allow access after detecting the emergency call.
- Devices communicate this context to relevant components, enabling access for the emergency team while maintaining security.

### 4. Multi-Environment Policy Examples

- **Smart Home and Vehicle Contexts:** For instance, if a smart vehicle approaches the home and requests the gate to open, the policy may only grant access if:
  - The homeowner is in the vehicle.
  - The vehicle is within a 20-meter range of the home.
  - The homeowner's smartphone is also detected in the same range.

These checks help ensure that only authorized individuals access the home, safeguarding against potential security breaches.

## 5. Security and Threat Detection

The context-based approach addresses potential security threats by validating several conditions:

- **Ownership Verification:** Confirms that the homeowner, not an unauthorized person, is requesting access.
- **Real-time Cross-Checks:** For instance, the home system may check with the office system to verify the homeowner's location.
- **Trustworthiness of Policies:** Ensures that only authorized personnel can alter policies to prevent unauthorized access. The smart lock, for instance, must verify the source and integrity of policy updates to avoid tampering.

## 6. Importance of Policy Design and Context Detection

Designing robust policies and accurate context detection mechanisms is crucial for maintaining security. Homeowners can customize policies based on local threat levels and asset value. This flexibility allows each household to set security levels suited to their specific needs.

---

This structured approach to context-aware policies ensures consistent, secure, and responsive behaviors from IoT devices across various smart environments, from homes and offices to vehicles.