KoDA: A Knowledge-driven Distributed Architecture for Context-Aware Systems

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Overview

- Introduction
- Designing KoDA
- Conceptual Design of KoDA
- Prototype of KoDA
- How different KoDA is?
Introduction

○ Background
  • What is context?
  • What is a context-aware application?

○ Role of a context-aware architecture
  • Provides a suit of solutions to realize fully potential of context-aware applications
  • They differ with context-aware middleware and context-aware frameworks in a number of ways

○ About this work
Designing KoDA

- **Central to KoDA is KiCM**
  - KiCM is a Knowledge-intensive Context Model
  - KiCM forms a basis of representing and reasoning knowledge about a real world environment

- **Design Requirements;**
  - Flexibility and scalability
  - Distributed nature
  - Continuous monitoring
  - Dynamic inferencing and responding
Conceptual Design of KoDA

- **Application Layer**
  - Application Suite
  - Application Manager

- **Inference Layer**
  - Other Knowledge Sources
  - Knowledge Base
  - Context Broker
  - Inference Engine
  - User Broker

- **Perception Layer**
  - Sensor Platform
    - Sensors (Physical & Logical)
  - Context Interpreter
  - Concepts Base
Conceptual Design of KoDA

**Perception Layer**
- Sensors
- Sensor platform
- Context interpreter

**Inference Layer**
- Knowledge base
- Inference engine
- Context broker
- User broker

**Application Layer**
- Application manager
- Application suite
Prototype of KoDA

- 5 sensors (1 physical, 4 logical)
- LAN was used to facilitate connectivity between the server and the proxy computer
Prototype of KoDA

➢ Through event-based programming, proxy computers only respond when a venue is occupied.
➢ When a venue is occupied, the corresponding proxy computer communicates with the server.
➢ The server then uses accessible information to determine what the user is up to and respond accordingly.
➢ If no one enters the venue in 5 minutes, the server rechecks the status of the occupant to ensure every time the user is appropriately supported.
How different KoDA is?

- **Built based on KiCM**
  - A comprehensive model and therefore closely represent the reality

- **Can infer ongoing context**
  - KoDA uses accessible surrounding information to dynamically recognize ongoing contexts

- **It is distributed**
  - Therefore can be used to support different rooms