



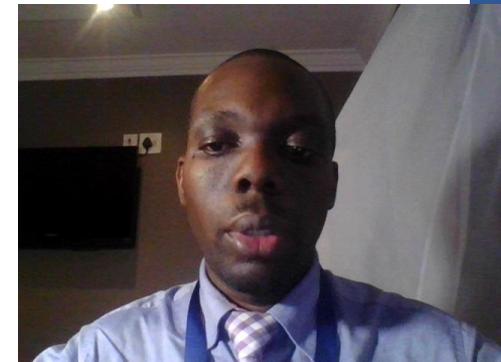
International Conference
for Internet Technology
and Secured Transactions

2018

December 10-13, 2018, Cambridge, UK

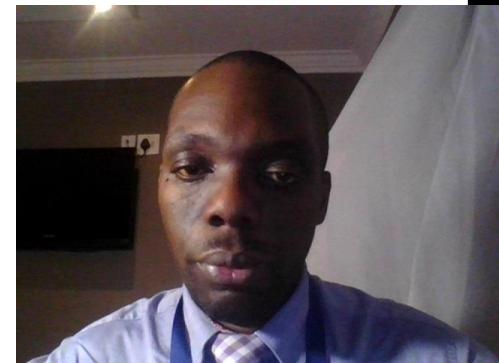
KoDA: A Knowledge-driven Distributed Architecture for Context-Aware Systems

Dennis Lupiana



Overview

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



Introduction

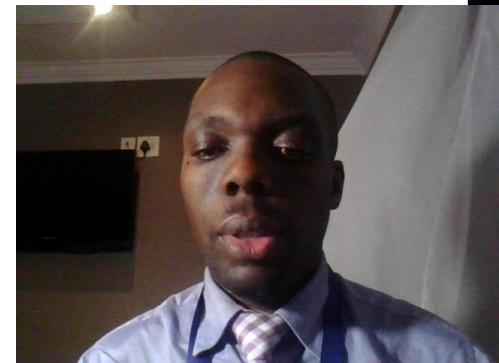
○ **Background**

- 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**

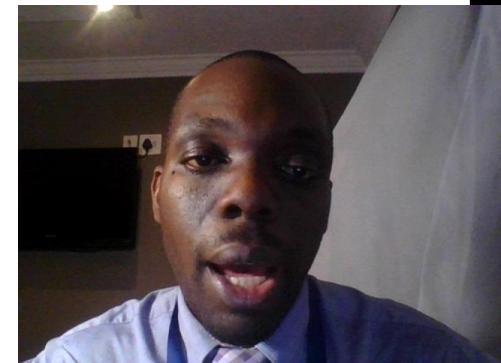
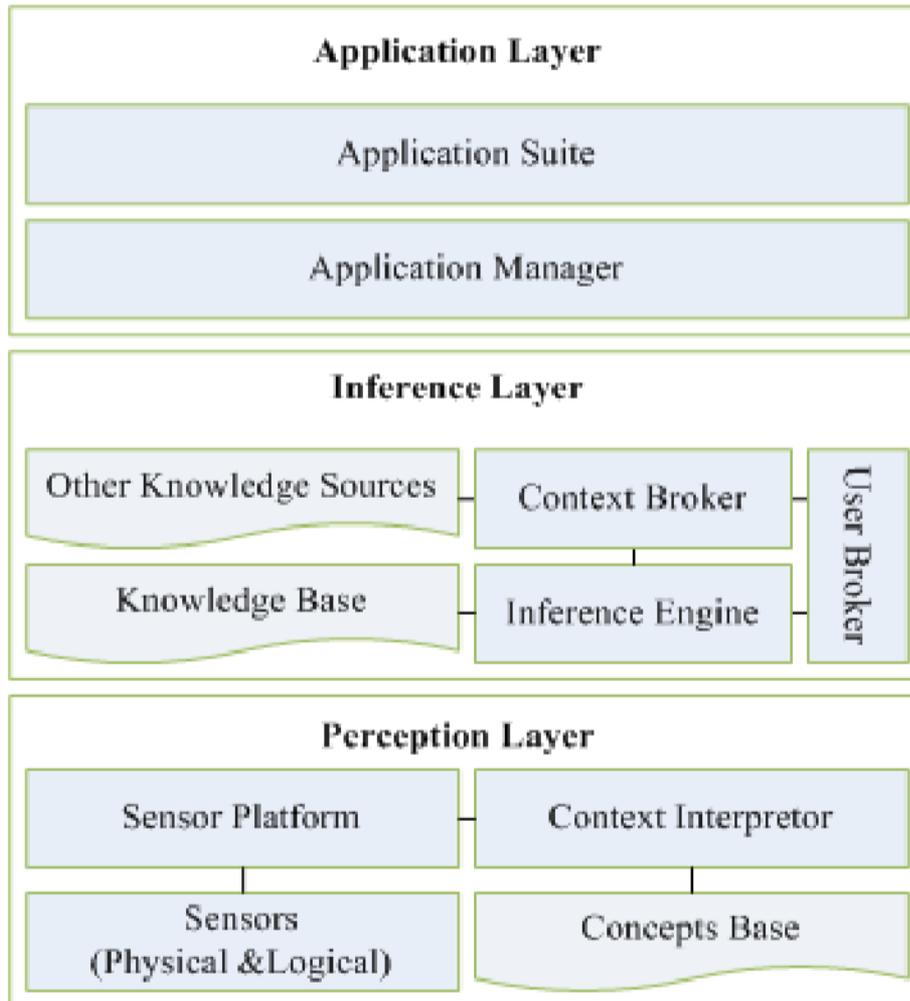


Designing KoDA

- **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



Conceptual Design of KoDA

Perception Layer

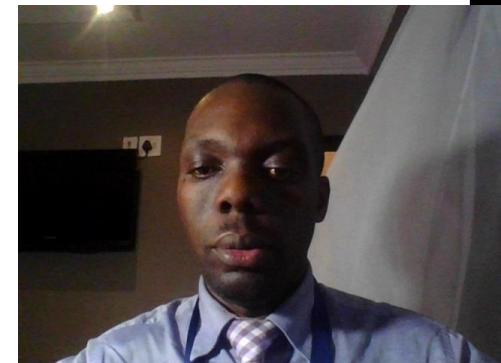
- Sensors
- Sensor platform
- Context interpreter

Inference Layer

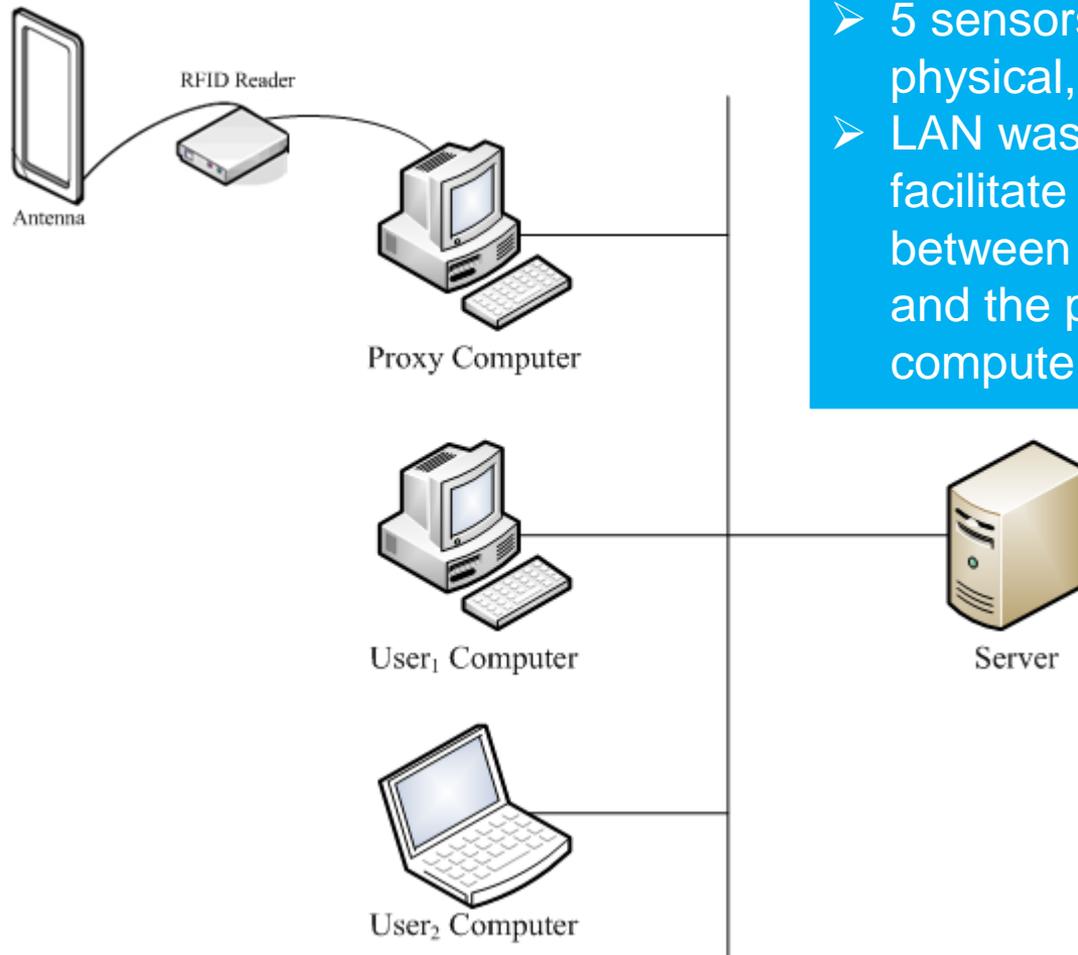
- Knowledge base
- Inference engine
- Context broker
- User broker

Application Layer

- Application manager
- Application suite



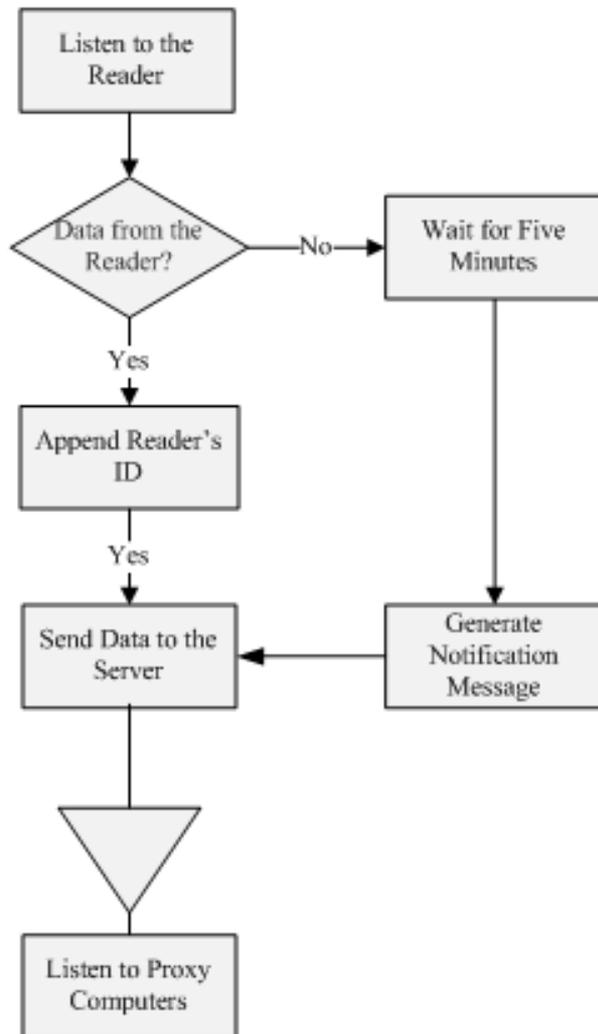
Prototype of KoDA



- 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 status of the occupied venue is updated to ensure every time the venue is occupied, the server appropriately supports the user.



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

