



An Object-Oriented Model in Support of Context-Aware Mobile Applications

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Overview

- Introduction
- Motivations
- Background - The MediaSense Framework
- The Model – Approach
- Realization
- Concluding Remarks
- Future Work

Introduction

- Proliferation of Mobile Devices and Services
- Availability of inbuilt Sensor
- Exploitable
- Deliver Services
- Targeted Advertising
- Sensors need not be Physical
 - Social Media Streams
 - Social Status Message
- Unifying Physical and Virtual Sources of Information



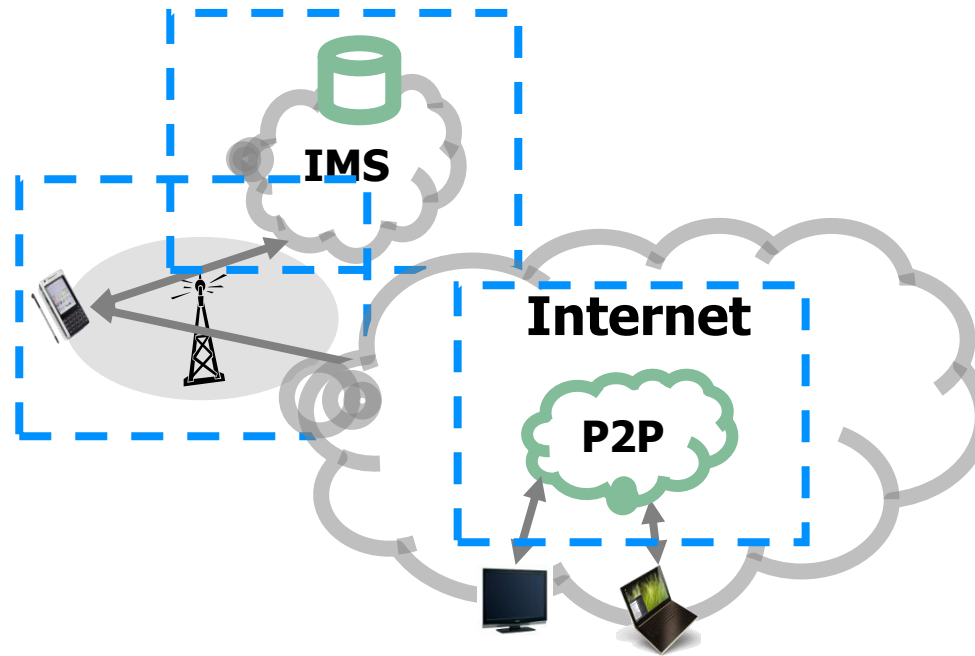
Motivation

- Mobile services benefit from information on:
 - User's situation and intentions
 - User's social activities
- However this requires:
 - A model that enables reasoning both over physical and virtual sensor sources
- Previous approaches exist!
 - SenseWeb, IP MultiMedia Subsystem
 - Centralised
 - AmbiSense
 - Hardware Dependent

Motivation

- Enabling agents over context information requires:
 - Making the agents in a distributed system context- aware
 - Enabling these agents to communicate and interact,
 - Facilitating for these agents to reason about sensor and social information
 - Spontaneous availability of sensor information

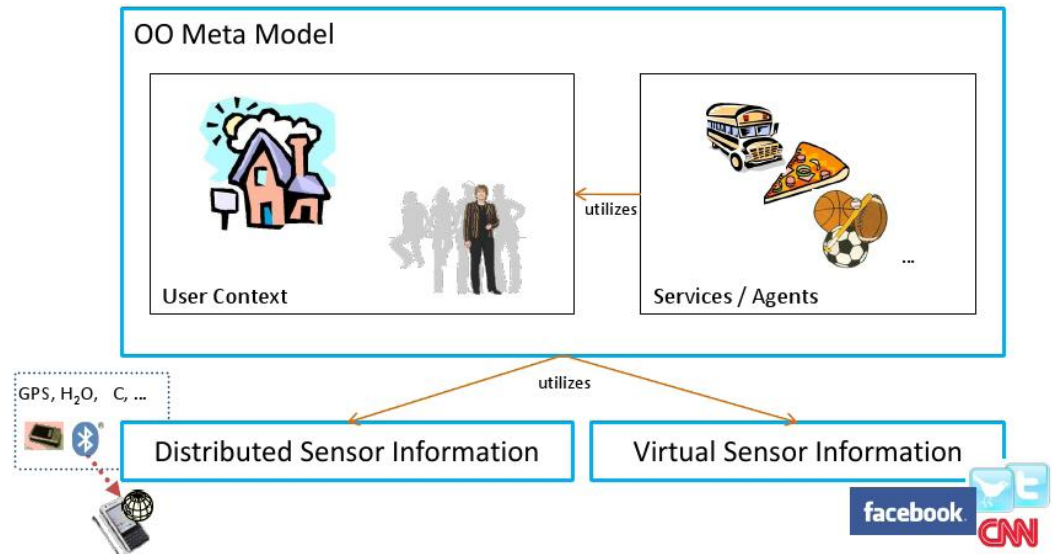
The MediaSense Framework



- 3G Mobile Internet
- 3G IP Multimedia Subsystem (IMS)
- Peer-2-Peer Infrastructure (P2P)
- Wireless Sensor Networks (WSN)
- Distributed Context Exchange Protocol (DCXP)

Approach

- The Context Information Integration Model



- Persistence and execution point for agents
- Modelling Context Information

Approach

- Internet of Things
 - Entity - Predicate - Entity
- Sensed Context
 - Information Sources
 - Physical or Virtual Sensors
 - GPS Sensor and Camera
- Context Meta Data
 - Aspect
 - Dimensions
 - Representations

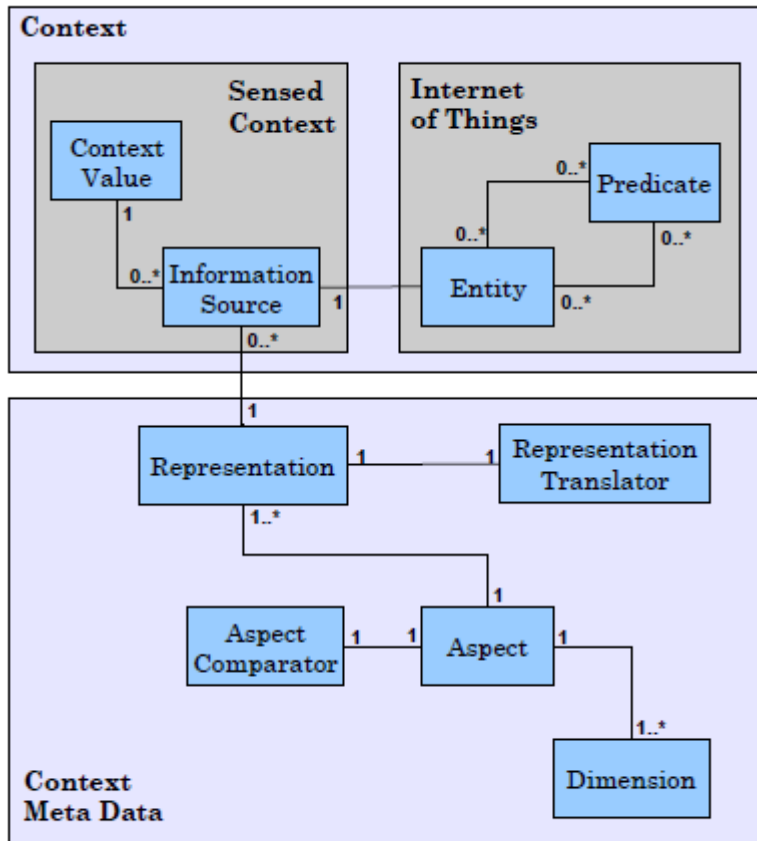
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Approach

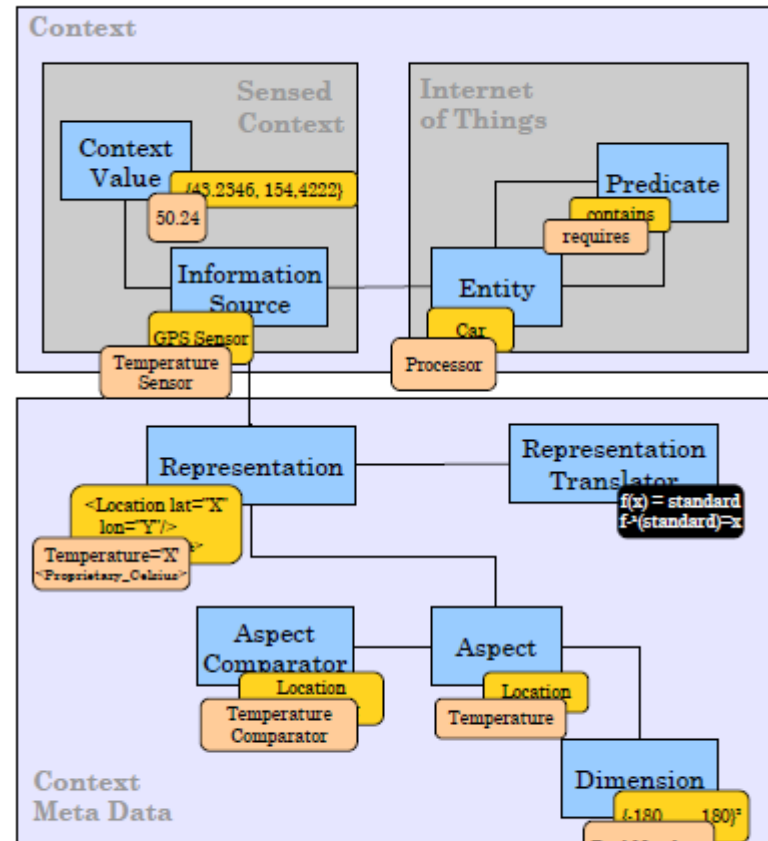
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Approach



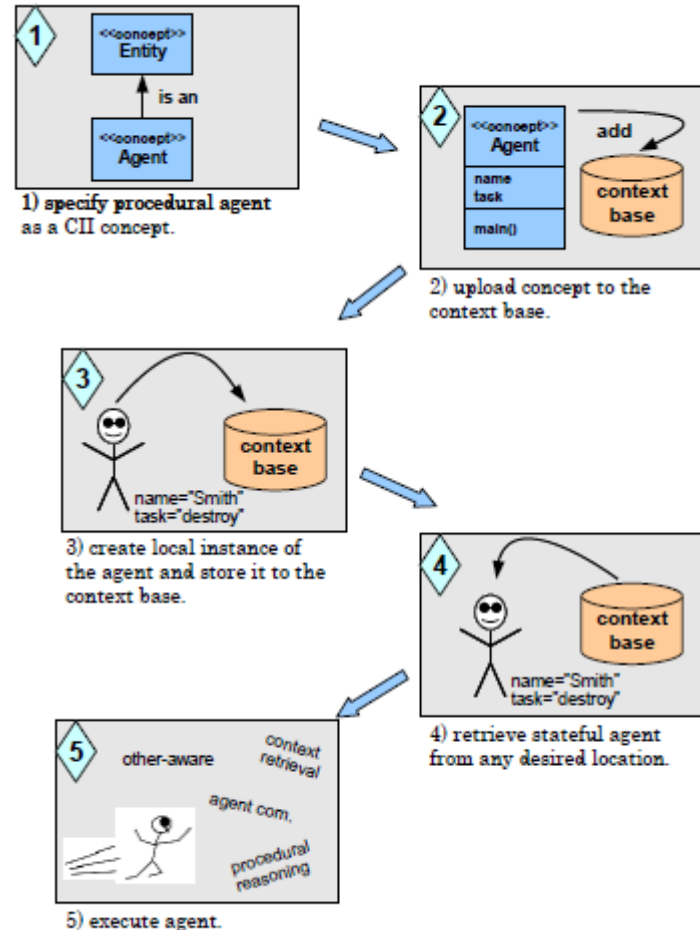
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(b)

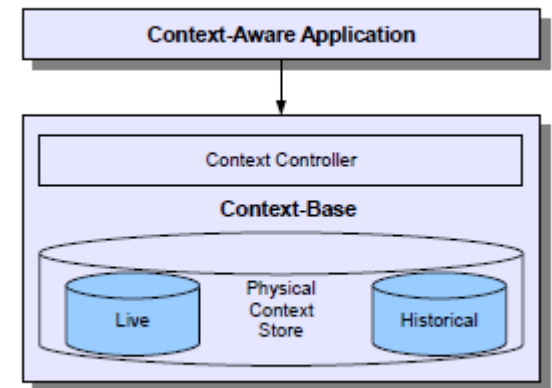
Approach

- Agent Environment
- Agents as Entities
- Can be realised using:
 - Java Agent Development Environment (JADE)



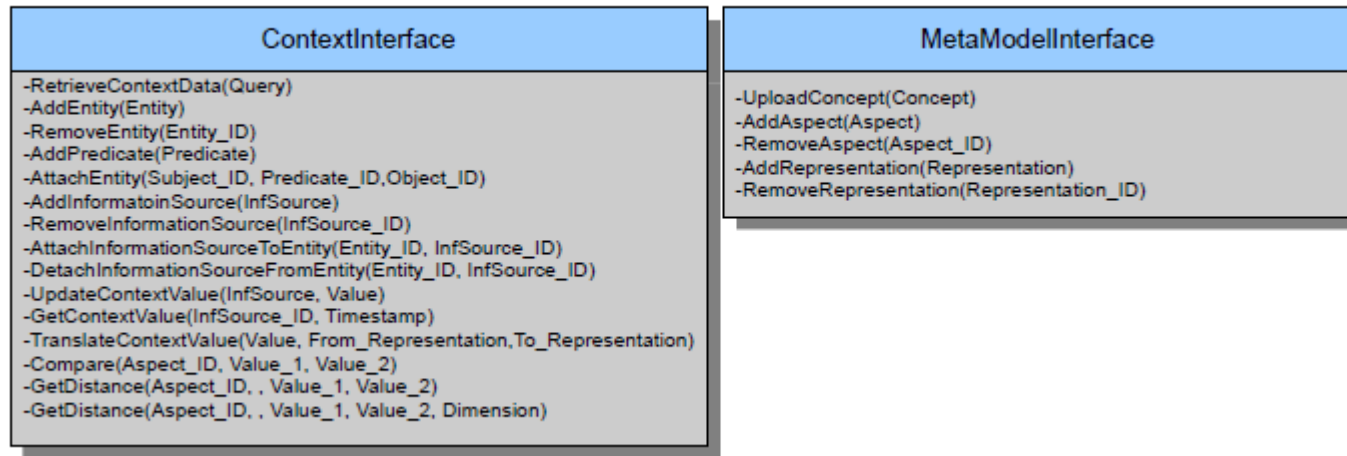
Realization

- Context Aware Applications
- Context Controller:
 - Handling data operations mediating between external requests (data from information sources) and the physical data store.
- Physical Data Store



Realization

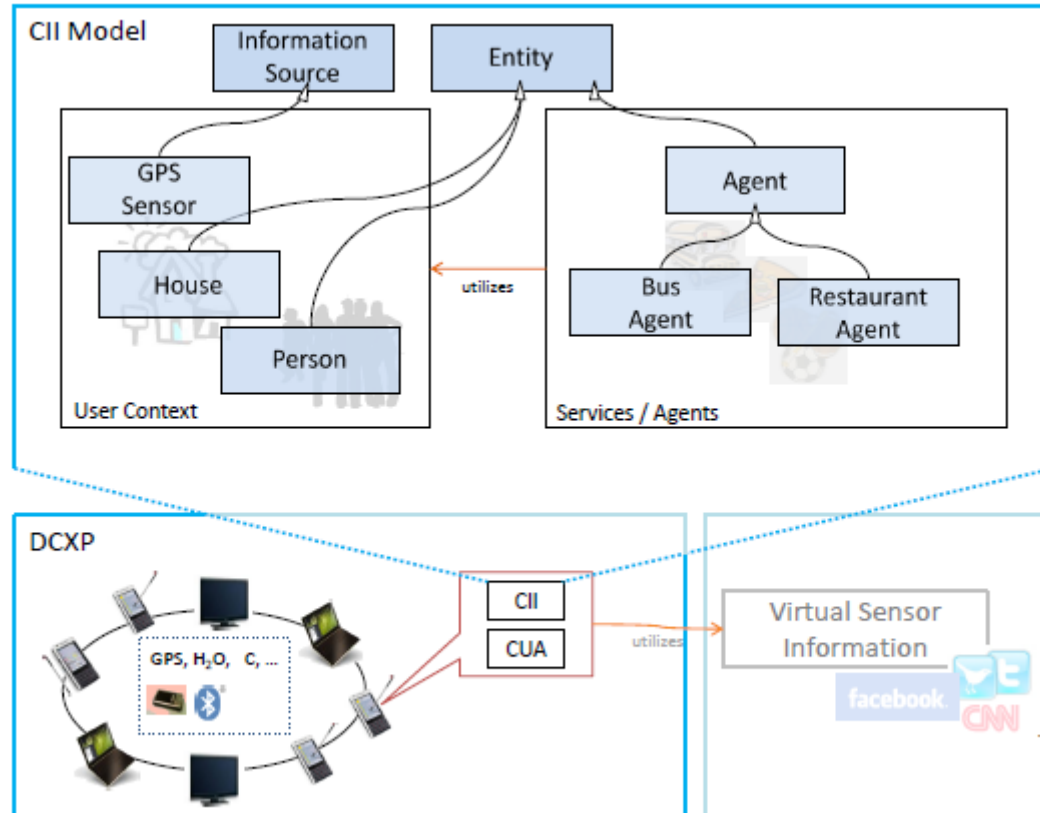
- Interfaces



- Context Interface
 - Available to applications
- Meta Model Interface
 - Available to System Modeller

Realization

- Realization on DCXP



Concluding Remarks

- Presented the CII Model
- Concrete foundation for building dynamic agent based services and supporting time critical context dependent applications
- Extendable environment for realizing continually evolving object domains
- Allows for agent persistence, recovery, resilience, accessibility and mobility
- Context awareness from their ability to act upon sensor information within the model
- JAVA -based implementation on DCXP

Future Work

- Model Distribution



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