Agent Oriented Design for Ambient Intelligence

Ao Dai

Andrei Olaru

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13.10.2010

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- Introduction
- Scenario
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- Agents
- CLAIM
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- Experiment
- Conclusion & Future Work

Agent Oriented Design for Ambient Intelligence

overview

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The Ao Dai Project:

· presented and demonstrated at the 5th NII-LIP6 Workshop, in June 2010.

· developed by
Thi Thuy Nga Nguyen, **Diego Salomone-Bruno**
and **Andrei Olaru**,
under the supervision of **prof. Amal El Fallah Seghrouchni**.

· part of the ongoing collaboration between:

- LIP6/SMA team – University Politehnica of Bucharest
  Andrei Olaru is PhD student in co-supervision between UPB and UPMC (prof. Amal El Fallah Seghrouchni and prof. Adina Magda Florea).
- LIP6/SMA team – Institut de la Francophonie pour l'Informatique, Hanoi
  PhD thesis of Thi Thuy Nga Nguyen.
- LIP6/SMA tema – PUC-Rio
  Diego Salomone-Bruno, Project STIC-AmSud.

Ubiquitous electronic environment that supports people in their daily lives, in a proactive, but "invisible" and non-intrusive manner [Ramos et al., 2008, Weiser, 1993]

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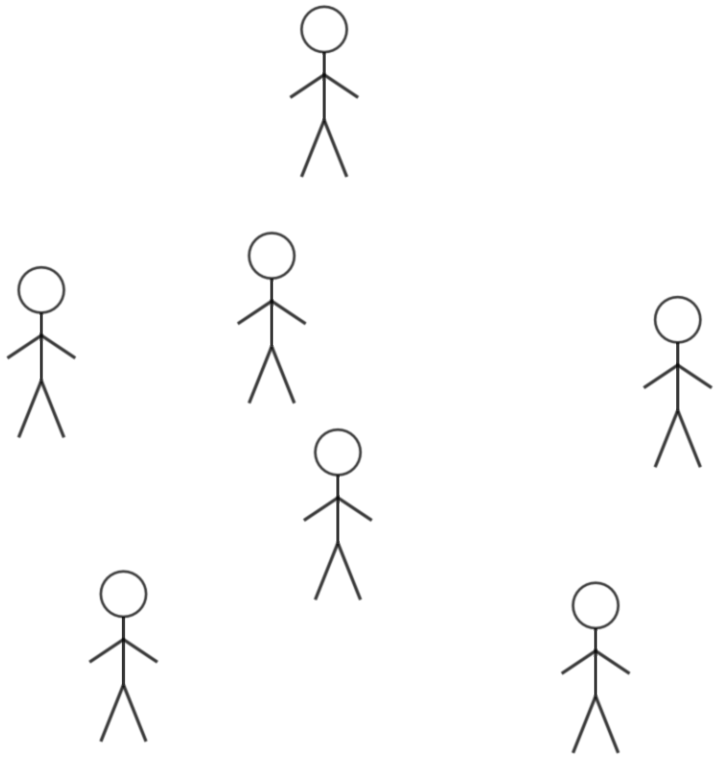

People

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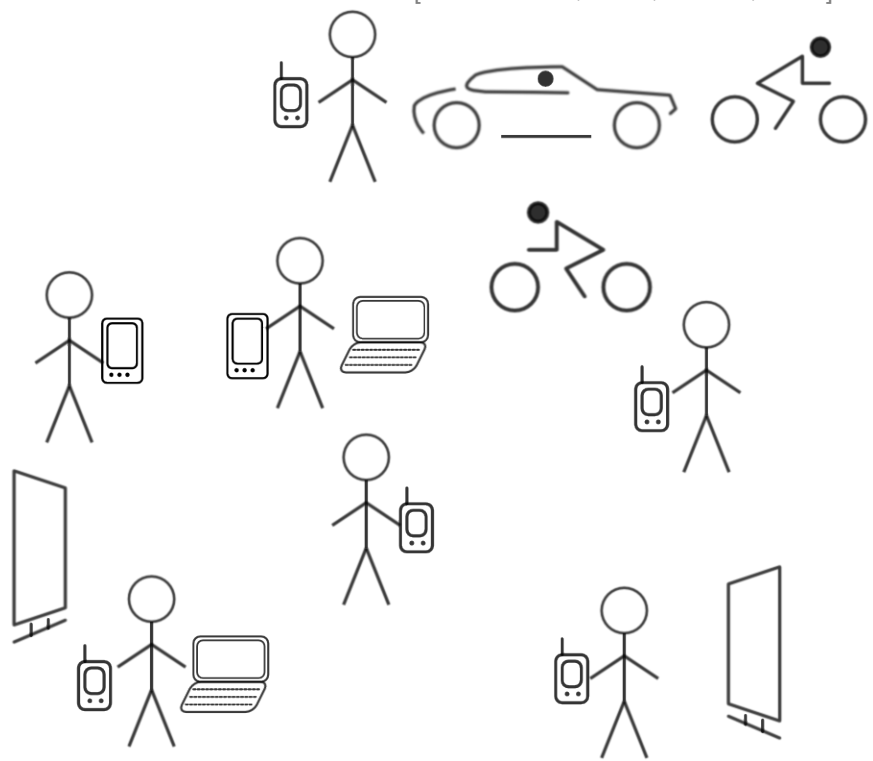

People · Devices

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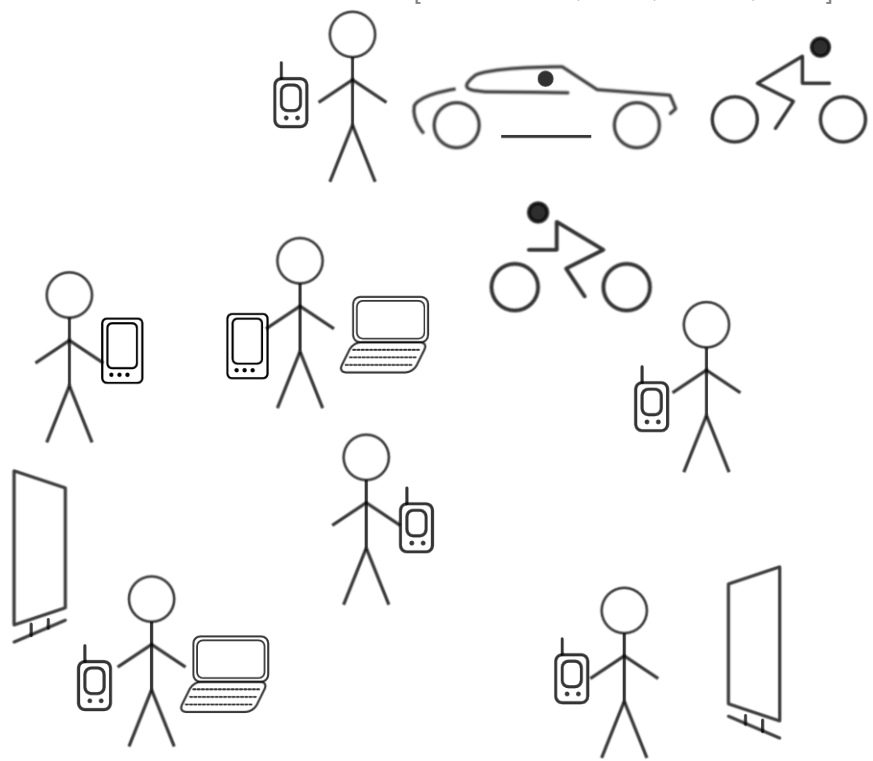

People · Devices · Services

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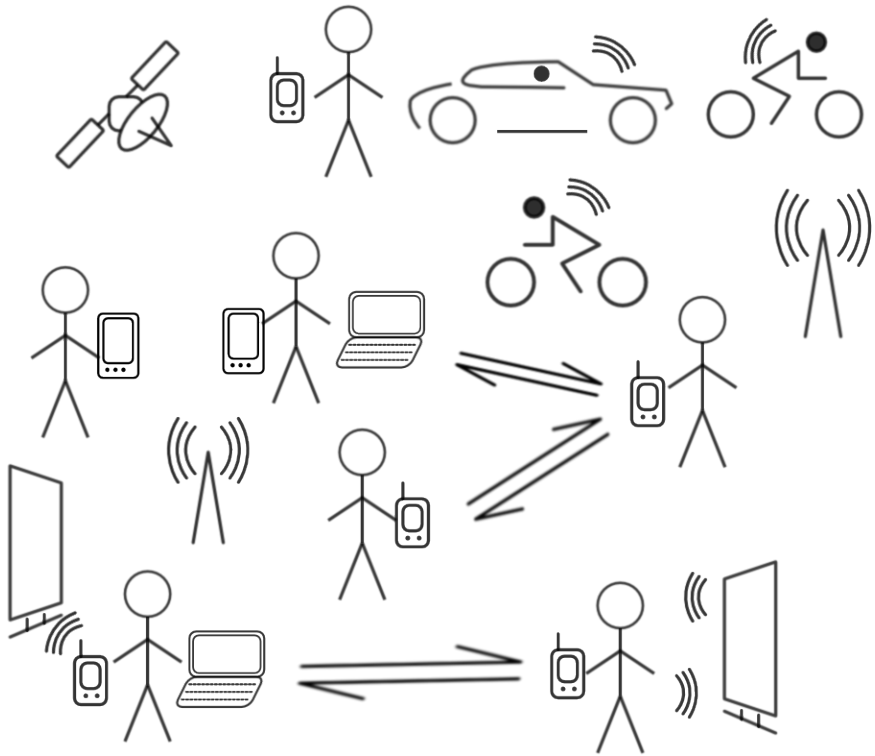

People · Devices · Services · Communication

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Two researchers arrive for the first time on the floor of the LIP6 laboratory – they both must attend a meeting in room 105.

Elements of an Ambient Intelligence environment:

- guiding people by means of light intensity or sound;
- appropriate adjustment of lights and other elements according to user preferences / aggregation of user preferences;
- appropriate choice of available screens for displaying useful information;
- choosing information to display depending on its estimated relevance to the present users;
- detection of incompatible contexts – e.g. unappropriate resources for the users' activity.

Context is any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves. [Dey and Abowd, 2000]

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Aspects: [Chen and Kotz, 2000]

- physical aspect (location, conditions)
- user profile and preferences
- computing resources
- associations
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In the Ao Dai project, we have so far considered:

- the spatial location of the user
- the user's preferences
- the available computing resources

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- reactivity
- proactivity
- autonomy
- anticipation
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For Ao Dai, we use CLAIM + Sympa as agent-oriented programming language and platform.

· Agent-Oriented programming language created by Alexandru Suna, during his Thesis at LIP6 [Suna and El Fallah Seghrouchni, 2004]
· Eases the programming task involving a Multi-Agent System

CLAIM is based on explicit declaration of agent's characteristics:

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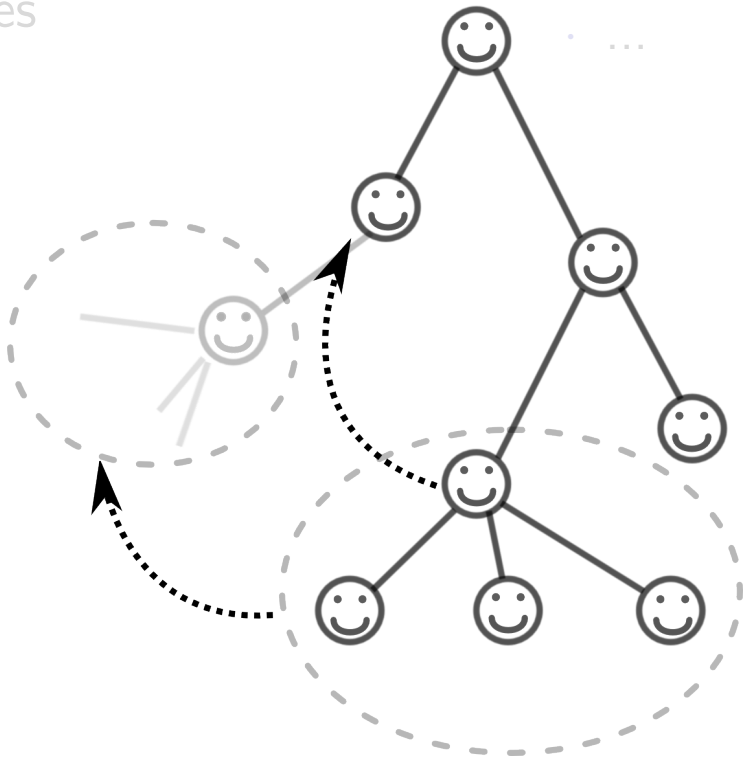

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· each agent represents a device, or a service, or a location, or a user;

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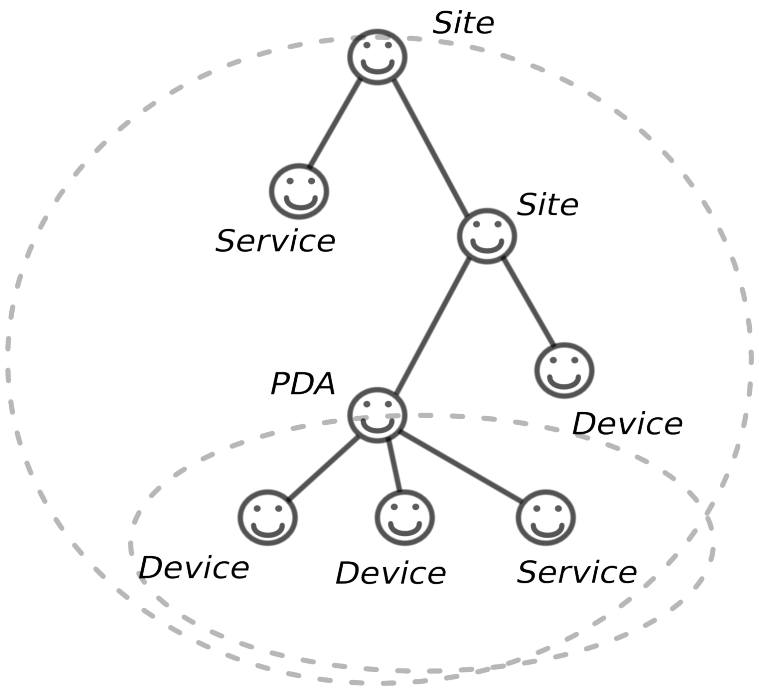

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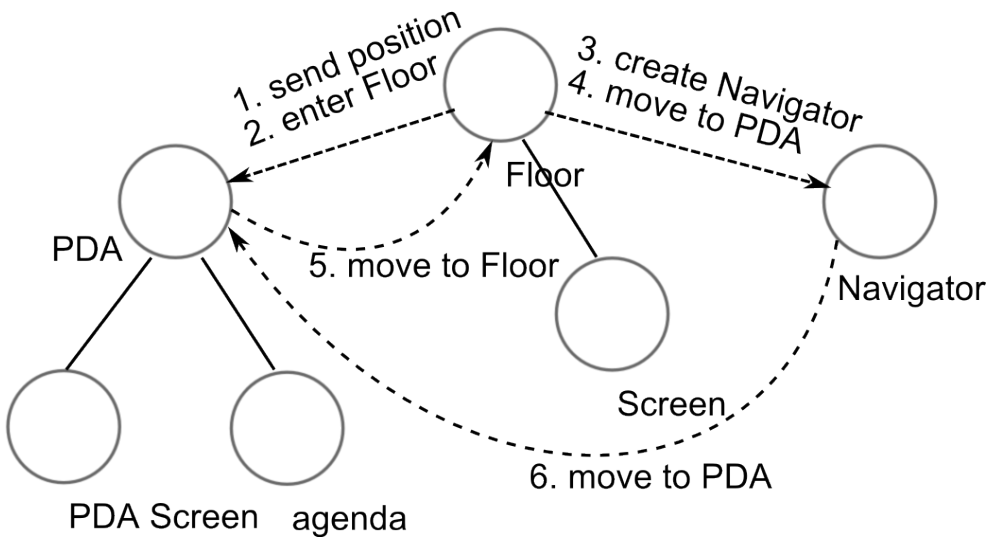
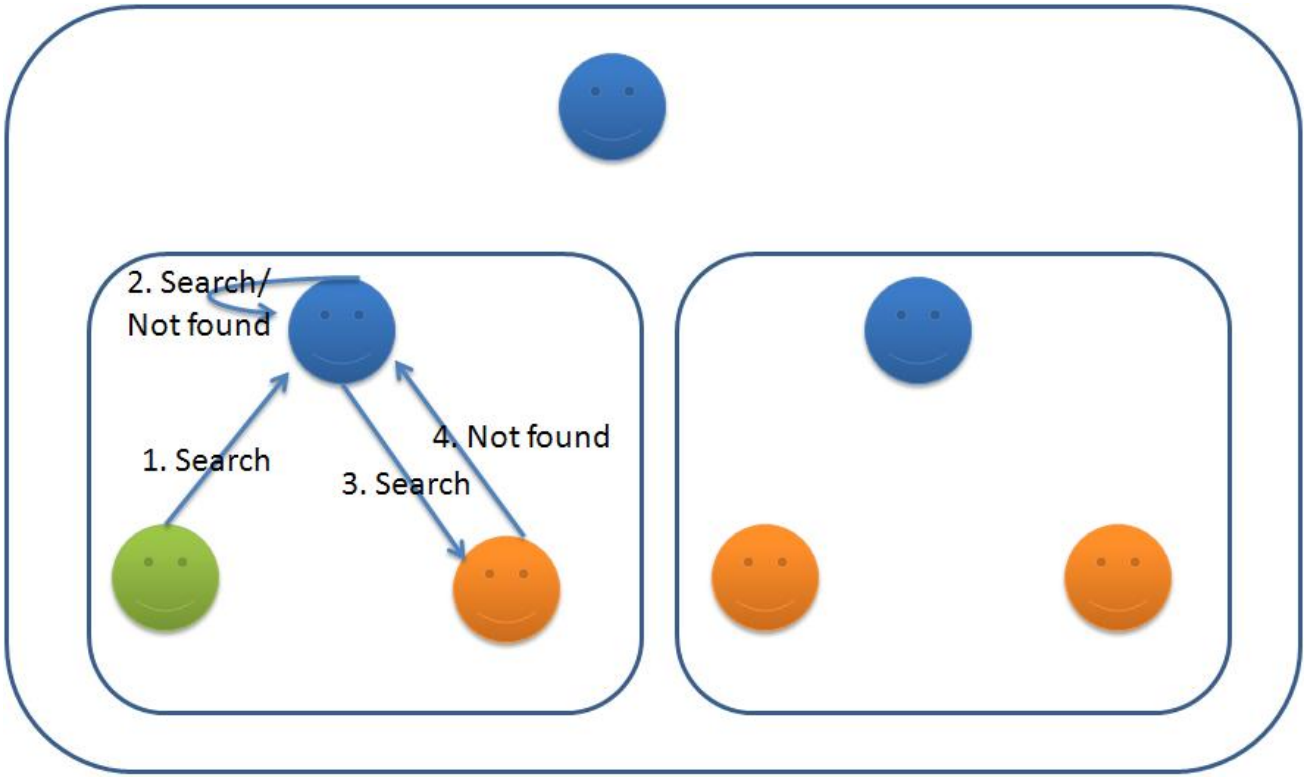


· Agent interacts only with its parent or its children

Example: Search



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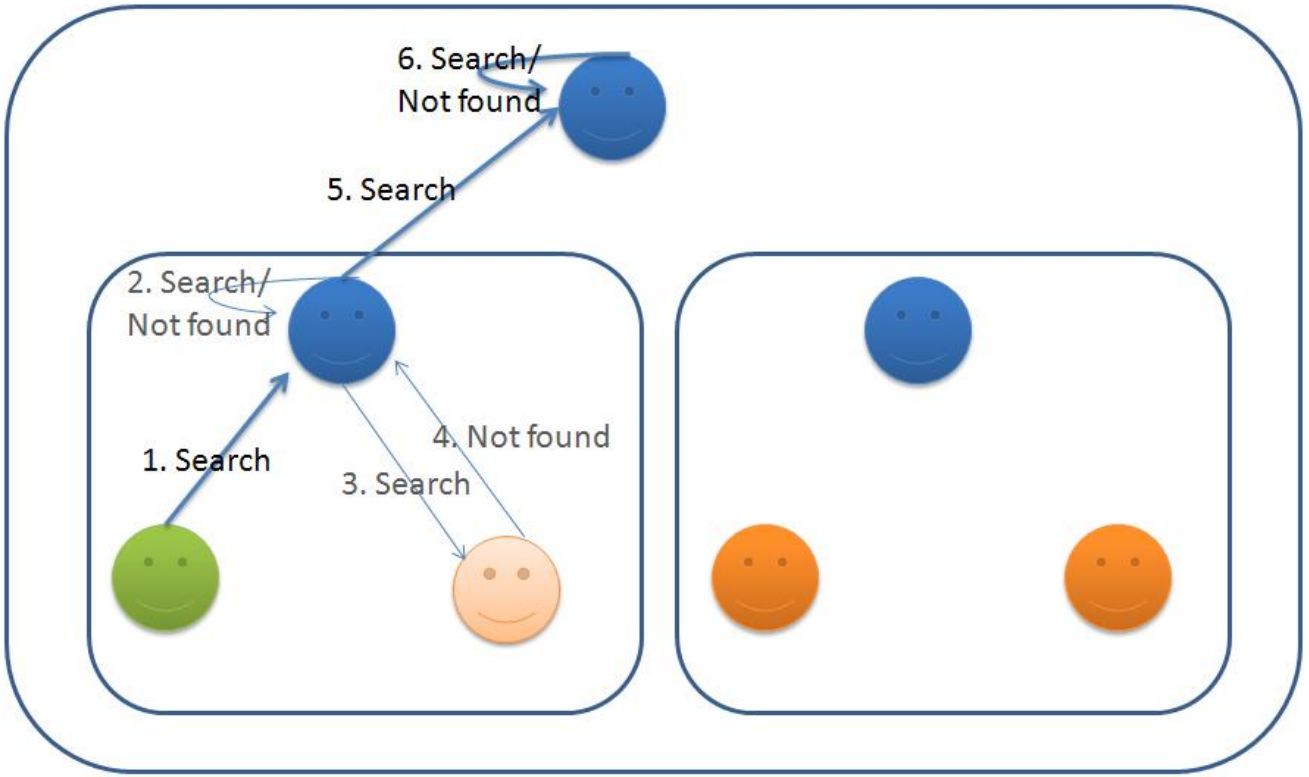

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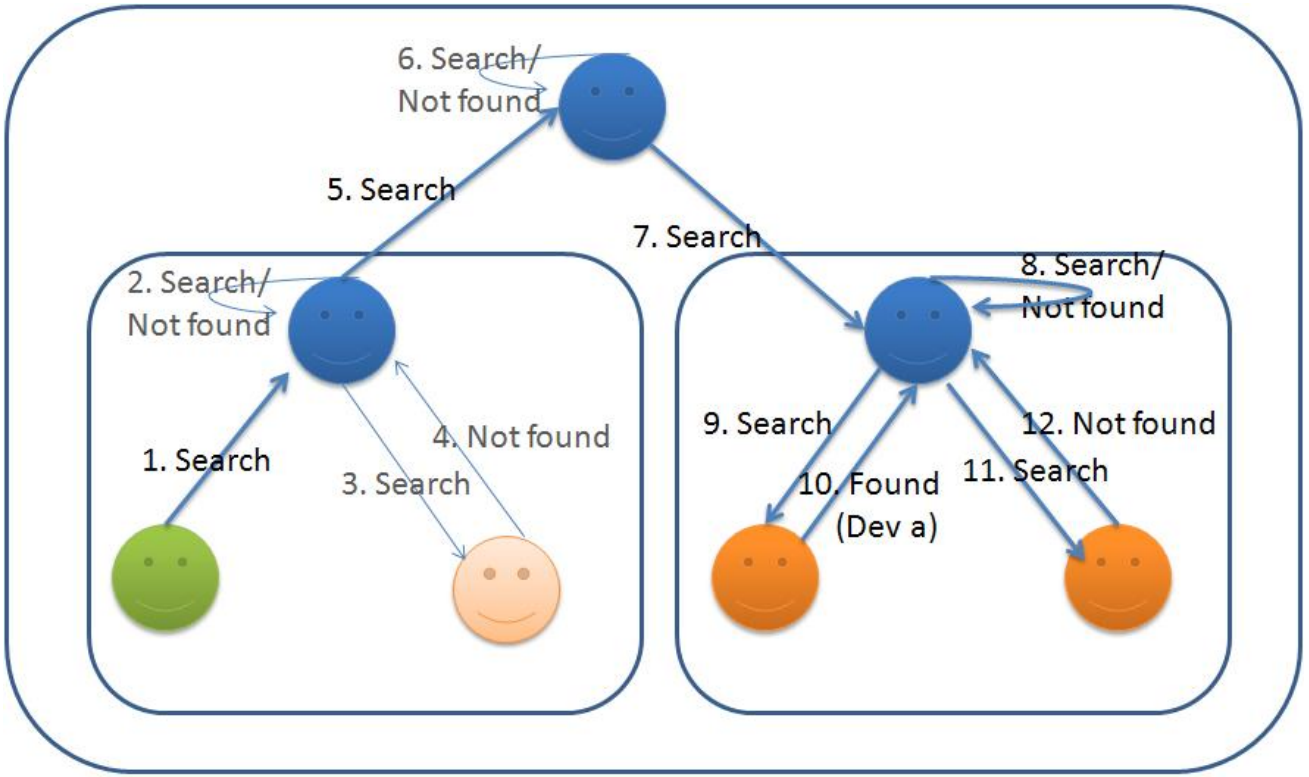

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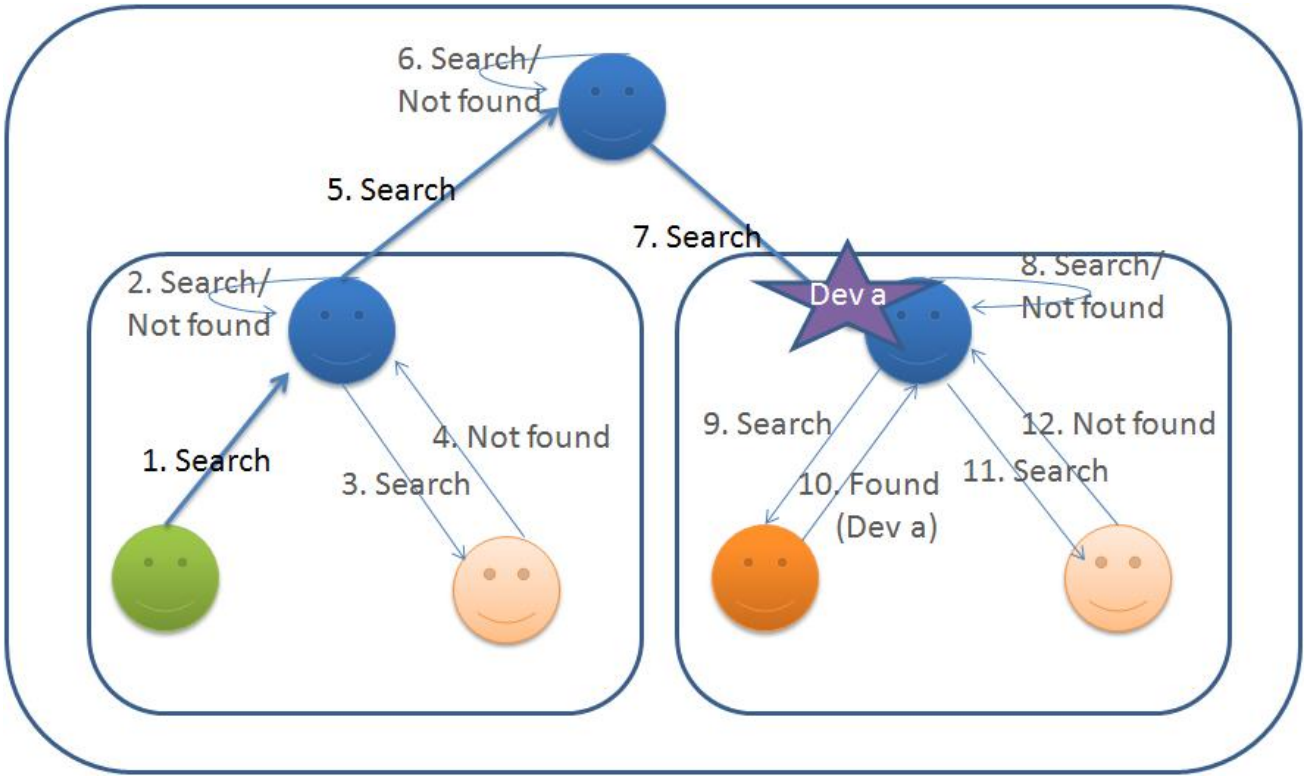

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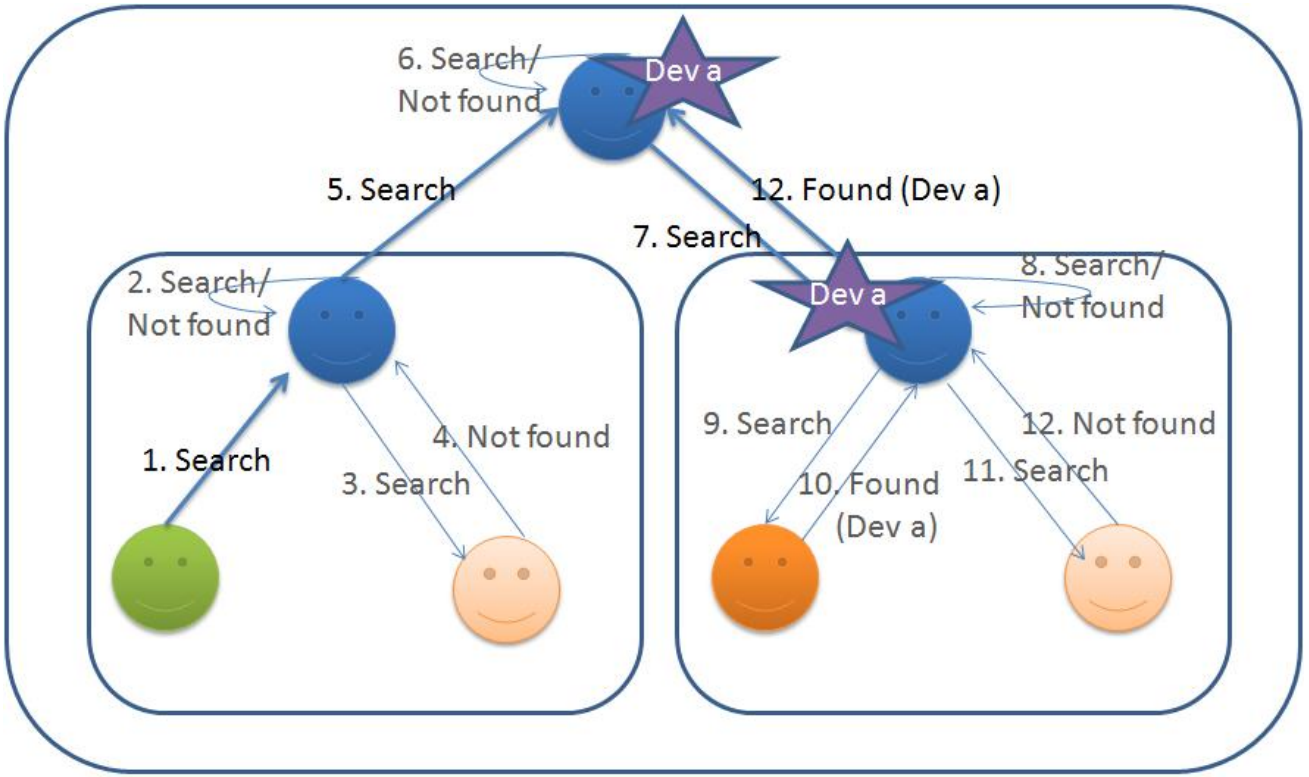

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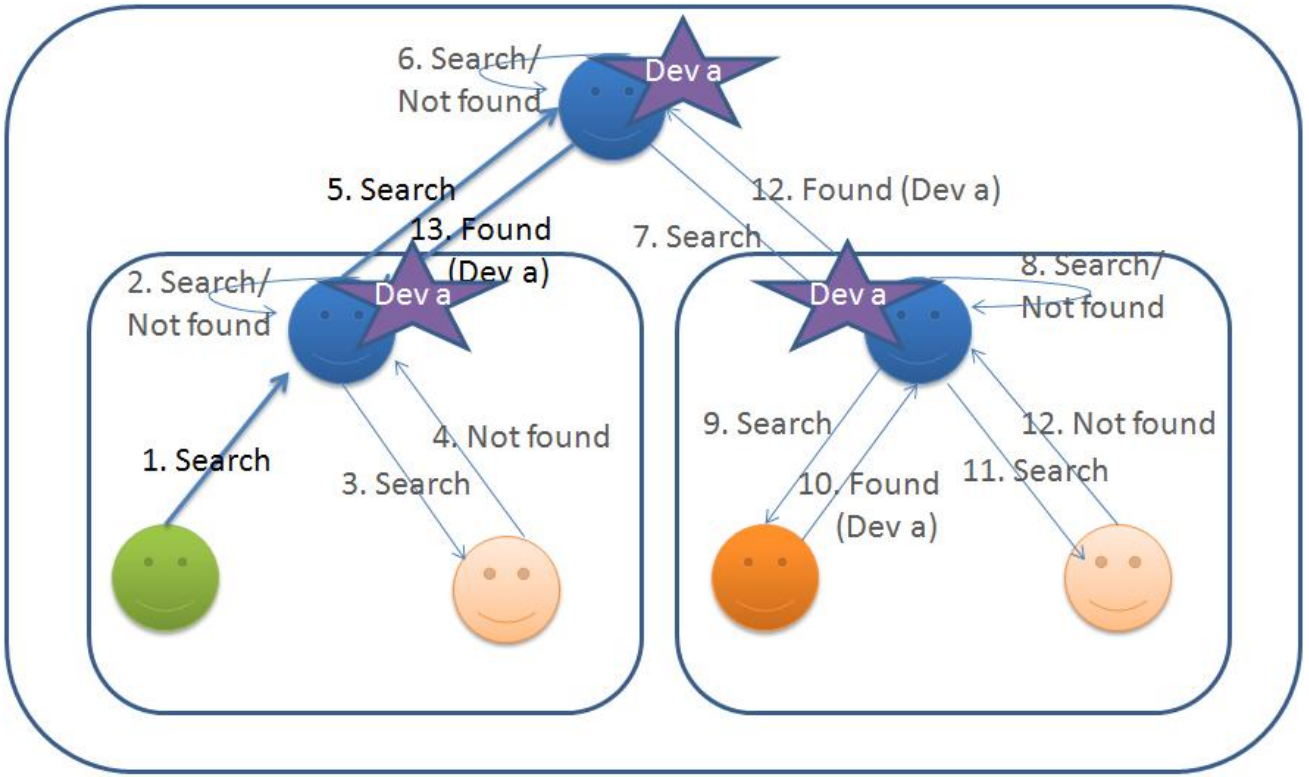

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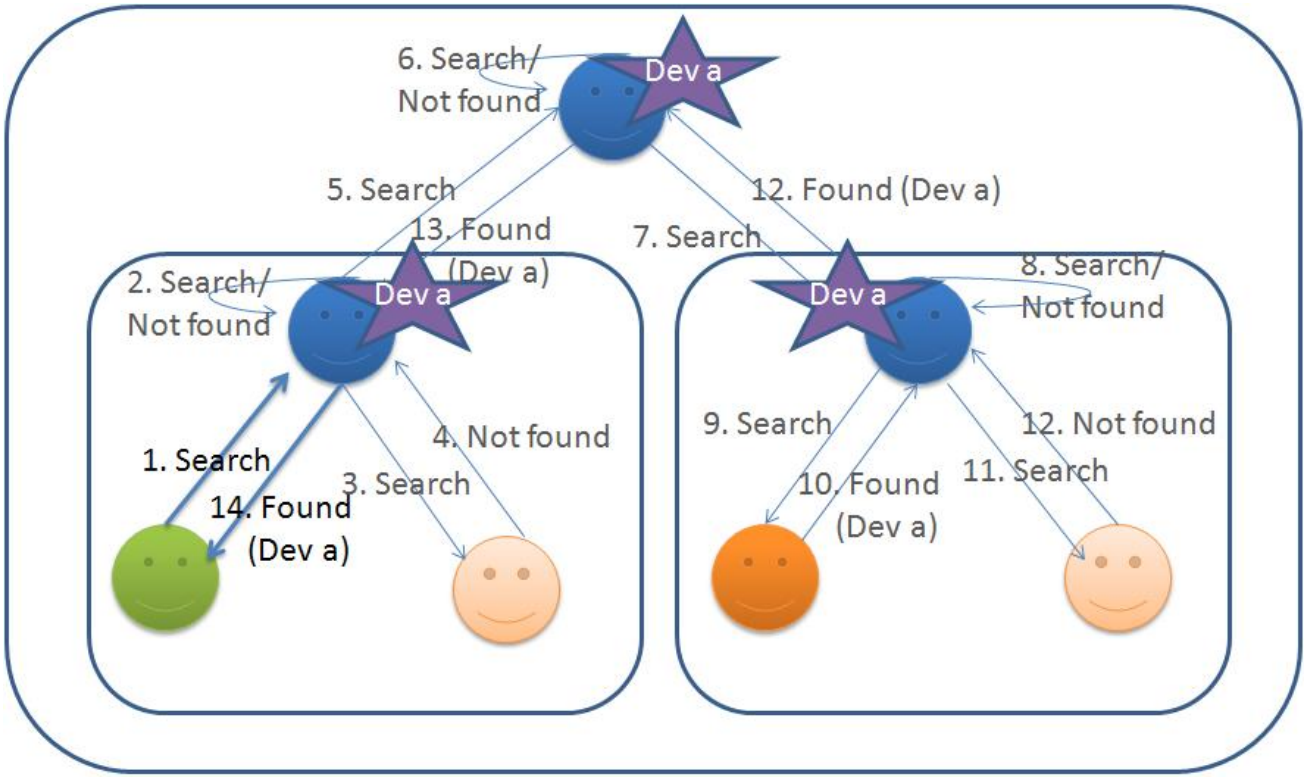

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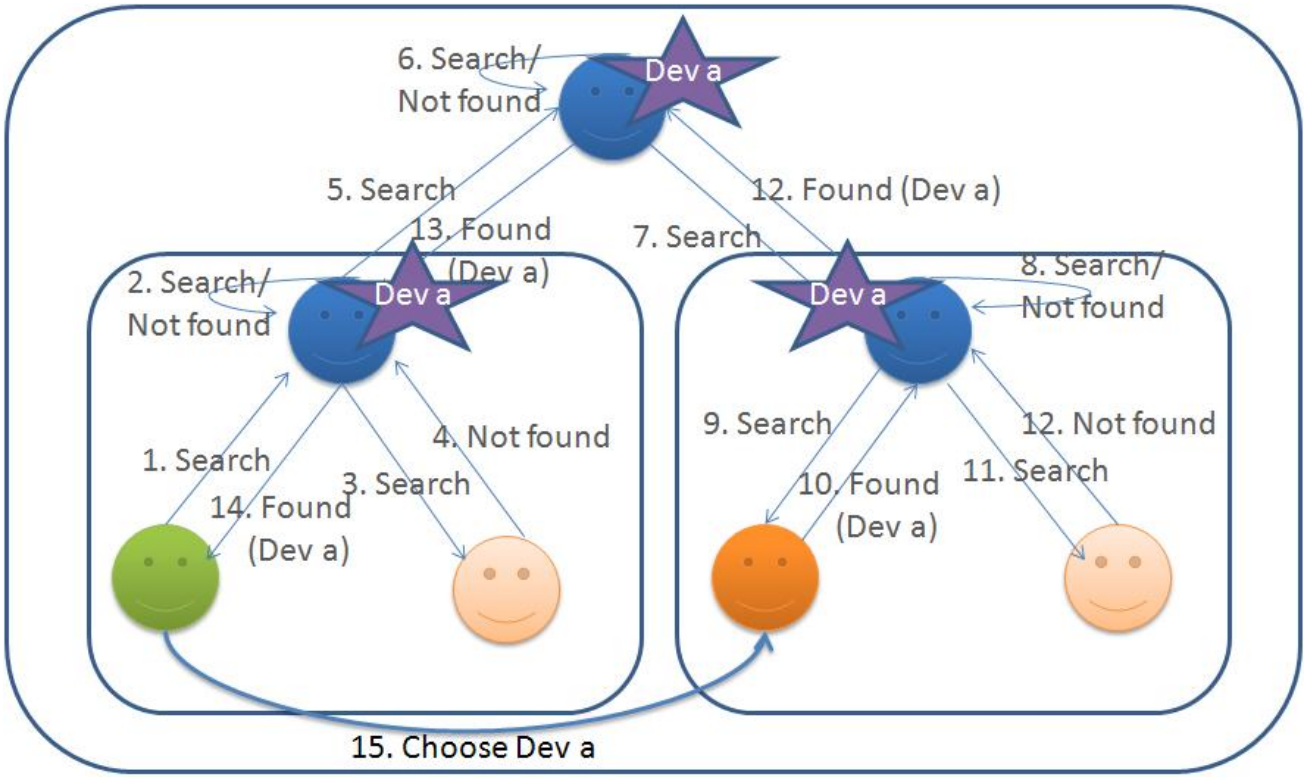

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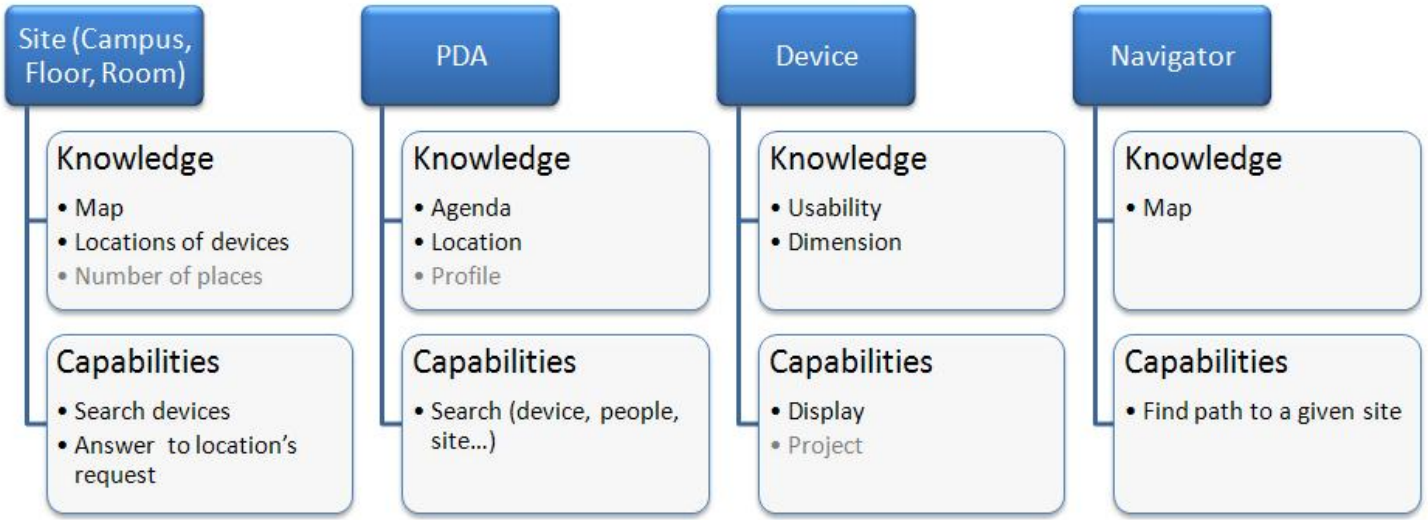

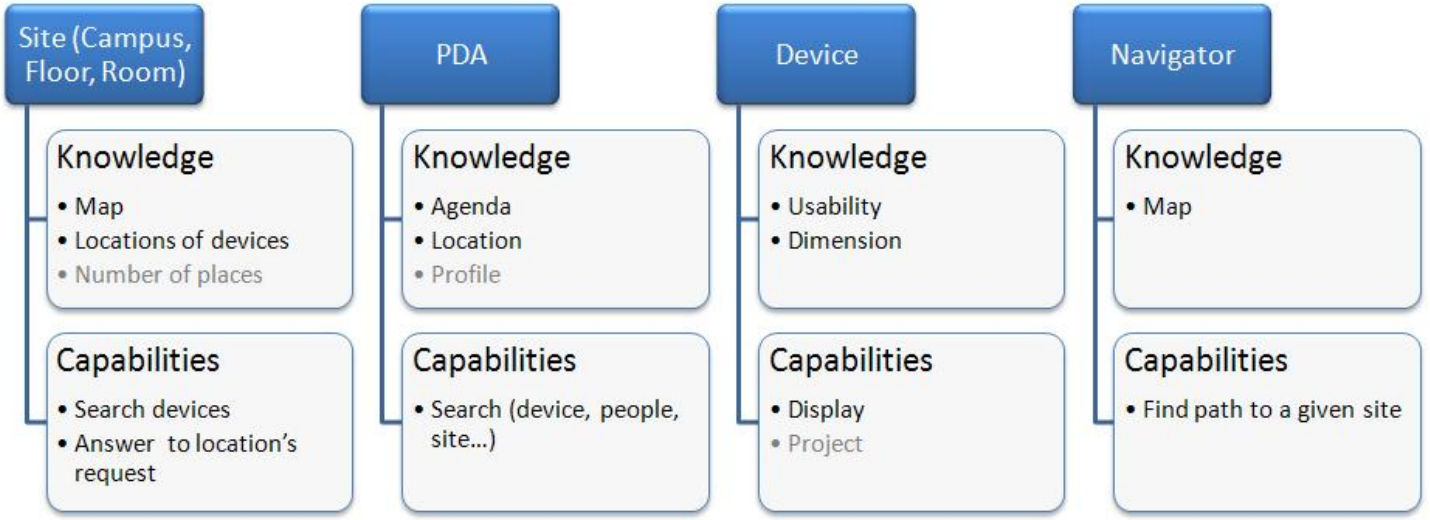

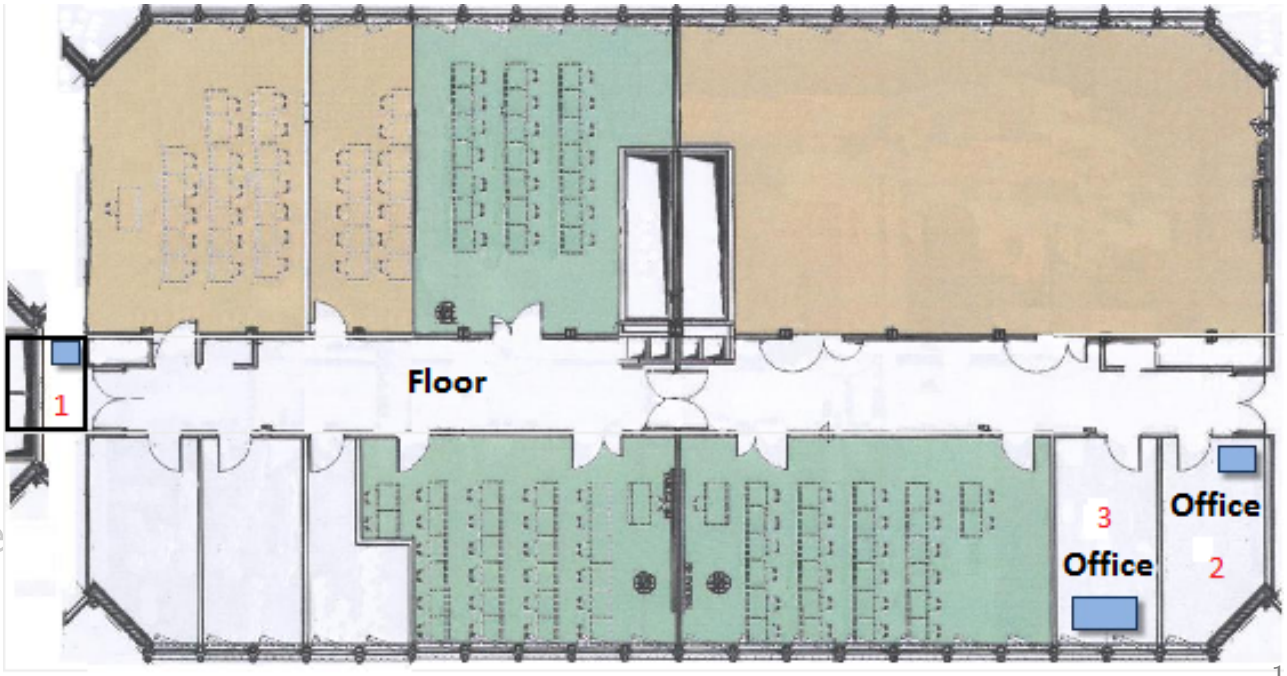

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· the Ao Dai project means implementing the idea of linking the two concepts of context and agent in a hierarchy.

· the project was implemented in CLAIM, that offers to developers an easy way to work with agents and hierarchies of agents, at a higher level.

· the demonstration showed how a simple scenario can be implemented, supporting context-aware actions that support the user.

· future work includes developing the features of agents, a better representation of context, and the extension of the types of context that are supported.

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Thank you!

Any Questions?