

User-centered online reinforcement learning for emergent composition of ambient applications

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Opportunistic software composition



Connected objects in an ambient environment

User

Mobility
Changing needs
Unpredictability

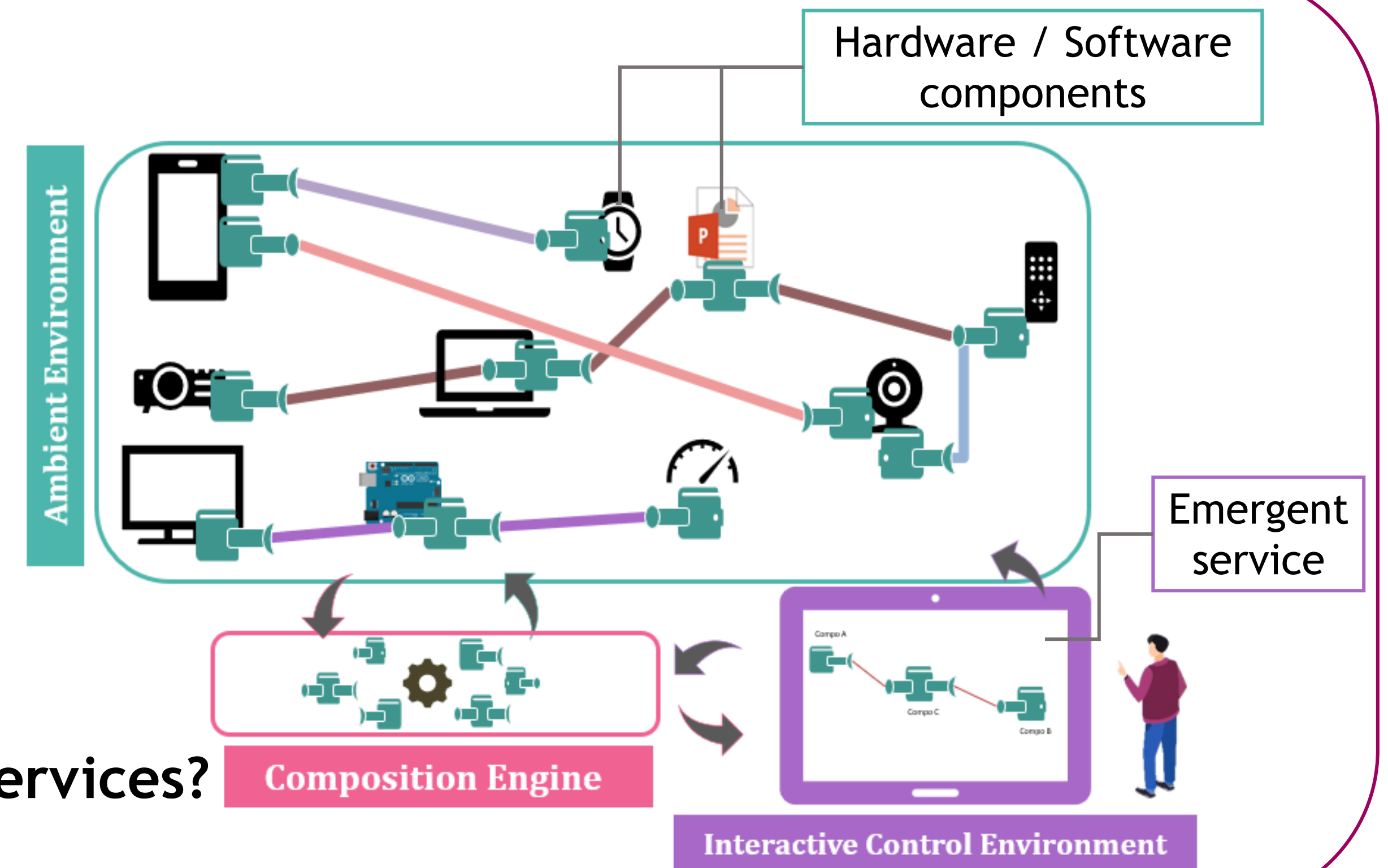
Environment

Uncertainty
Instability

Components and services

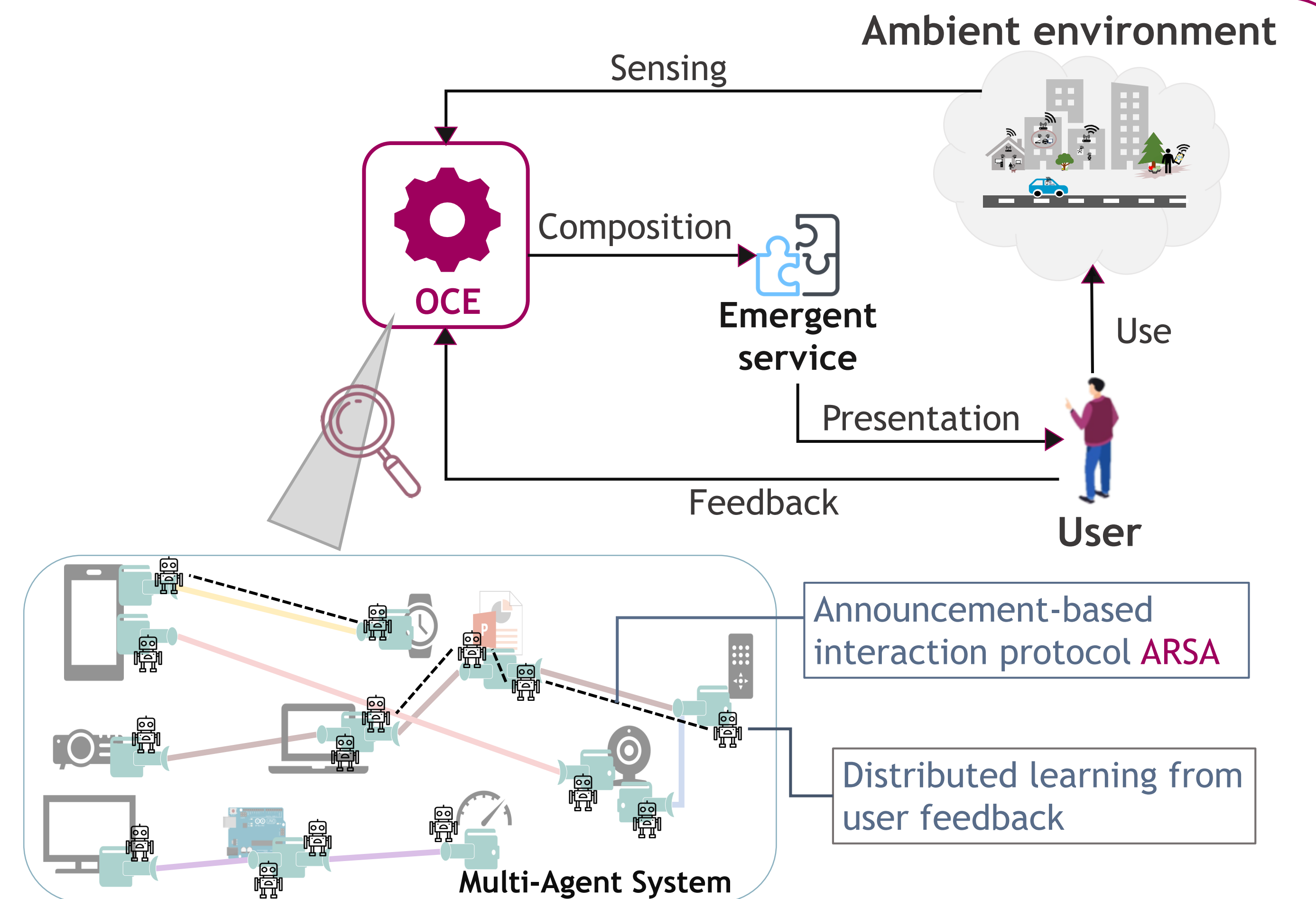
Composability
Unpredictable availability

How to provide working and relevant composite services?



Opportunistic Composition engine OCE

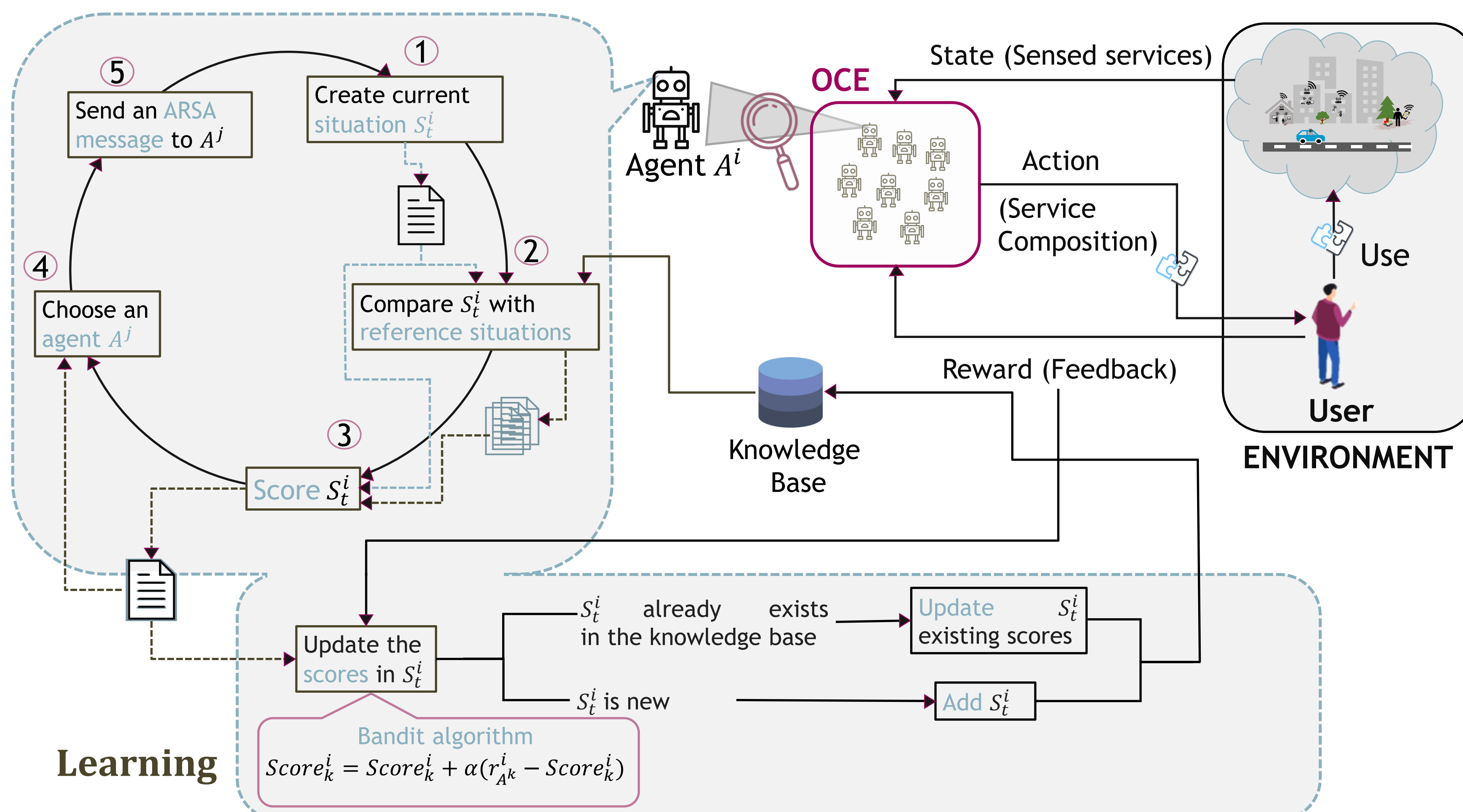
- Environment-directed automatic service composition
- Emergence of new composite services
- Dynamic and continuous adaptation to the context and the user
- Consideration of new appearing services
- Decentralized decision
- Online reinforcement distributed learning
- Domain independent



OCE decision & learning

Decision

Online Reinforcement Learning



Current status

- On going implementation
- Experimentation & validation

Under discussion

- Which values for the learning parameters?
- Q-Learning (with a discount factor) instead of Bandit?
- How to manage the agent's knowledge in the long term (obsolescence)?

Perspectives

- Towards cooperative learning
- Towards diversification and enrichment of user feedback