R-CoRe:
A Rule-based Contextual Reasoning Platform for Aml

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Reasoning about Context in AmI

- **Challenges**
  - Imperfect context information
  - Heterogeneous entities
  - Highly dynamic and open environments
  - Distributed context information
  - Unreliable wireless communications
  - ...restricted by the range of transmitters
R-CoRe

- **Main Features**
  - Distributed
  - Rule-based
  - Non-monotonic
  - Preference-based conflict resolution
  - Dynamic & Adaptive

- **Underlying technologies**
  - Contextual Defeasible Logic (CDL)
    - a distributed version of Defeasible Logic
  - Kevoree
    - a s/w framework for Distributed Dynamically Adaptive Systems
Contextual Defeasible Logic

- Overview
  - The local knowledge of each agent is modeled as a Defeasible Logic theory (*context*)
  - **Mapping rules** enable information exchange between contexts
  - **Preferences** on contexts are used to resolve conflicts caused by the interaction of mutually inconsistent contexts.
Kevoree

- **Overview**
  - Open-source software platform
  - Provides tools to build, adapt and synchronize distributed systems
  - Any sensor, software application, web service can be represented as a **component** (with I/O ports)
    - In R-CoRe, each context is implemented as a Kevoree component
  - **Channels** represent different types of communication among components (TCP/IP, email, SMS, etc.)
    - In R-CoRe, contexts exchange information through Kevoree channels

Available at [www.kevoree.org](http://www.kevoree.org)
R-CoRe in action

SMS System

Home Care System

Medical Profile

Wearable Health Bracelet

Activity Recognition

prone to heart attack

normal pulse

lying on the floor

emergency

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RuleML Challenge, Seattle 2013
R-CoRe in action

\[ r^1_{\text{med}} : \rightarrow (\text{med} : \text{proneToHA}) \]

\[ r^1_{\text{br}} : \rightarrow (\text{br} : \text{normalPulse}) \]

\[ r^m_{\text{sms}} : (\text{hcs} : \text{emergency}) \Rightarrow (\text{sms} : \text{dispatchSMS}) \]

\[ r^m_{\text{hcs}} : (\text{br} : \text{normalPulse}) \Rightarrow (\text{hcs} : \neg \text{emergency}) \]

\[ r^m_{\text{hcs}} : (\text{arm} : \text{lyingOnFloor}), (\text{med} : \text{proneToHA}) \Rightarrow (\text{hcs} : \text{emergency}) \]

\[ T_{\text{hcs}} = [\text{med,arm,br}] \]
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You can download the demo and test it yourself from

https://github.com/securityandtrust/ruleml13

We would really appreciate your feedback!!!

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