

Developing Privacy-Aware Social Applications

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Overview

- Social applications are the ones that cater to multiple users
 - Primary user
 - Secondary user
- Privacy in social applications
 - Information leak
 - Intrusion
 - Disapprobation

Goal:

- Develop ARNOR, norm-based methodology to engineer privacy-aware social applications
- Develop a pseudo-real test bed to simulate the application execution

Ringer Manager: A Social Application

- Allows phone users to set ringer mode on cell phones
 - Phone owners are primary users
 - Callers and neighbors as secondary users
 - What if the phone rings loud during a meeting?
 - What if the phone remains silent during a meeting even when a family member calls in an emergency?
- An intelligent ringer manager could take into account changing contexts and its implications, and act accordingly
 - It could possibly keep the phone on silent for casual calls and notify the caller, and vibrate only in emergency

Research Questions

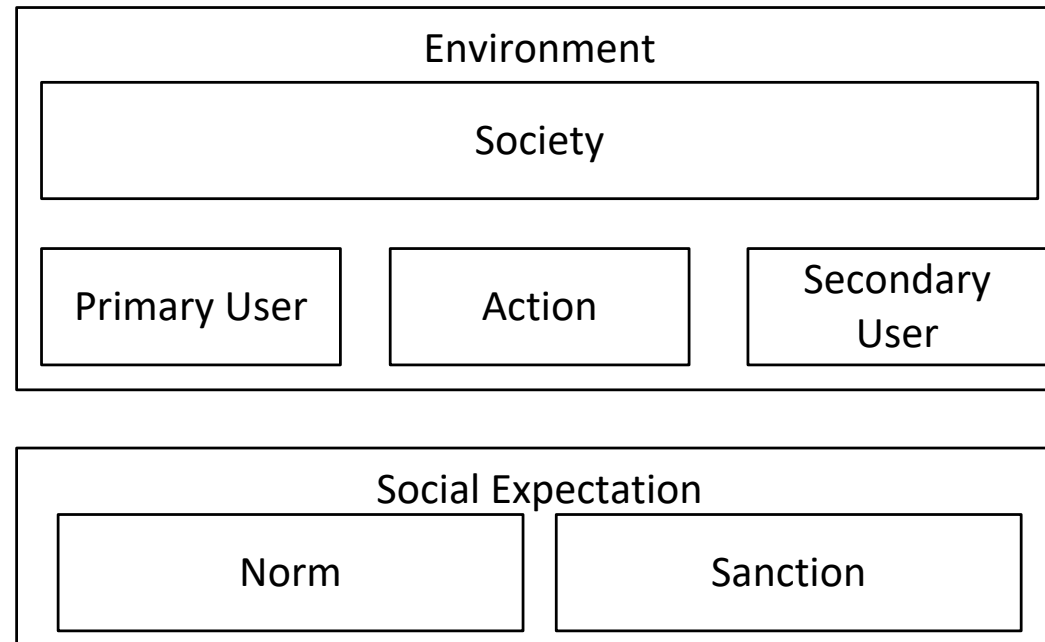
RQ1. [Design-time + Social] Can ARNOR capture social expectations needed to serve stakeholders' social requirements?

RQ2. [Runtime + Individual] Can ARNOR determine potential effects on social expectations?

RQ3. [Runtime + Social] How effectively applications developed using ARNOR promote social requirements?

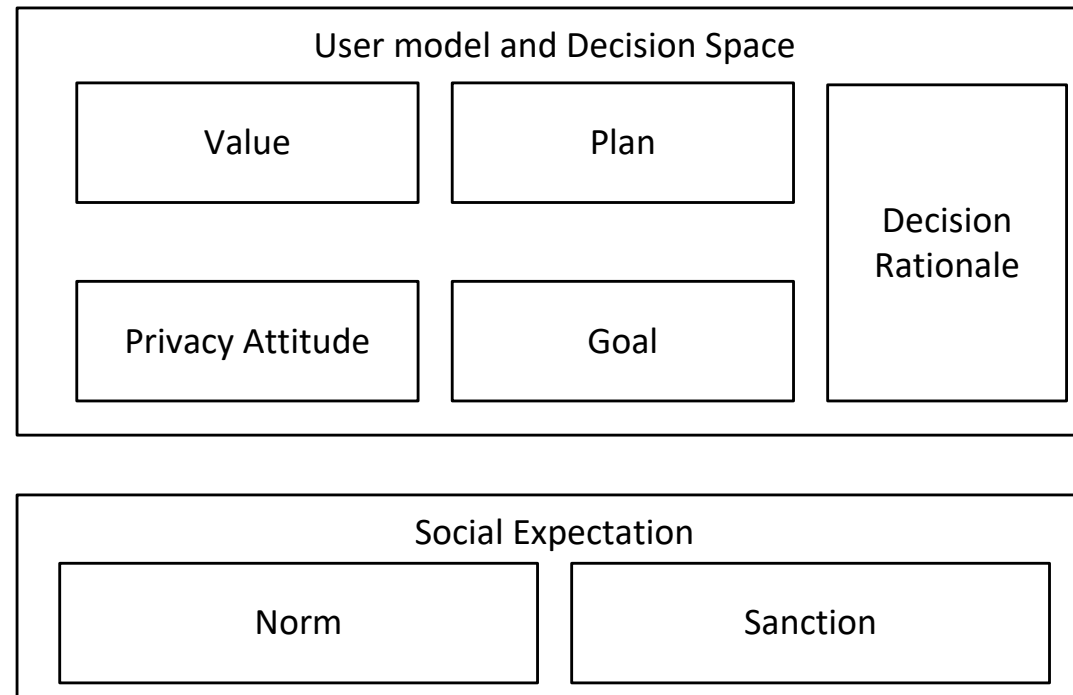
RQ1. [Design-time + Social]

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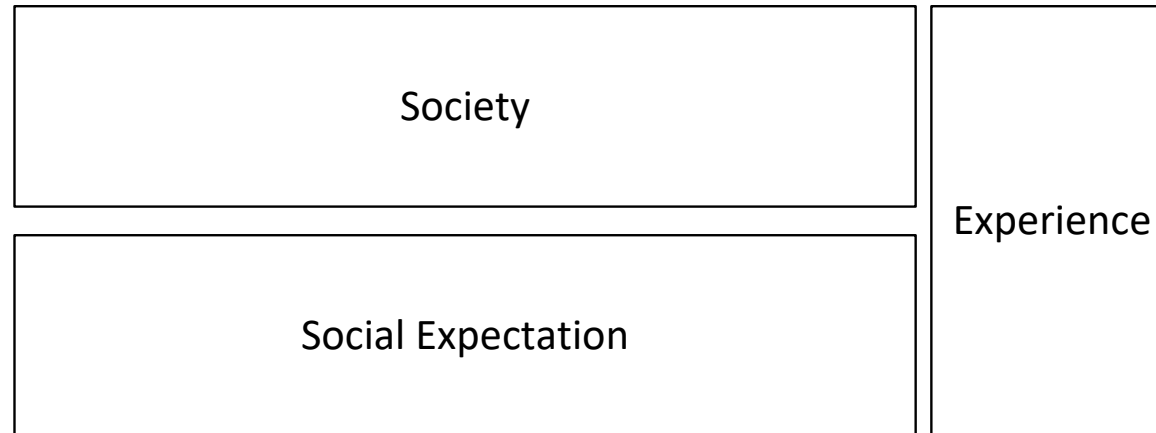
RQ2. [Runtime + Individual]

Can ARNOR determine potential effects on social expectations?

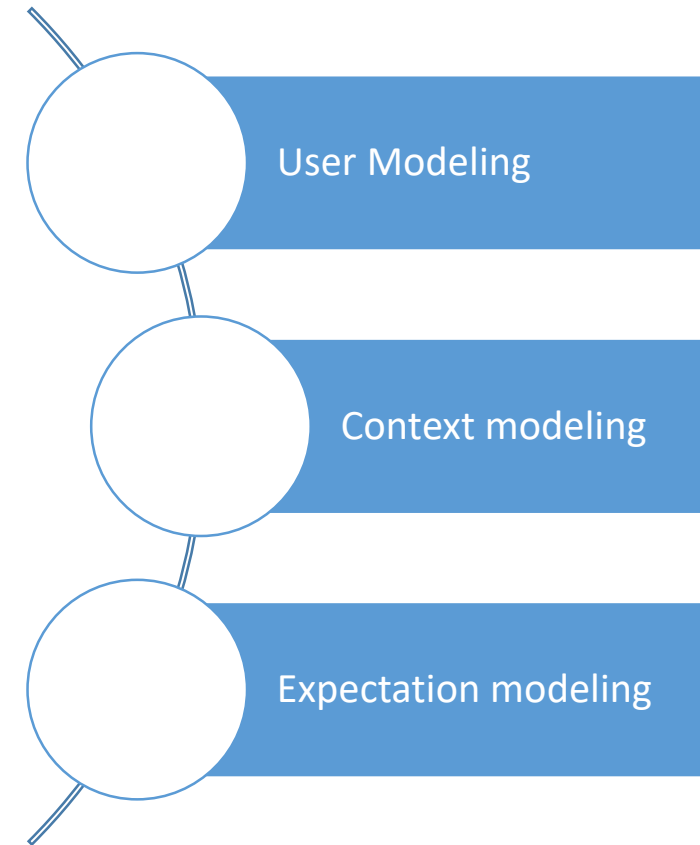
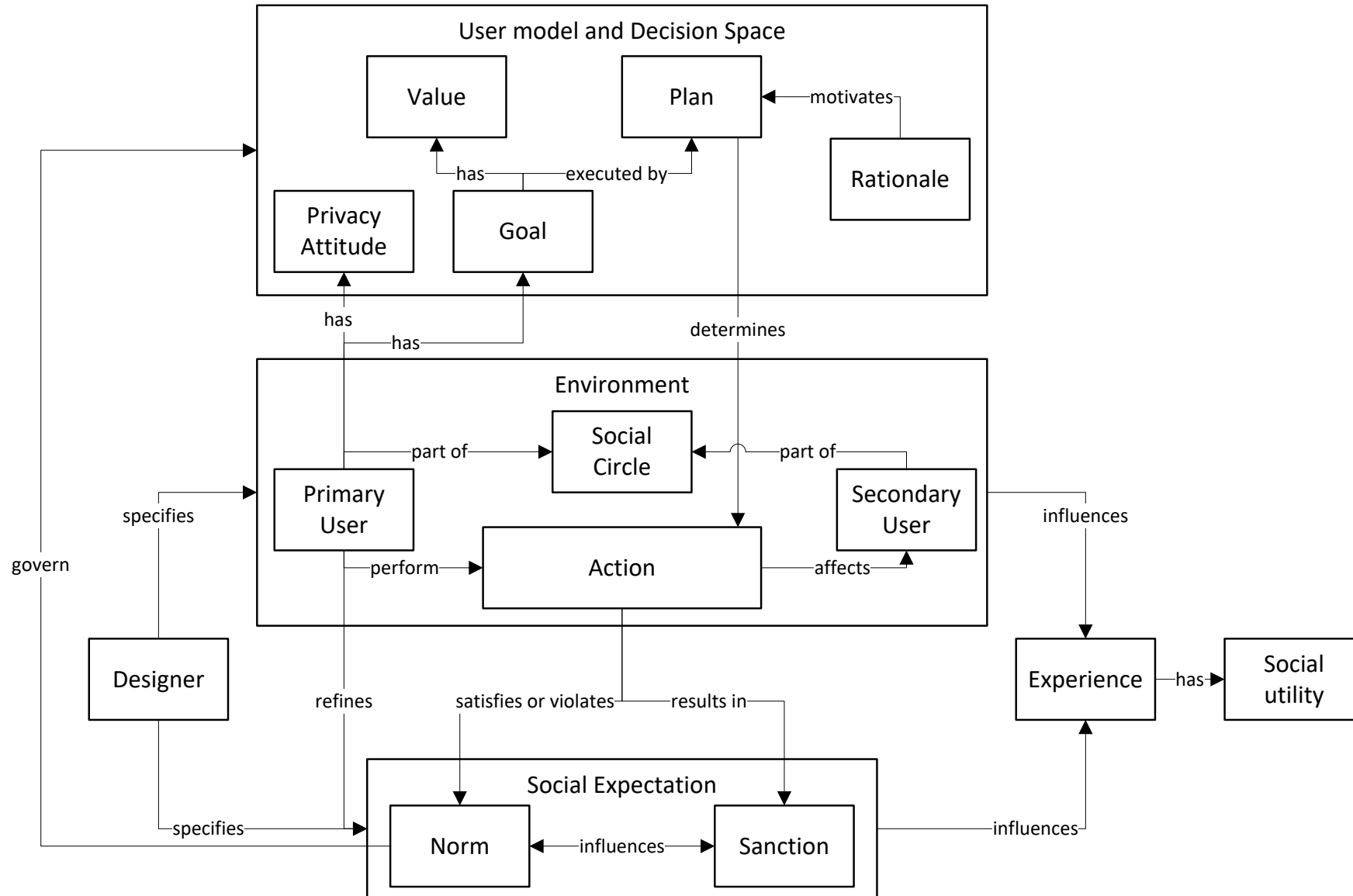


RQ3. [Runtime + Social]

How effectively applications developed using ARNOR promote social requirements?



Conceptual Model



Experimental Design

- Developer Study

- Participants: Computer Science Graduate Students
- Pre-participation Survey
- Application Development
 - Learn
 - Model
 - Implement
- Time and effort Survey
- Post-participation Survey

- Simulation Study

- Simulate developed applications in pseudo-real environment
- With and without decision rationale

Metrics

- Developer Study

- [Subjective] Model quality
 - Correctness
 - Coverage
- [Objective] Time to learn
- [Objective] Time to design
- [Objective] Time to implement
- [Objective] Difficulty to learn
- [Objective] Difficulty to design
- [Objective] Difficulty to implement

- Simulation Study

- Norm emergence
- Social utility
 - Expectation satisfaction
 - Norm violation and Sanctions

Hypotheses

- Models produced using ARNOR are of better quality, compared to models produced using traditional goal modeling approaches
- Developing social application using ARNOR expend
 - less time, and
 - less effort
- Social applications developed using ARNOR
 - promote greater social utility
 - norms emerge faster?
 - lesser number of sanctions?

Success Criteria

- Hypotheses holds!

Anticipated Difficulties, Limitations and Criticisms

- Developer Study
 - Skill difference
 - Balanced groups for skill difference
 - Or, randomize participants for equal skills
 - Participants forgetting to report data
 - Participants report time and effort after each work-session
- Simulation Study
 - Capturing realism in test-bed
 - Extrapolate previously collected data
 - Crowdsourcing