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 is not just limited to information leak
  • Intrusion
  • Disapprobation

Goal:
• Develop Xipho-N, norm-based methodology to engineer privacy-aware social applications
  • Understand privacy implications of social applications when an application is put to use
• Develop a pseudo-real test bed to simulate the application execution
Ringer Manager Example

• 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 application 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.
Conceptual Model

User model and decision space

- Value
- Plan
- Rationale

Social expectation

- Privacy Attitude
- Goal

Context

- Social circle
- Action
- Secondary User

Desinger

Social expectation

- Norm
- Sanction

User Modeling

Context modeling

Expectation modeling
Research Questions

• [Design-time + Runtime] Can Xipho-N capture social expectations and privacy implications of privacy-aware social applications?

• [Design-time] Does Xipho-N assist developers in developing privacy-aware application?

• [Runtime] Does applications developed using Xipho-N promote social utility?
Hypotheses

• Compared to traditional approaches, developing privacy-aware social application using Xipho-N
  • takes less time?
  • takes less effort?

• Compared to traditional approaches, privacy-aware social applications developed using Xipho-N
  • promote greater social utility
    • norms emerge faster?
    • lesser number of sanctions?
Success Criteria

• Hypotheses holds!
Experimental Design

• Developer Study
  • Participants: Computer Science Graduate Students
  • Pre-participation Survey
  • Application Development
    • Proposal
    • Design
    • Implement
  • Time and effort Survey
  • Post-participation Survey

• Simulation Study
  • Simulate developed applications in pseudo-real environment
  • With and without design rationale
Metrics

• Developer Study
  • Time to learn
  • Time to design
  • Time to implement
  • Difficulty to learn
  • Difficulty to design
  • Difficulty to implement

• Simulation Study
  • Norm emergence
  • Social utility
    • Expectation satisfaction
    • Norm violation and Sanctions
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
    • Crowdsource