Karlsruhe Institute of Technology

Technology for Pervasive Computing

Preliminary Investigations About Interruptibility of Smartphone Users at Specific Place Types

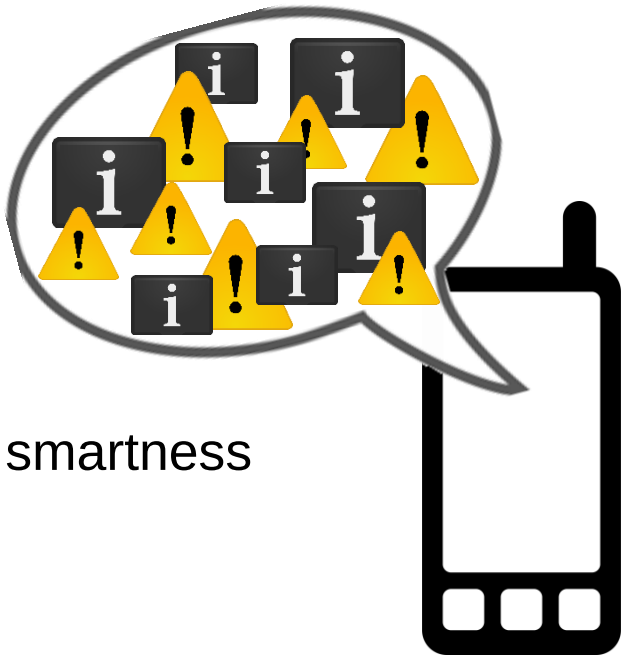
Anja Exler, Marcel Braith, Andrea Schankin, Michael Beigl

CHAIR FOR PERVASIVE COMPUTER SYSTEMS, INSTITUTE OF TELEMATICS, DEPARTMENT OF COMPUTER SCIENCE

Motivation

- Smartphones are supposed tu support us in everyday life
- But they happen to be a burden

- We drown in a flood of smartphone notifications
- Resulting in, e.g:
  - Distraction
  - Loss of focus
  - Hyperactivity
  - Digital burnout



- Growing need for the smartphone to prove its smartness
  - Detect user needs
  - Manage smartphone notifications
  - Reduce negative effects

Idea

- Investigation of relations between place types and interruptibility
- Related Work considered as location
  - Pejovic et al. (“InterruptMe”) [1]
    - Descriptive, self-reported location ("residential", "work", "public")
    - GPS, Bluetooth fingerprint and WiFi fingerprint changes
  - Ter Hofte [2]
    - Self-reported location
- Drawbacks of self-reportet locations
  - Might not be generizable
  - Might underly recall bias
  - Very subjective

- Proposed solution:
  - Place types out of a fixed, generalized set → Google Places API

Preliminary Steps

- Categories:
  - To make place types more generazible and to allow abstractions
  - Based on Zheng et al. [14] and considering [3,4] we propose:
    - Food & Drinks
    - Sports & Exercises
    - Movies & Shows
    - Shopping
    - Recreation & Amusement
    - Work and Education

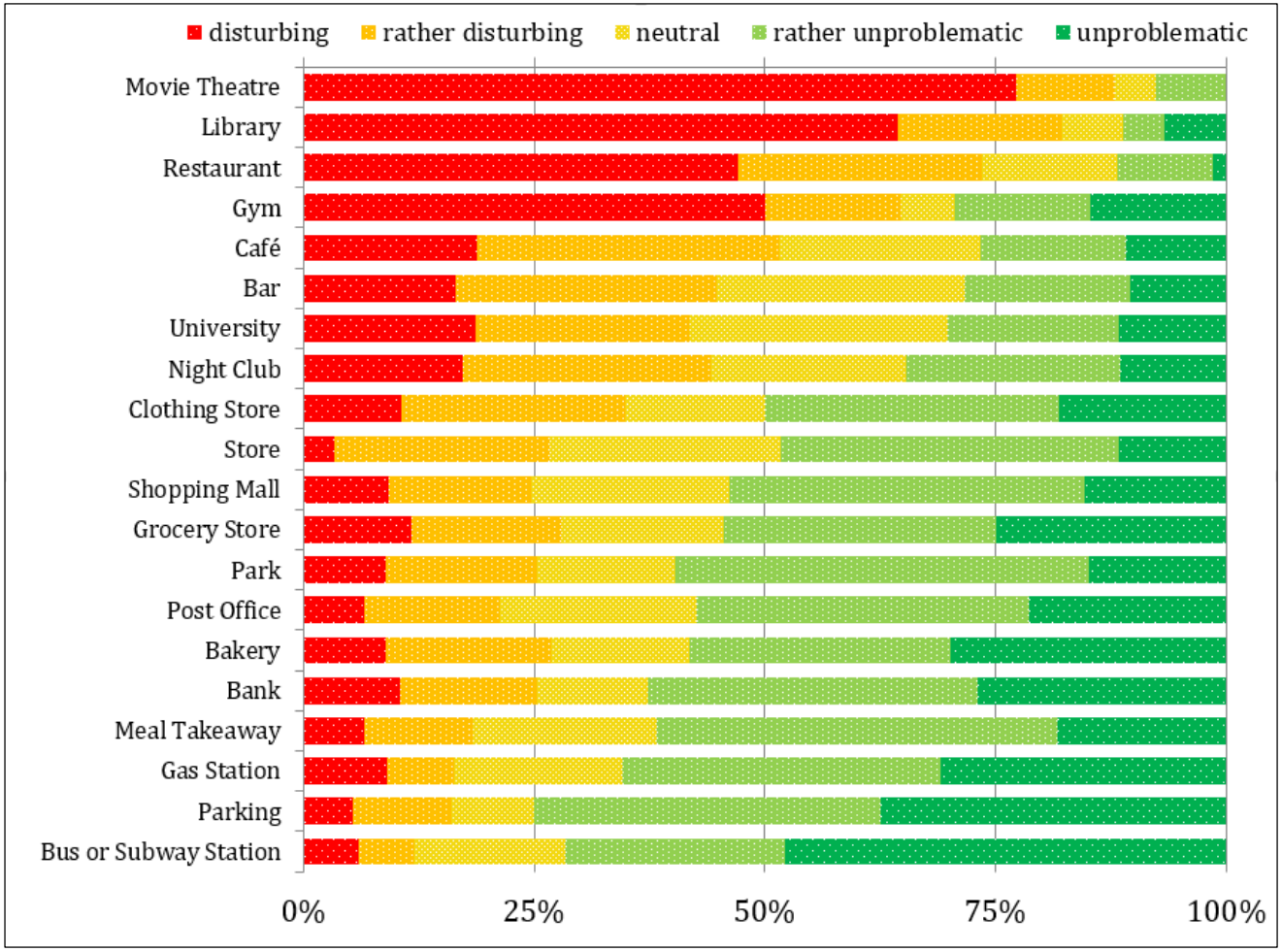
- Reduction of place types:
  - Google Places API consists of >120 place types → too many for a survey
  - We asked 10 people which places they visit at least once per month
  - We kept all that were named at least 4 times

Survey

- Design:
  - Online survey (Google Forms) distributed via social networks
  - Two questions per place type
    - "In which category would you assign the currently displayed place type?“
      → select categories using checkboxes
    - "At the displayed place type, how interruptive are smartphone notifications?“
      → rate on a likert scale randing from "disturbing“ (1) to "unproblematic" (5)

- Subjects:
  - 68 subjects
  - 50% female, 50% male
  - Age: 33 years ±12 years
  - The largest occupational category was information and communication technology

Interruptibility Per Place Type & Category

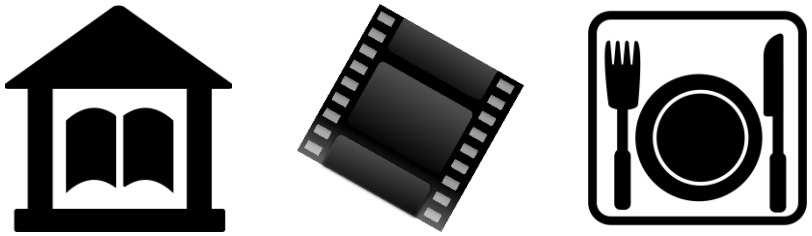


Place Type	Likelihood
Shopping	60.9 %
Work & Education	51.4 %
Food & Drink	48.9 %
Recreation & Amusement	44.2 %
Sports & Exercise	41.7 %
Movie & Shows	15.3 %

Findings + Conclusion

- Participants are rather interruptible at places where they have to wait
  - Bus / train stations
  - Parking lots
  - Gas stations
  - Meal takeaways

- Participants do not want to be interrupted at silence areas or at places with expected social interaction
  - Library
  - Cinema
  - Restaurants



- Results appear trivial to us, but they are detectible by smartphones → automatic assessment instead of self-reports (generizability, reliability)
- Categories allow easy integration of new place types

Outlook

- Further context information should be considered in combination with place types:
  - Physical activity
  - Social activity
  - Information about the notification itself
    - Origin / app
    - Social relation / sender
    - Design of the notification / notification type

- Further info:
  - Anja Exler et al: Smartphone-Based Detection of Location Changes Using WiFi Data. MobiHealth'16. To appear.
  - Anja Exler et al: Towards A Smartphone-Based Method To Estimate If A User Is In Company Or Alone Based On Place, Time, And Basic Physical Activity. MobiCase'16. To appear.
  - www.teco.edu/people/exler

References

1. Veljko Pejovic and Mirco Musolesi. 2014. InterruptMe: Designing Intelligent Prompting Mechanisms for Pervasive Applications. UbiComp ’14 (2014).

2. G Henri Ter Hofte. 2007. Xensible interruptions from your mobile phone. In MobileHCI ’07.