Overview

- Direction of the computing paradigm
- Fundamentals of systems design
- Core components influencing mobile system design
- Describing a new model to design for mobile use

Introduction

- Computing today and tomorrow is headed towards miniaturization and wireless, bearing no boundary of time or place
- Some popular areas of modern computing are ubiquitous computing, pervasive computing, mobile computing.
- Use of computers today are influenced not only by technology but also by social groups and activities

Traditional Systems Design

- Environment and components of system do not change
- Users are often operating from designated areas such as the office
- Requirements elicitation conducted through interviews, questionnaires, review of manuals and other artefacts can provide substantial information on how the information system functions or is meant to function.

Problems Understanding Req

- Problems surface when the designer understands and deciphers the requirements of the system with a technical frame of mind i.e. problems faced by user can be solved with a program or some technology
- This results in a gap between understanding the user needs and providing solutions to support user in their activities for we tend to treat the symptom and not seek the problem

Design Fundamentals

- Attitude
- Method
- Tool
- The shift from desktop to mobile computing requires a change in how we perceive design ought to be hence the first step to deriving a design methodology is to identify the attitude or the frame of mind required when designing for mobile use
Elements influencing mobile systems design

- Two core components established as important elements to consider when designing for mobile use are:
  - Context
  - Mobility
- Context has been suggested as an element of consideration for design even in the past but lacked emphasis within traditional design methodologies. Mobile and Ubiquitous computing has resulted in context concepts to be researched and debated extensively today.

Context

- What is context?
  - Human action and the relationship between that action and computational systems to support it
  - Focus on social settings - interpersonal relationships of users with other users
  - Elements of human factors
  - Physical setting
- Most common understanding and stand on the definition of context is “any information that can be used to characterize the situation of an entity, where an entity can be a person, place, or physical or computational object.”

Technical Context

- System – detail specification of the system and what is required to operate or run the system
- Platform – knowledge and understanding of the platform which the application will operate upon
- Site – information about geographical location such as GPS position, co-ordinates or relative location

Use Context

- Work Practice - how things are done within the work environment, such as the processes involved in executing a certain activity or task
- Strategy - relates to perspectives on achieving business goals through an IT system

Social Context

- Important in determining how an application can help support a user in his/her context as well as help the user adapt to various changes in the context.
- The nature of how we communicate with the people we are in contact with or work with influences the flow and work practices that we carry out. In a mobile setting, this social interaction is heightened and evident in the seamless switching between ‘work’ and ‘play’ contexts.
- Elements of Social Context include:
  - Individual
  - Group
  - Organisation
Mobility

- Common perspective of mobility - Geographical disposition
- Degree/extend of movement with mobility results in the following mode of mobility:
  - Wandering - an activity characterized by extensive local mobility, referring to users that spend a considerable part of the working day wandering around office premises and buildings.
  - Traveling - an activity that takes place while traveling in a vehicle.
  - Visiting - an activity that happens in one place for a coherent but temporal period of time.

Extended Perspective of Mobility

- Kakihara and Sørensen (2002) extend the notion of mobility to three different dimensions of mobility. They are:
  - Spatial Mobility
  - Temporal Mobility
  - Contextual Mobility
- Though the Mode of Mobility is regarded as spatial mobility, in this work, spatial mobility is discussed beyond geographical movements.

Spatial Mobility

- The most prominent dimension of mobility that is reflected in the "nomadic" nature of mobile users/workers. Three aspects of spatial mobility are highlighted:
  - Mobility of objects - referring to objects that are carried by humans in their movements and travels.
  - Mobility of symbols - status symbols, communicating symbols, visual images such as logos or information signposts to be conveyed beyond geographical borders.
  - Mobility of space - the existence of a mobile space, such as a virtual community that is mobile in terms of geography/location, temporality and situation or circumstance.

Temporal Mobility

- Based on concepts of structural or interpretive temporality
  - Structural - largely objectified parameters, among which sequence, duration, temporal location and rates of recurrence are particularly important
  - Interpretive - how people in the workplace interpret the change of those structural parameters.
- Monochronicity - situations where people seek to structure their activities and plan for events by allocating specific slots of time to each event’s occurrence.
- Polychronicity - situations where people place less value on and accept divergence of structural and interpretive attributes of the temporal order.

Contextual Mobility

- Kakihara and Sørensen make reference to contextual mobility as "... tied in essential ways not to individual predispositions or conventional rules but to local interactions contingent on the actor's particular circumstances"; such as 'in what way', 'in what particular circumstances', 'towards which actors'.
- This focuses on the how aspect. We re-use the context taxonomies of technical, use and social context discussed earlier within this dimension to address the what aspects of context.
- Other influences within the contextual mobility include unobtrusive vs obtrusive, ephemeral ("only exists in the flux of unfolding activities") vs. persistent ("leaves behind a trace for further inspection and discussion") as well as weakly and strongly tied social networks.

Design Attitude

- The key to approaching requirements elicitation is to allow the natural activities, incidents and situations to inform your understanding.
- Wipe out pre-conceived notions and expectations that you have of the system, user or tasks on hand. This causes a mind block to absorbing the actual situation on hand.
Design Attitude

- Avoid making assumptions based on your observations. Instead, probe the user for details of what, why, and how they attempt a certain task or activity and seek clarification instead.
- Do not prompt them for answers to your enquiries.

Designing Mobile Systems

- Context and mobility form the fundamentals of mobile system design but can not be viewed in isolation when approaching design.
- Both aspects share an intertwined relationship that inform and influence each other, requiring equal emphasis and importance.

Pyramid on a Spinning Rotunda – Design Model

- The guideline tables form a basis to aid designers in identifying specific aspects of mobility and context despite its intertwined complexities and establish a clear and isolated perspective whilst keeping the dependencies in view.
- The table is consistent with components and parameters identified in the Pyramid on a Spinning Rotunda Model.

Recording Observations

- Notations and records of observation and evaluation of all components and aspects require attention to whether a specific task, parameter or aspect of mobility is affected by context and vice versa.
- These impacts/influences can also be given a priority or importance level such as high impact or low impact. High impact would signify that the level of collaboration and cohesion between the components in question require extensive attention and perhaps thorough evaluation, whereas low impact would signify minimal importance on the specific components or aspects.
Summary

- Overview of modern computing paradigms
- Understanding systems design approaches and how to adapt to changes in computing trends when designing for mobile use
- Overview of context and mobility concepts
- Overview of design model and method to aid when designing for mobile use

References

[19] Implications for Research & Theory. (1986)