Context-Awareness
Ch. 8 of Ubicomp Fundamentals

Donald J. Patterson
Donald Bren School of Information and Computer Sciences
Department of Informatics
Laboratory for Ubiquitous Computing and Interaction

INF 241

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: Context Awareness

- Canonical Problem:
  - "You are in an unfamiliar office environment and would like to find the closest printer?"
- No Tech Solution:
  - Find someone who knows the answer and ask them
- The Simple Tech Solution
  - Find a list of printers online and a map and figure out which is closest
- The Context-Aware Solution
  - Use a program which ranks printers by proximity

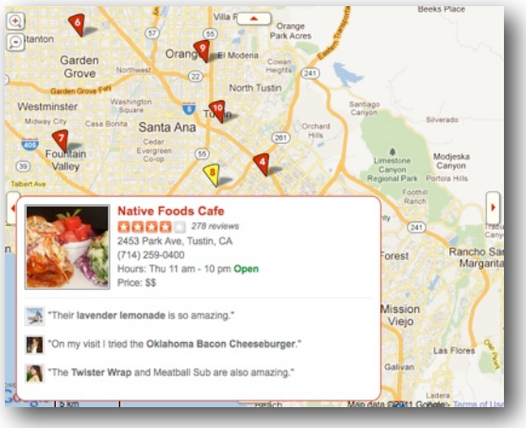
: Context Awareness

- The Context-Aware Solution requires:
  - Knowledge of where the user is
  - Knowledge of where the printers are
  - Infrastructure for maintaining the accuracy of the information
  - Software to make this information available at the right time

: Context Awareness

- The first round of context-aware systems were essentially location-based services
- The Active Badge
  - created a directory of locations of people
  - enabled routing of land-line calls to offices

- Modern LBS include
  - Siri geo-fencing
  - Sex Offender GPS anklets
  - Yelp Restaurant Finder



: Context Awareness

- Can we use more information about the world to help the application than just location?
  - orientation
  - light levels
  - accelerometers
    - protecting hard drives

: Context Awareness

- What else?

: Context

- The information that makes a computer do a better job of adapting to the human world is “context”
- Definitions include:
  - “where you are, whom you are with, what resources are nearby” - Schilit
  - “the subset of physical and conceptual states of interest to a particular entity” - Pascoe
  - “any information that can be used to characterize the situation of an entity. An entity is a person, place or object that is considered relevant to the interaction between a user and an application including the user and the application themselves.” - Dey

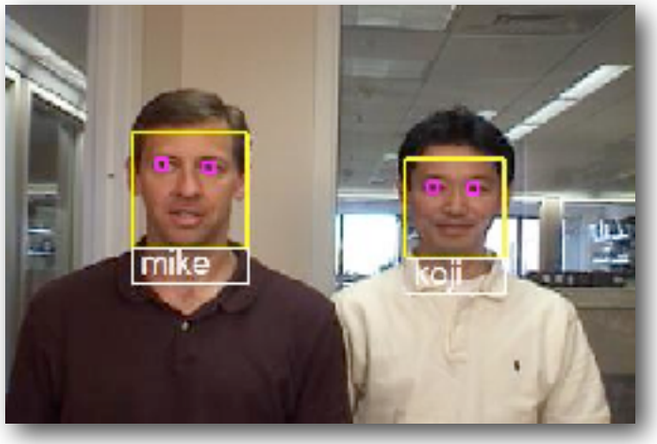
: Context Aware Systems

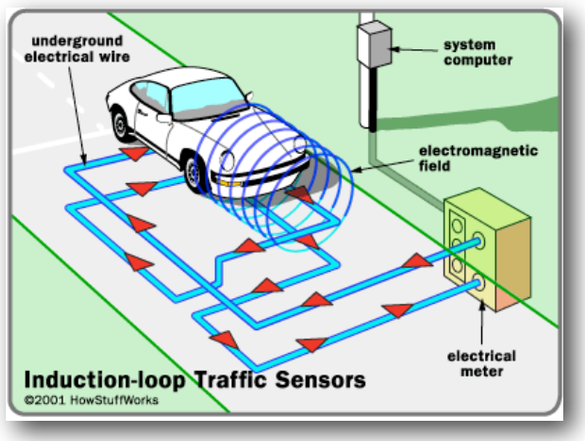
- “adapt according to it’s location of use, the collection of nearby people and objects as well as changes to those objects over time” - Schilit et.al.
- “automatically provide information and/or take actions according to the user’s present context as detected by sensors” - Brown
- “provides relevant information and/or services to the user, where relevancy depends on the user’s task”

: Context Aware Systems

- Computer regularly adapt to their input

- Context-Awareness is about implicit input from
  - sensors
  - computers
  - other services

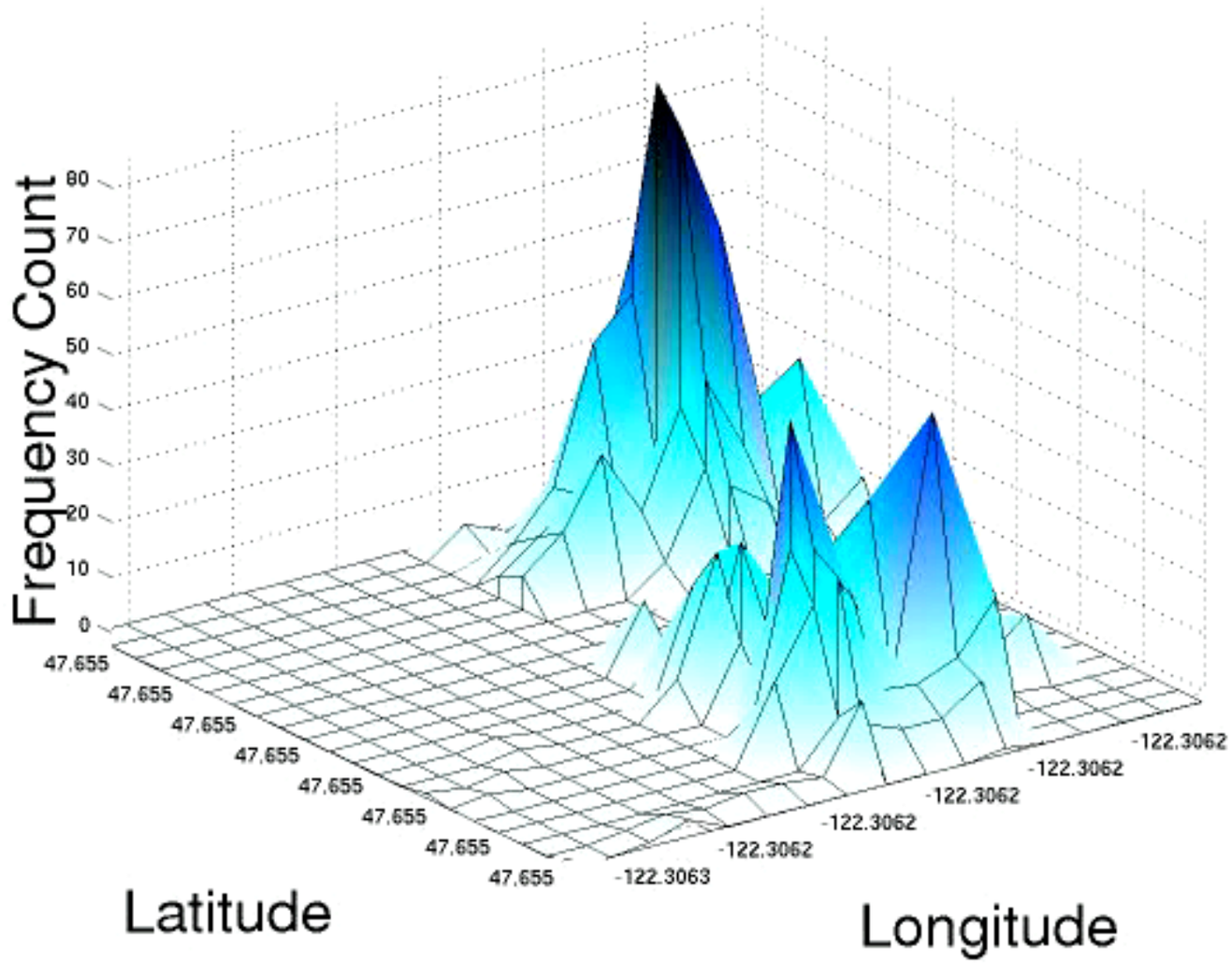




: Context Aware Systems

- The holy-grail of context-aware computing is
  - to understand and act on human intent without interruption
- but this is hard because
  - sensors are ambiguous and impoverished
  - getting intent exposes it to privacy breaches
  - sometimes humans don't know their intent
  - not all relevant context can be sensed (yet)
  - this removes the locus of control from the user
  - the computer may not be able to explain why it is taking an action b/c the decision is too complex
    - rules vs machine learning

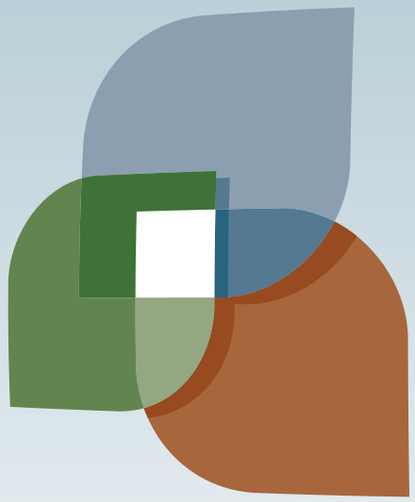
Global Location GPS



Global Location GPS

: Ambiguity

Sun Mon Tue Wed Thu Fri Sat
9/14 9/15 9/16 9/17 9/18 9/19 9/20
13:33:2
Color represents participants
Wifi Spot
writing
eating lunch
at home
in my office
in my office:writing
on campus:
in Hewitt Hall
in my office
on campus
at school at my desk
at home
in Mobile
at home
at home



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