

INFORMATION ACCESS

A Typical Day, Close-Up and Personal

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Outline

- 8:00 Wakeup and day preparation
- 9:30 Doctor/hospital appointment
- 11:15 Gossip hunting
- 12:00 Lunch w/ colleague
- 14:00 Library visit
- 16:30 Gym
- 19:00 Dinner

8:00 Wakeup and Day Prep

- Deciding what to cook for next-day guests in front of “Smart Online Fridge Screen”
- Suggestions are based on **profile** with
 - Current diet restrictions
 - Food preferences
 - Recent recipes by preferred famous chefs ...
- and on availability of necessary ingredients in
 - The fridge and/or the cabinets (RFID-tagged items)
 - The area supermarkets
- at the level required by a **profile** for
 - Prices and freshness restrictions
 - Quality preferences ...

Knowledge Commons Challenges

- **Multi-objective** search optimization, result rank
 - Constraints
 - **Preferences**
 - Supermarket prices and available quantities ...
- Optimization over many **autonomous** systems
- Compound-object **approximate** distributed query processing and matching
 - Recipes against local RFID-tags and remote repositories
- **Transactions** for ordering and on-time delivery
- **User modeling**

9:30 Doctor/Hospital Apnt

- Presenting to hospital stuff “Medical Card”
 - Contains key aspects of medical profile
 - Leads to entire medical history (EHR – genetic, lab, clinical)
- Actions and results of visit added to EHR
- Diagnosis aided by similarity search in global EHR bank

Knowledge Commons Challenges

- EHR is widely **distributed**
 - Heterogeneity (horizontal and **vertical**), multimedia, integration
 - Uncertainty, missing information
 - Security, privacy
 - **Card vs. distribute server** storage
- **Approximate** compound-object matching
 - Complex similarity – **relevance feedback**
- Disease modeling and decision support based on epidemiological **EHR data mining**

11:15 Gossip Hunting

- Searching for info on lunch date and movie character
- Using “Info Card” with profile
 - Preferences on info pieces and characteristics
 - (Dis)trust on info sources
 - Search optimization criteria ...

Knowledge Commons Challenges

- **Multi-objective** search optimization, result rank
- Optimization over many **autonomous** systems
- Compound-object **approximate** distributed query processing and matching
- **Personalized search**

12:00 Lunch w/ Colleague

- Eating over two synchronized “Wireless Electronic Books”
- Analyzing and modifying script and related info
 - Script text
 - Connections to similar characters, related performances, ...
- Annotations on own Book
 - Immediately observable on the other
 - Permanently stored after lunch

Knowledge Commons Challenges

- The **provenance** of data updates should be recorded, typically through annotations
- **Modeling** annotations over multi-structured data
 - Annotation hierarchies, graphs, ...
 - Garbage collection
- **Inserting** annotations automatically with updates
- **Propagating** annotations to query results
- **Querying** annotations, annotating queries
- Using annotations as **optimization** parameters
 - Item popularity
 - (Dis)trust of source

14:00 Library Visit

- **Browsing** for new arrivals in books, DVDs, ...
- Using “**Library Card**” with **profile**
 - Preferences on authors, artists, themes
 - Timing and activity of recent visits ...
- **Recommendations** from “librarian”

Knowledge Commons Challenges

- Profile duality
 - Personal profile on the card (anonymous)
 - Community profiles on the server
- Profile organization on the card
- Personal vs. community profile matching
- Personal and community profile update after use
 - Profiling with usage data mining
- Recommendation

16:30 Gym

- Exercising while vital parameters are monitored via body sensors
- “Medical Card” and entire medical profile (HER) determine
 - Interpretation of generated streams
 - Action if problem
- Medication profiles (side-effects) take part
- Collected data added to EHR

Knowledge Commons Challenges

- Processing of group of continuous queries over streams
- **Personalized**
 - Different queries
 - Different interpretations
- Changes over **time** (medications, medical conditions, medical science)
 - Pre-optimization unlikely
- **Workflow** of interconnected query-groups
- Complicated queries
 - **Data-mining**/pattern-recognition
 - Approximate, similarity match
- **Scalability**

19:00 Dinner

- Wearable computers that unobtrusively **monitor**
 - Health parameters
 - Own behavior (for **profiling**)
 - Environment
- **Alerts** issued if needed
- Cloths back in the closet: collected data
 - Added to general profile store at home
 - Propagated to other **wearables**

Knowledge Commons Challenges

- Storage and computational **constraints** of wearables
- Support for any functionality

Conclusions

- Personalization (personalized access, recommendation, ...)
- Profile-based content management
- Card/palm/e-book/wearable knowledge commons
- Multi-channel access
- Mobile knowledge commons
- Annotations and provenance
- Extreme diversity in content type (film, text, ...)
- Medical streams, biomedical content management
- Multi-objective optimization in autonomous environments