

# Digital Me: your digital footprint in knowledge work

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# Knowledge work is changing



Tuukka Lehtiniemi et al, Trends of Knowledge Work and Needs for Knowledge Work Tools, Re:Know White Paper.

# Placing the knowledge worker in the centre

- ▶ Much of knowledge work is digitally mediated
- ▶ Digital interactions are *always* logged
  - ▶ Privacy challenge
  - ▶ Potential to solve many of the knowledge work challenges!
    - ▶ Automatically tracking work
    - ▶ Memory, recall
    - ▶ Proactivity
  - ▶ Individual needs to be in control!

*Re:Know research project: HIIT (Aalto + UH) + FIOH*



# Introducing Digital Me

- ▶ We developed Digital Me (DiMe) to facilitate the research
- ▶ Logs your digital footprint
- ▶ Free and open source software (FOSS), open ecosystem
- ▶ Our focus in research:
  - ▶ Leveraging machine learning
  - ▶ Occupational health aspects
  - ▶ Human-computer interaction

<http://reknow.fi/dime>



## DiMe technologies

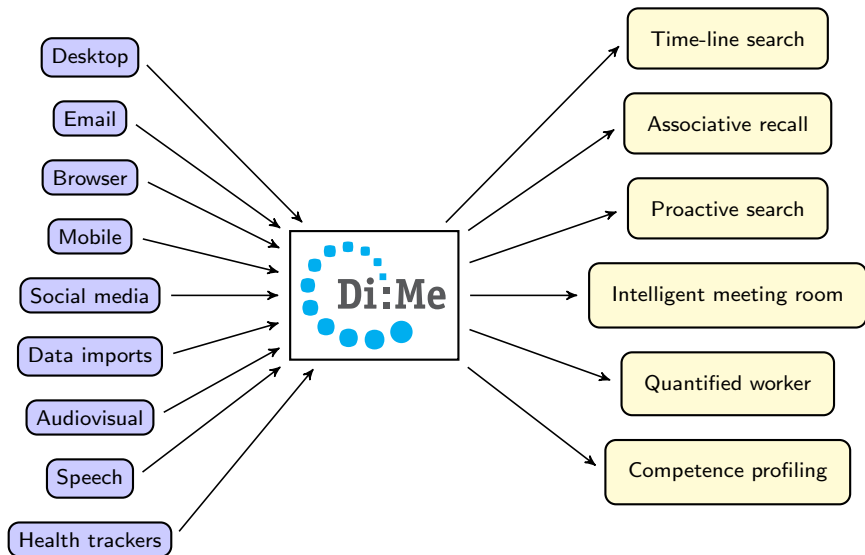
- ▶ Java, Spring Boot
- ▶ RESTful API, JSON
- ▶ Database: SQL Hibernate or MongoDB
- ▶ Lucene text search
- ▶ Runs locally on Mac OS X, Linux and (sort of) Windows

## DiMe core architecture

- ▶ Intelligent database server
- ▶ (Mostly) RESTful API
- ▶ *Loggers* record events from person's actions or environment
- ▶ *Applications* provide user interfaces for viewing, manipulating, and analysing events

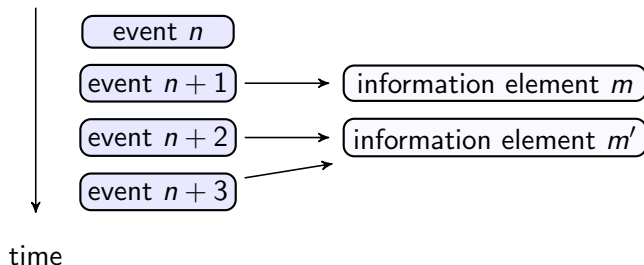


# DiMe ecosystem



## DiMe data model

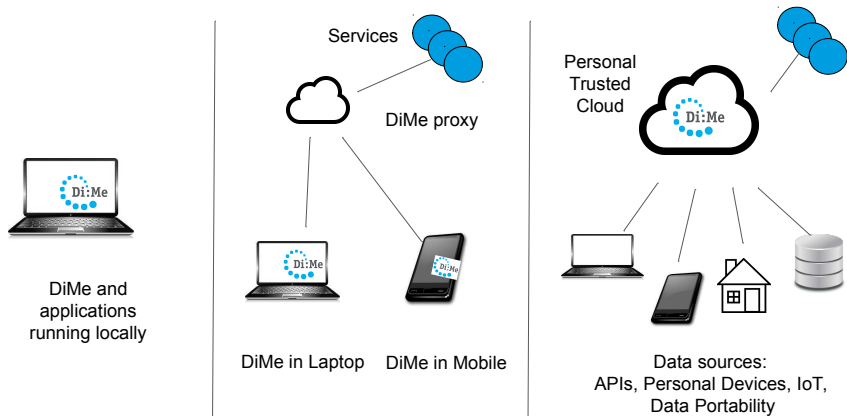
- ▶ Event-based data model
- ▶ May refer to “static” information elements (documents, web pages, etc)





## DiMe scalable architecture

- ▶ Designed to run on your own computer (desktop, laptop)
- ▶ Mobile app in the works
- ▶ Proxy service to connect mobile and other external services
- ▶ Future development: personal trusted cloud option

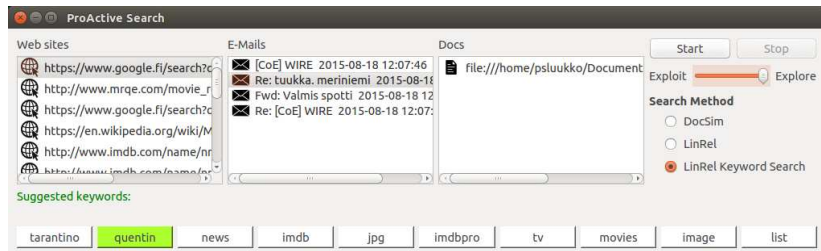


## DiMe applications

- ▶ DiMe augments the human with a “digital memory”
- ▶ Provides insight into the person’s own behaviour
- ▶ Many applications can build on this personal data
- ▶ Just a few ideas explored in our research project

# Applications: Proactive search

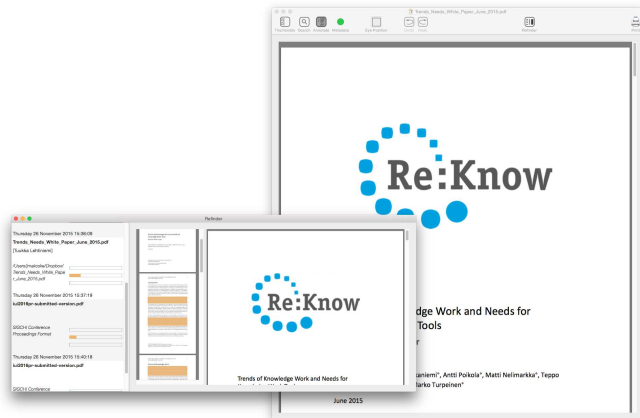
- ▶ Proactively estimate the user's current task
- ▶ Runs unobtrusively in the background
- ▶ Relevant documents already retrieved when user needs them!



Luukkonen, Koskela, Floréen. LSTM-Based Predictions for Proactive Information Retrieval. arXiv:1606.06137

# Applications: auto-annotating PDF reader

- ▶ Keeps track of what was actually read
- ▶ Supports gaze-tracking for increased accuracy
- ▶ Benefits: more relevant search results, easy recall



## Applications: automatic profiling

- ▶ Automatically create a skill profile from your data
- ▶ Can be shared (with consent) to enable expert finding service
- ▶ Team formation

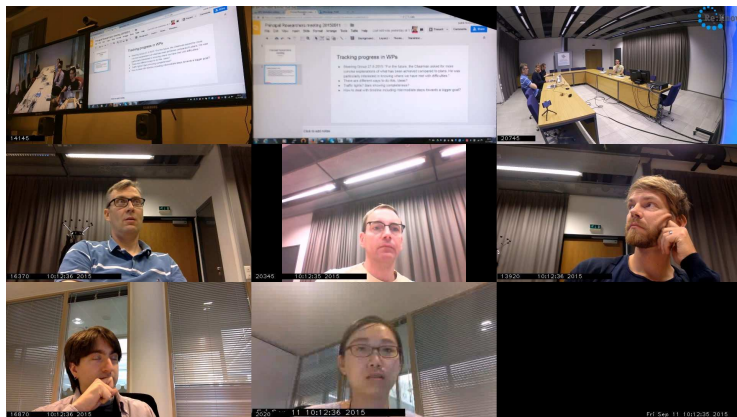


Shankaralingappa, De Francisci Morales, Gionis, Extracting skill endorsements from personal communication data, ACM CIKM 2016.

Icons designed by Freepik from Flaticon.

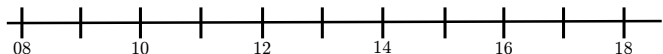
# Applications: Intelligent meeting room

- ▶ Recording meeting video, audio
- ▶ Extracting speech, slides, attention level, participant gaze
- ▶ Recalling, searching contents of meetings



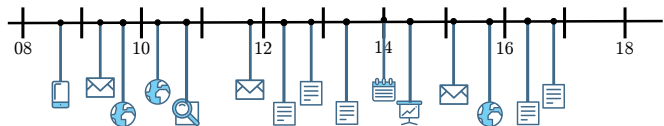
## Applications: Quantified worker

- ▶ Automatic time tracking
- ▶ Machine learning: automatic project/profile classification



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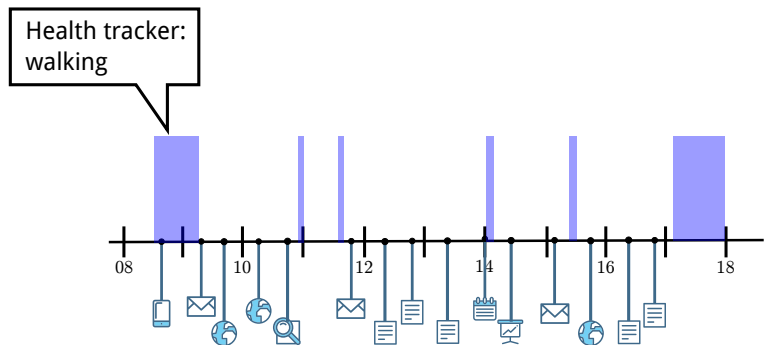


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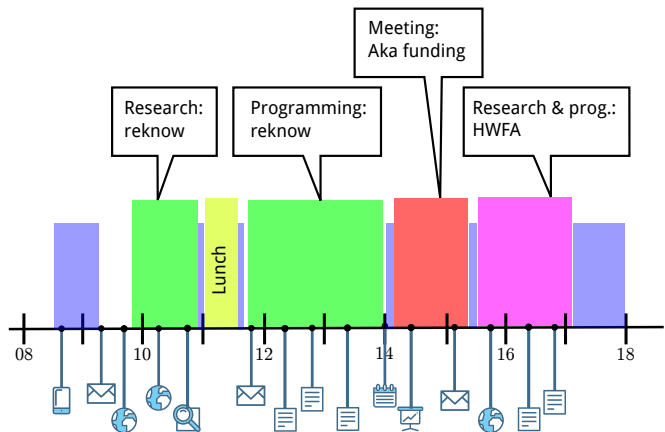
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# Conclusions

- ▶ Knowledge work is changing
  - ▶ Increasing complexity, automation, information overload
- ▶ Personal data part of the answer
  - ▶ Logging and tracking can be used for good!
- ▶ Digital Me research platform
  - ▶ free and open source
  - ▶ machine learning and HCI expertise
  - ▶ several applications being built

