Enhancing healthy eating by intelligent digital assistants

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Basic facts about Estonia

- North-East Europe
- Capital Tallinn
- Population 1,34 mio
- Area 45 000 km², comparable to the Netherlands and Denmark
- Parliamentary republic, independence Feb 24 1918
- EU, May 1 2004
- Schengen treaty, Dec 21 2007
- Euro zone, Jan 1 2011
Problem statement

- Nutrition information printed on product packages in small print
- Nutrition information hard to compare, especially with respect to price and between different stores
- Experience-based information available but hard to use in the context
Intelligent digital assistant

- We use the term “agent”
- A software entity that can act in the environment *on behalf* of its principal, perceive events, and reason
- May run on a variety of devices: desktops, cell phones, blackberries, laptops, specialized devices, etc.
The abstract agent architecture
The case study of social grocery shopping

- Customers post the prices they paid for their groceries and QoS information
- A prospective shopper enters a grocery list and obtains a pointer to the store(s) with the lowest total price (and best service)
- Each customer has an agent representing his/her interests and interacting with the agents of the other customers
- Results from initial experiments by Prof. Michael Huhns and Hongying Du: savings up to 21% can be obtained!
Extending the case study to healthy eating

- Agent:
  - Manages the profile of its principal;
  - Retrieves nutrition and price information of products;
  - Processes price information posted by other customers;
  - Processes feedback posted by other customers;
  - Suggests healthy and affordable alternatives;
  - Accordingly creates the list of stores to be visited.
Cheddar cheese, 8 oz, $2.5

Nutrition Facts
Serving Size 8 oz (132 g)
Amount Per Serving
Calories 532
Calories from Fat 85
% Daily Value*
Total Fat 44g 67%
Saturated Fat 28g 139%
Trans Fat
Cholesterol 139mg 46%
Sodium 820mg 34%
Total Carbohydrate 2g 1%
Dietary Fiber 0g 0%
Sugars 1g
Protein 33g

Low fat cheddar, 8 oz, $2.8

Nutrition Facts
Serving Size 8 oz (132 g)
Amount Per Serving
Calories 228
Calories from Fat 81
% Daily Value*
Total Fat 9g 14%
Saturated Fat 6g 26%
Trans Fat
Cholesterol 28mg 9%
Sodium 808mg 34%
Total Carbohydrate 3g 1%
Dietary Fiber 0g 0%
Sugars 1g
Protein 32g

Healthy alternatives

Customer ratings
How to engineer such systems?
Example of a goal model

Customer

Shopping

Store

Assistant

Healthy products

Creating shopping list

According to the need

Simple

Finding stores

Close

Deciding stores

High QoS

Transacting

Safe

Minimal participation
Conclusions

- Work-in-progress: how much does buying healthier products influence the cost of groceries?
- Full potential of social networks has not yet been employed
- Further experiments with real data required