A Mechanical Memory

Prototype Digital Memories in Everyday Devices

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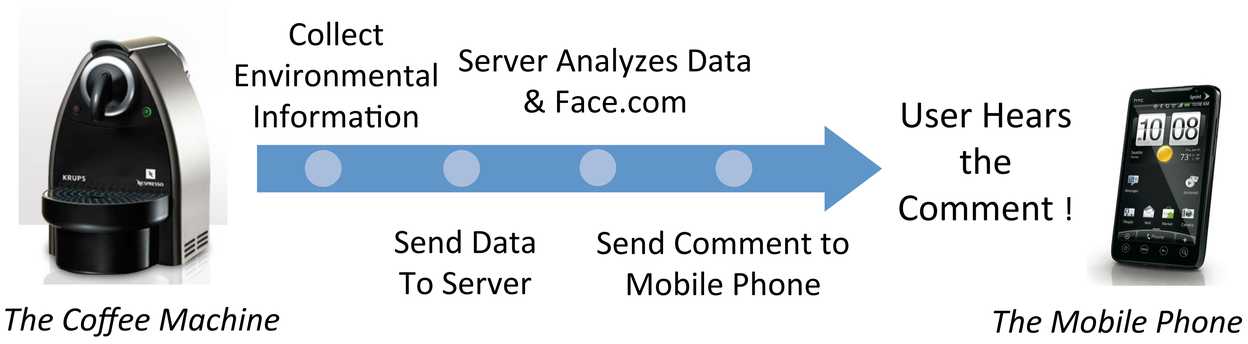
There has been significant research effort in recent years on sensing the person, using wearable sensors to understand the person's activities and build a digital memory for the person. We achieve this by using software for android phones that read from the on-board sensors and attempt to understand the activities the person is involved in. This project aims to replicate some of this functionality for everyday objects, such as coffee machines, and to build a digital memory for this device. We attach an android phone to the coffee machine which will sense activities within the environment. This digital memory will learn what is normal for a person and what is not, and will inform when a person is drinking too much coffee and if necessary will post to social networks.

The Real-Time Process

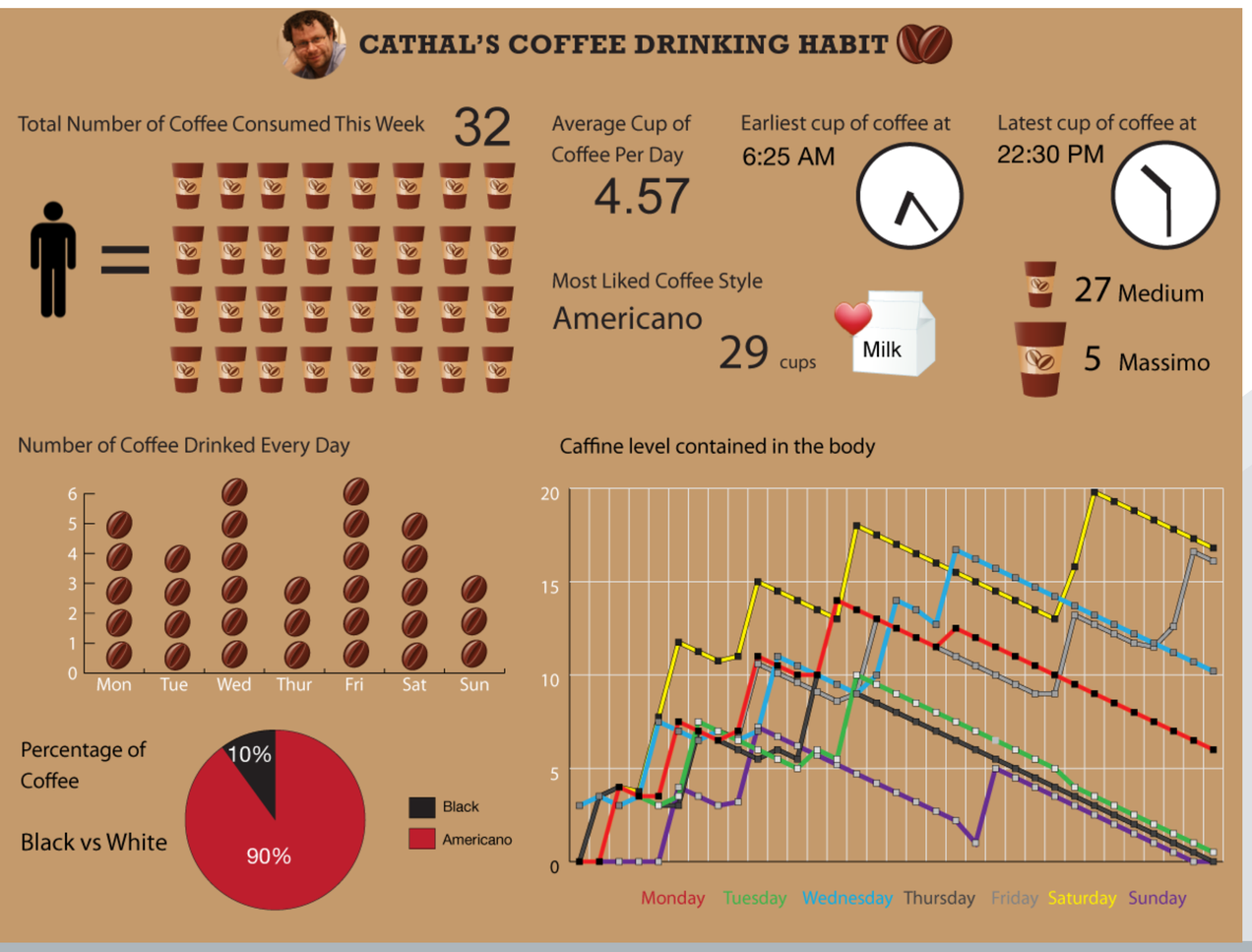


Detecting Events

The key factor in this prototype is the detection of a coffee making event. The android phone sits beside the coffee machine and is oriented towards the user as they approach the device. Audio is constantly monitored and the audio signature of a coffee machine operation triggers a new event, during which the person making coffee is detected, the data sent to our server-based digital memory which generates comments and stores the event for historical analysis.

Feedback Interface

In addition to the aural feedback and welcome conversation with the user, the digital memory maintains a contextual history of the user's interaction. In this manner, a summary 'timeline' provides feedback to the user on their habits, which otherwise may go unnoticed. The graph shows the feedback for one user given a week of interactions with the coffee machine.



A Digital Memory for Coffee Machine

To derive a suitable comment for the user, the server will calculate the amount of the coffee this user has already drunk within the same day by searching for the event records saved in database.

In this prototype, there were two user states supported. (1) the user has had a 'reasonable' number of coffees in this day, and(2) the user is drinking a lot of coffee.

If state (1), the coffee machine will welcome the user by speaking a welcoming message; however if the user comes back for additional coffees, the machine will remind him/her of their excessive consumption done via a speech API. Future work would enhance this 'personality' element to provide more ammusing or natural utterances from the device.

Person Identification

Upon detection of a coffee machine event, the phone triggers multiple photo capture. The photos are sent to www.face.com for online recognition and the resultant identified person is returned to the server. This process takes in the order of seconds.

Similar Applications in the Future

Similar applications of this kind can be built in the future for wide use, such as an 'alive' fridge that can study the users' eating habit by recording the foods it stored; a digital water bottle that can help people the water they have drunk; and more user friendly applications in the domain of robotics for healthcare.

In conclusion, any object that is commonly used in daily life can be attached by digital devices to study the users habits when using this object, aiming at improving usability.

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