

: Can wearable computing devices provide decision support?

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Computing devices continue to become smaller and more portable. A wearable computing device can now adorn a person's body like a traditional wrist watch, eye glasses, hearing aid, bracelet or conceivably any wearable item even clothing. Wearable devices have the advantages of easy accessibility, convenient removal and automatic gathering of data about the person including pulse and location and a wearable can provide situation awareness or augmented reality (AR) for its user. Computing devices can and may be implanted in people, but more likely people will want removable accessories for at least the near-term future. Potentially any computing device, large or small, can provide data collection and decision support.

There seems to be a growing popularity for the Apple iWatch, Fitbit, and many other wearable devices. Devices like Xybernaut's Poma and Google Glass encountered problems. The use of wearables for specific decision support applications, such as healthcare monitoring and personal wellness decisions is a reality. Also, wearable computing is gradually entering the workplace and the military.

Mobile computing and communications, sensors, and wearable devices facilitate human-computer interaction that is pervasive and easily accessible. Because devices can be "always on and ready" one can envision a new form of synergy between people and computers. Computing devices become a part of the person's interaction with surroundings.

For example, a tracking device like Fitbit (<http://www.fitbit.com/>) collects data and provides rudimentary indicators that encourage one to get more steps, a.k.a. exercise. Supposedly the Apple Watch legitimated a new era of wearable computing. On September 9, 2014, Apple CEO Tim Cook introduced it as a device that will "redefine what people expect from its category". In terms of functionality Apple Watch presents a range of features for communication, from notifications to smart replies. Apple Watch provides activity tracking via an accelerometer and optical sensors for heart-rate measurements. What else seems possible? Let's examine the categories of decision support.

Communications-driven Decision Support

Wearables can access synchronous and asynchronous text, audio and video communications technologies that facilitate collaboration, communication and decision making. A wearable like a

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watch or glasses can create increased and improved communications-driven decision support. A wearable navigation system can provide real-time turn-by-turn guidance and location awareness.

Data-driven Decision Support

Access to historical and real-time data coupled with location awareness and analytical processing can provide support for people performing diverse roles from sales to operations. Wearables can provide a wide range of personal, data-driven decision support. For example, using voice recognition and facial recognition a salesperson can ask "Who is this?" and look at a person.

Document-driven Decision Support

A device like Google Glass can provide real-time access to documents including policies and procedures, product specifications, catalogs, and corporate historical documents, like minutes of meetings, corporate financial records, and important contracts or correspondence. Email documents can be easily retrieved and reviewed. Also, using a smart watch checklists can be easily accessible.

Knowledge-driven Decision Support

Using sensors in the device and knowledge stored in a distributed Cloud network, users can receive suggestions or recommended actions. Various systems or a generalized expert advisor with subject-specific knowledge can be a constant companion. For example, Siri from Apple is an intelligent personal assistant and knowledge navigator. Watson from IBM is a development platform and artificially intelligent computer system. It can be programmed to answer questions in a knowledge domain asked in natural language. Watson generates hypotheses, gathers evidence, analyzes the data, and reaches a conclusion very quickly. Perhaps a major benefit will be helping people act in a more informed way and hence make "smarter" knowledge-base decisions.

Model-driven Decision Support

Quantitative models can be used with historical data stores, real-time data including sensor data, and model parameters provided by a decision maker to analyze a situation and make predictions. If you are running, your watch can predict when you will arrive at a destination or calculate your

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speed. In a business setting, Google Glass like devices and smart wearables can include predictive analytics for many specific purposes like which customer to focus on to increase the likelihood of a large sale or provide alerts when events happen like an out of stock situation. The market for wearables continues to expand (Meola, 2016).

We are beginning the age of wearables. How a new form factor will evolve depends upon ingenuity and perceived need of a target user group. Decision support has always evolved opportunistically and wearables provide a very large opportunity for enhanced, novel, and distributed decision support.

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