amicus (formidus)

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Abstract

In this paper we discuss the development of personal digital assistants over the last decades to the current state of the art. This recently resulted in the invention of proactive personal assistants which collect all available data to predict future needs of the user and assist in the resulting situations. We propose that this development will continue and result in amicus, a pure virtual assistant which handles all possible challenges a future human might be confronted with in the real or virtual world. The system will provide pure intuitive interaction including natural feedback and recognition of any human communication form.

1 Introduction

During the last decade a continuous trend could be observer for everyday technology to provide help to users in nearly every situation in life. One key role is played by the mobile phone which has already developed towards a mobile personal assistant. This development started already in the 1980s with the introduction of the first real mobile phones by Motorola and with the first personal digital assistants by Psion in the early 1990s. Today's smartphones combine the features of mobile phones and personal digital assistants into one gadget exhibiting a whole set of additional features:

Communication

The gadget allows freedom of communication in different aspects. Since connections to the global communication channels are available with nearly no limits, the user can communicate regardless of its location or its current activity. Also the mode of communication is as flexible as imaginable. One can use text, speech, video, and all combinations of these by virtue of automatic conversion. Even communication in different languages is possible on current hardware providing automatic translation on-the-fly.

Work

Current gadgets allow for high flexibility in the working environment. All work items that can be executed on any computer can nowadays also be handled by a gadget. Even if processing power is needed, the gadget only acts as interface to the processing machine relaying input and output channels. In addition, gadgets typically include a complete set of office capabilities like document preparation and managing, calendar management, and information retrieval. The ability for recording and creating of all kinds of media facilitates the digitalization of any needed real-world feature.

Leisure

With all these features and possibilities it is clear that such gadgets can not only be used for serious applications, but they are also able to entertain everywhere and in any situation. It is possible to consume any media at any time and at every location. The communication abilities allow not only playing games but also experiencing multiplayer game sessions with direct virtual contact and additional social features such as sharing the user's environment or preferences.

Proactive Personal Assistant

Combining all the abilities of gadgets, including also the detection of location, surveying communication, and interpreting different other sensors (temperature, loudness, camera), can lead to a massive amount of data collected every day. Processing this data for years can enable creation of a user profile containing more details than the best friend of the user might know. In combination with methods from artificial intelligence this facilitates the construction of a proactive personal assistant (PPA). A first step into this direction is *Google Now*, which is already able to remind the user to leave office early because of heavy weather or traffic conditions or remind the user of recurring events although these are not marked in the calendar.

Despite the steady discussions regarding protection of data privacy, this development in the direction of PPAs might well extend into the future. Since speech and gesture recognition are ever improving, PPAs might soon be integrated into everyday objects. Recent developments into this direction are smartwatches and augmented reality glasses. Having one PPA connected to or living within any technical object would lead to a fading of borders between digital and real world. All features of the real world could be digitalized and used within the virtual life and all virtual information and features could be used to enhance life in the real world, e.g. automatically open doors for authorized users or manage the zoo of different gadgets without having to study the manual.

2 Vision

We propose for the year 2026 the invention of the ultimate personal assistant, the *amicus*. This pure virtual system offers ad-hoc virtual materialization and interaction with the real world in terms of providing visual, audio, and haptic feedback combined with the recognition

of any user input via speech, gestures, or direct interaction with the amicus avatar (Valli 2008). The system is designed to support its user in any situation in the real or virtual world.

The system is connected to the user throughout the whole life and collects all data related to the user's behavior, environment, and interaction with the world. Since the system grows up together with the user it can adapt its interaction paradigms to the user's needs and characteristics. The system can be materialized on purpose to fulfill special needs and make interaction more natural. Typically, the amicus of a user will materialize as a small character sitting on the shoulder of its user. However, the audio-visual appearance of each amicus is highly customizable and can be adapted to the current situation and environment either by the user or by an automatic process. This facilitates easy acceptance by the user and other people. In addition, this customization in combination with the natural and human behavior of the amicus allows for building a strong social relation to the user.

As a personal assistant (Maes 1994), each amicus will master all well-known assistant tasks such as reading, writing, interpreting, driving, handling of all kinds of machinery, navigating, taking over conversations, providing knowledge, educating, and entertaining. Interaction with the amicus can be done without any materialization just on the basis of speech or by using gestures. If the amicus can directly access needed hardware (satellites, internet access points, cash points, electronic door locks) it will also not need to materialize to fulfill respective tasks. The amicus will verbally guide the user to the desired destination, instantly provide the answer to a question, pay the bill with the user's credit card, or open the door of the user's car. If such a direct connection is not possible, the amicus will materialize in a beneficial way at the needed place and fulfill its task. This can be for example as the driver of a classic car, as the counterpart of a telephone call for the simulation of a direct conversation, or as a video screen showing a movie. Depending on the performance of the amicus it will also be possible for one amicus to materialize in different locations at one time and fulfill several different tasks in parallel. However, such sophisticated behavior can only be expected for the latest high-performance amicus systems.

3 Conclusions

As presented in the video, the introduction of amicus will dramatically change users' lives, the relation of respective users to technology as well as to other people. Users will save a tremendous amount of time due to amicus' help and assistance in everyday tasks. Performance of workers will increase dramatically and many duties will be performed much more efficiently with the help of amicus. In addition this will increase leisure time for each user.

Apart from work, the change in private life will be even greater for amicus users. There will be no limits for entertainment and no barriers for non-technophile people. If a user in Berlin wants to join a performance of "The Magic Flute" in Paris a live-stream can be set up instantly by amicus via intrusion of cameras present in the theater. If a question arises there is no need to know where to search, just ask amicus and s/he(?) will tell you the answer. If you ever wanted to try riding a motor bike but have no driver's license, join amicus for a ride.

Also tedious activities like taking the dog for a walk can easily and proactively be performed by amicus.

However, if the full capabilities of amicus should be utilized, it can never be turned off. This results in a complete supervision of the user's life and parts of related people's lives, consequently eliminating privacy. The user is always reachable, at least for amicus, and there is no possibility to be for itself. The ease of virtual communication will make real conversations and social contacts seem too complicated and expensive. People might start living in their private virtual sphere, constructed by amicus in the real world.

Within weeks after starting to interact with amicus, a typical user will completely rely on the features and get completely dependent on the abilities of the system (Glass et al. 2008). Users will not be able to detect malfunctions or bugs of amicus if they are non-obvious and for example just result in incorrect answers to questions. Also it might happen, that incorrect behavior of amicus suddenly appears without any warning, e.g. that amicus instantly dematerializes when flying an airplane. Such very rare cases and their consequences will be concealed most of the time by amicus producers in the light of the nice features. However, there will be an underground movement of skeptics, fighting against the distribution of those systems they call:

amicus formidus.

References

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