Internet Communication Beyond the Barrier of Death: Messaging with the Lost Ones

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Internet-based communication has transformed the way we stay in contact with family and friends who live remotely from us. Death puts such communication to an end and leaves us with just static data of our past interactions, such as pictures, chat protocols, video recordings, and letters. Available computer technology could keep up the illusion of communicating with people beyond the barrier of death, and to continue to learn from them—how they lived, the places they've been to, the people they met, and how they would deal with our present challenges. In essence, such technology could reinforce and revitalize memories of a common past.

Think of the following: "My dear grandson," says the email in my inbox, "I just see from your calendar that you will be attending the IEEE International Congress on Big Data 2014 in Anchorage, Alaska." It continues, "I am not sure you remember, but I once went hunting and fishing with your uncle there back in 1978. Here is a picture of us fishing from a boat on the Kenai river, and a link to the place in Google Maps. You can check how this place looks today."

Such an email would be nothing special at all, and similar messages are being exchanged between people who care for each other on a daily basis. It's only that my grandfather passed away in 1998. One day, we will all have lost loved ones, and the communication will break as soon as the person on one side of the dialog passes away and leaves the other behind. With masses of digital data exchanged with people who are important to us, and the technology at hand to process this at scale, it's high time to think about whether we can and want to exploit this data to keep up the illusion of communicating beyond the departure from life. Technology-wise, it doesn't have to be that we stop receiving email and lose the ability for chat messaging, and maybe even voice-over-IP and instant video messaging, when we're saying farewell to a dear one.

Approach

The approach I envision is pretty simple: An application on our computer devices continuously monitors all of our interaction with a certain person (like the emails we exchange, chat sessions, attached pictures, and so on), and other aspects of the daily lives of both individuals, like calendar entries, geoposition data from the smartphone, pictures we take, books we read, items we buy, and websites we visit. The application then uses this data to construct and maintain a knowledge representation of facts about the individuals involved, their actions and thoughts, and their commonalities and exchanges, such as places visited together, common topics, and past discussions. The knowledge representation will contain a giant graph of information about each individual and the contents and style of communication between the two people.

Then, if one person dies, the system creates a virtual account for email, Internet relay chat (IRC), and maybe even voice-over-IP or instant video messaging. From that point on, the system can operate in the following two modes.

Messages triggered by the system. By continuously relating new data produced by the surviving individual with the knowledge representation about the person who passed away and the interactions in the past, the system can automatically generate messages, like the one given in the introduction. The more powerful the models of speech patterns are and the more detailed information of the

relationship between the two individuals that the system has at hand, the more this generated message could mimic a true message from the dead person in style and content. Note that in its simplest form, this would be purely asynchronous messaging with no need for real-time processing. A script could generate such email messages as resources permit. It could initially even be limited to one-way communication, with a "no-reply" clause—"Dear Martin: Since my body has ceased to exist on <date>, I can unfortunately not process any replies to this message. But I will try to send you new ones from time to time."

Responses to messages sent by the surviving individual. One could go a step further by allowing a living being to send messages for the lost one to the system, like an email to <userID>@eternalmessaging.org: "Dear Richard: I remember we once went canoeing in the Everglades. What brand and model of canoe were we using?" And the system could reply from the knowledge base: "Dear Martin: I do not remember which boat we took back then, but I used to own the following ones …" extracted, for example, from past Amazon or eBay receipts or credit card statements.

The messages could contain references to or excerpts from images (from the collection of the dead person, already shared pictured between the two individuals, or even from the Web), old email messages ("Here is what I wrote to you in preparation for our trip back in 2004"), or books and other media ("When I was your age, I loved reading the novel *Night Flight* by Antoine de Saint-Exupéry. Here are my bookmarks and highlighted sections in my eBook edition").

If processing power and the granularity of the data permits, such could even be a synchronous channel, such as an IRC or Skype chatterbot mimicking the dead person. Before you judge this as science fiction, consider that Joseph Weizenbaum has shown with his ELIZA chatterbot[1] back in 1966 that it takes very little to make people feel they're communicating with a human. Then hold this against the

- level of technology driving Apple's Siri assistant,
- the technologies developed as part of the CALO project, and
- Skype's ability to offer real-time translation.

You will likely agree that going from that level of technology to the vision sketched in this article is a realistic option.

Triggers

Now, what could trigger a message from the system to the living? In the following, I list a few promising signals.

Geospatial Relatedness

Examples of geospatial triggers could be if the living person travels to a place where

- the other person has been ("I see you are flying to Lake Garda for ISWC 2014. That's where I spent summer vacation with your mother in 1960"),
- both individuals have been together ("Nice to see that you still go to our old fishing spot"),
- the living person has been before and told the person about it in an email ("So you are going to Sicily again, which you mentioned in your last email before I passed away"),
- something important happened, or
- a picture exists that either shows the person who passed away or else was taken by that person.

If the system knows the geofence of the dead person's last rest, it could even greet the living person when he or she visits the graveyard.

Temporal Relatedness

Such a system could use date information in a straightforward manner, such as anniversaries ("Fifty years ago today I bought my first car"), joint activities ("Do you remember how I helped you set up your student apartment in Chicago in September 1985?"), activities by one of the two individuals, emails or other messages written on that date, or calendar events (such as restaurant reservations in the past).

Relatedness to Media Content

The system could also spot that some of your recent plans or actions are related to the dead person on the basis of media content and its metadata. For instance, you take a picture of your new Volkswagen, and the system generates a message saying, "Congratulations on your new car! I also used to own a Volkswagen in the 1950s." With facial recognition and image processing, the system can spot relationships between living and dead people, places of interest, and other objects. Image metadata—in particular the geoposition of where the picture was taken—could trigger messages, too.

Data Sources

Today's digital devices capture a wealth of information that can be used for constructing and maintaining the knowledge representation, namely

- email content and metadata (such as IP addresses and their geoposition—"You seem to be sending email from the Boston Lennox hotel. It used to be very close to a

jewelry shop, but Google doesn't find that anymore, so I assume it no longer exists");

- image and video content and metadata, in particular faces, geolocation information, temporal information, topics, and choice of motives ("It seems you like the golden colors of autumn, the same as I did. At least you are taking some pictures of autumn leaves recently");
- IRC and other chat platforms, in particular chat logs;
- calendar entries, in particular if they include rich textual descriptions and location information;
- Web search behavior, including search topics ("I see you're searching for a canoe. Go for a Kevlar or Carbon, even if it's a bit more expensive");
- books purchased, read, and which parts thereof, where and at what time of the day—including bookmarks and highlighted sections;
- music you listen to ("Funny that you also like Elvis Presley while driving. I always enjoyed it when commuting to college");
- purchases from receipts and credit card statements ("I see that you're buying a microscope for your own grandchild. Do you remember the one I gave to you for Christmas in 1981?"); and eventually even
- voice-over-IP data.

Depending on the amount of natural language processing and image recognition techniques at hand, a lot of facts and named entities could be extracted from textual and image content. With speech synthesis and the recently described ability to generate animated videos of faces from multiple static images,[2] it might be even possible to simulate a live video-messaging session with a person who has passed away.

For my generation, the threshold in terms of coverage of data might not be sufficient yet to create realistic conversations with our lost ones, because a lot of relevant information and communication wasn't originally captured as digital data. While analog media could be digitized, the crucial metadata would be difficult to reconstruct, such as where a picture had been taken, the date and time of a message, OCR access to the textual content of handwritten letters, and so on. However, the more our interaction with the world manifests itself in digital data, the more comprehensive and realistic can such an illusion of reality be, and the more special the messages such a system could exchange.

Societal Issues

Even if you follow my argument that this is a very realistic technical option based on the state of the art of virtual assistants like Siri, it's unclear whether we should go that route. Do we want this? Who owns the data that, essentially, represents an individual's patterns of communication, factual knowledge, and media objects? Don't we devalue life if we take away the silencing might of death? Will we be more negligent in separating the important from the vanity, the deep human relations from the superficial, and the ephemeral when we know we could make up for the missed conversations with our friends and family in virtual sessions based solely on digital data?

I don't think so, for the following reasons. First of all, as in real human relations, the depth and richness of the conversations that this system will make possible critically depend on the amount and specificity of interaction in the living years. Each and every email, chat message, and image exchanged and commented will

enrich the system's knowledge base and allow for more unique messages later on. Second, the legal problems could be handled by a non-terminable legal agreement between the parties involved. As for the amount of data, I bet that any Apple iOS device stores most of what's needed in the Apple cloud anyway. Just see how Siri silently adds information about your family relations to your contacts taken from Siri dialogs. Third, such a system doesn't have to be perceived as a competitor to traditional forms of remembrance. It can be seen as a complementing service that adds serendipitous connections between our present lives and our ancestors and passed friends. Of course, it will all be an illusion; but an illusion that might make it easier for us to deal with the loss of a loved one. And it might preserve the very essential aspects of someone's personality, or the parts of the personality that we were familiar with.

There are people who have their bodies (see "cryonics") or at least their brains (see "neuropreservation") deep-frozen after death based on the vague hope that future technology will allow them to be revitalized. I personally think that's unrealistic, and a waste of resources. Also, it could put your living remainders under the control of others, as in the famous short story "William and Mary" by Roald Dahl.[3] Who tells you that your revitalized self doesn't become a slave mining radioactive rock under the brute regime of aliens? All your earthly might and wealth and the societal structures that make our lives enjoyable and peaceful won't follow you through the envisioned channel into the distant future.

In comparison, trying now to keep a long-term archive of all your digital

interaction with people you'll miss when gone could be a very worthwhile attempt towards preserving the chance for realistic conversations related to your future daily life, even if the applications for this are yet to come.

I, for my part, would love to continue some past conversations with lost ones, even knowing that it was just an illusion. It could continuously link our future with the shared past. In essence, isn't this fabric the essence of human relations? And yes, Web science debate should include such fundamental topics. ▢

References

1. J. Weizenbaum, "ELIZA—A Computer Program For the Study of Natural Language Communication Between Man And Machine," *Comm. ACM*, vol. 9, no. 1, 1966, pp. 36–45.
2. I. Kemelmacher-Shlizerman et al., "Moving Portraits," *Comm. ACM*, vol. 57, no. 9, 2014, pp. 93–99.
3. R. Dahl, *Kiss Kiss*, Alfred A. Knopf, 1960.

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