

# S-face

SFC makes the future through researches

## IT and AI Technologies for Creating Well-being in the Age of the 100-year Life

Tadashi Okoshi



×

VOL.

**034** /100

2022.Jan ISSUE

Japanese Color: OUNI-iro

## Knowing about Humans Is the Starting Point of WellComp

The human life span has been extended due to various factors including advances in healthcare and medical care, and we are now living in the so-called age of the 100-year life. "Well-being" is a concept describing a physically, mentally, and socially healthy condition, and "WellComp" is a type of computing based on technologies geared toward achieving the well-being of people in the age of the 100-year life.

One of the core WellComp technologies is sensing technology for knowing about humans. The technology is designed to capture data on various aspects of people's lives that range very broadly from actions (walking, eating, sleeping, etc.), daily living (dietary habits, sleep, exercise, etc.), and behaviors (learning, hobbies, art activities, keeping animals, etc.) to include even inner mental conditions (feelings, emotions, mood, etc.). More technically, sensing technology enables the collection of big data on these aspects of human life from mobile, wearable, and Internet of Things (IoT) devices, sensors, websites, and other sources. At our laboratory, this sensing technology is coupled with machine learning technology to develop recognition technologies.

Sensing technology can also be applied widely in many services ranging from health and medical care to public infrastructure, education, and leisure. For instance, patients using anticancer drugs are prone to suffer from numbness in the limbs as a side effect of the drugs and so have a risk of falling over, even on flat surfaces, and thereby sustaining a fracture. For such patients, sensing technology can be used to collect data from their smartwatches or smartphones so that falls can be prevented before they happen through the detection of any signs of numbness, such as staggering, using machine learning technology.

## The "Mood" of Society Can Also Be Observed from Analyzed Mass Data

After knowing about humans using sensing and recognition technologies, the next step is analyzing the big data captured. The results of the analysis become new knowledge that can be used as valuable output data. For instance, while the thermometer function of smartphones only shows temperature, its data can become valuable in other ways when used with location information or information on the status of Wi-Fi connections or when connected with AI technology.

Data from sensing devices, such as that on human behaviors and actions, is not the only useful data we can obtain. We can also gather and analyze data about how people usually use the Internet, for example.

In our joint research with Yahoo Japan Corporation, we are collecting data every day on the words input and searched by approximately 10 million people on the Yahoo! search page and, by adopting a machine learning model, we can observe changes in the "mood" (emotional changes) of Japanese society on a daily basis. Also, in our research on mental health and social media, it is becoming clear that the frequency and duration of using social media of each individual and the degree of utilization of each service, such as Facebook, Twitter, Instagram, and LINE, by each individual are related to their level of well-being and mental health (sense of loneliness, etc.). We are trying to understand this in more detail.

# WellComp: Human-friendly Enabling Technology for New Well-being

IT and AI technologies have been developed with the main focus placed on increasing speed, capacity, and number of computers. However, as the notion of ubiquitous computing has now been realized to the extent that we are drowning in a flood of information and services, there are mounting needs for more human-friendly computing. Tadashi Okoshi, an associate professor whose research theme is "human-centered computing," has advocated "WellComp" ("Computing for Well-being"), or computing based on IT and AI technologies aimed at promoting people's health and welfare. Through this research, he has been pursuing well-being in the age of the 100-year life.

## Analyzing Searched Words to Measure the "Mood" of Society



We have developed an AI model that analyzes words searched by people to monitor changes in their mood. In 2020, the year in which COVID-19 started spreading, the analysis of searched word data of approximately 10 million people showed a decline in the mood index as the number of cases increased during the first and second waves. We observed a tendency for mood to sink when the number of positive tests rose, while the mood was elevated when the number decreased. However, in the third wave and thereafter, the mood changed only a little when the number of positive cases increased, reflecting the effect of people becoming accustomed to the pandemic.

## Smile Meter



The "Team SMILE" Health Information Consortium, organized at the Keio Research Institute at SFC with the aim of promoting health among people through smiles and information, is studying technologies for creating opportunities for people to smile. Smile Meter, which was developed as part of the consortium's research on smiles, is a unique system that measures smiles. When a person on the screen smiles, flowers bloom around the person's face. When the person's smile causes others on the screen to smile due to the effect of emotional contagion, flowers bloom all over the screen. The system is useful particularly in online meetings where participants cannot communicate directly with each other, because a chain of smiles can be generated at will to ease the atmosphere of the meeting.

## There Are as Many Research Subjects as the Number of Students



Research subjects created based on a fresh conception of students are very innovative. One student developed virtual reality (VR) software useful in vision correction by taking advantage of VR that allows the eyes of the viewer to focus on objects in a video image, rather than on the actual screen of the goggles. Another student developed a system for smartwatches that senses the vibrations of an umbrella held by the arm wearing a smartwatch that are generated when the umbrella is hit by raindrops. The system allows for the real-time observation of exactly where downpours are occurring and turns individuals into observatories.

## Feedback Technology for Encouraging Better Behavior Change

While smartphones receive and display numerous push notifications, such as new messages and breaking news, many of these are overlooked and not acted upon. We humans are often driven by our emotions, which can make it difficult for us to remain rational in our attempt to achieve a goal. For instance, even when your fitness app sends you a notification saying that you need to go for a walk to achieve your goal of losing five kilograms, as a human being you may be tempted to not do it, making excuses such as "it's raining" or that you are simply "not in the mood."

What this means for information system designers is that simply displaying a message like "Walk for 30 minutes" cannot effectively change users' behavior.

For this reason, a research project is currently underway that explores ways to manage human attention, which involves the development of context-aware technology to identify, using AI, the best circumstances or timing for displaying notifications for each user, as well as the development of technology for generating effective wording and voice. Our major future challenge is to create a mechanism that factors in the circumstances and psychology of each user at any given time and identifies the best possible ways to present information (in terms of timing, modality, wording, strength, etc.) in order to encourage a smooth transition in user behavior.



## Profile Tadashi Okoshi

Associate Professor, Faculty of Environment and Information Studies, Keio University. M.S. in Computer Science from Carnegie Mellon University and Ph.D. in Media and Governance from Keio University. Formerly an entrepreneur in the areas of blogs, social networks, and social media, an employee for a U.S. company, and a researcher at School of Information Systems in Singapore Management University and HCI Institute in Carnegie Mellon University. Has held current position since 2021.

Please visit S-face website for details!

There are more articles and video of Tadashi Okoshi.

S-face

Search



Keio Research Institute at SFC  
Office of Research Development and Sponsored Projects,  
Shonan Fujisawa Campus, Keio University  
5322 Endo, Fujisawa, Kanagawa, 252-0882, Japan  
Tel: +81-(0)466-49-3436  
E-mail: info-kri@sfc.keio.ac.jp