FRONTEO, INC.

Developing the unprecedented dementia diagnosis support system by leveraging Concept Encoder: its proprietary NLP (Natural Language Processing) AI engine

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Founded: 2003
CEO: MORIMOTO Masahiro
No. of employees: 380
Type of Ownership: Public
Stock exchange: TSE Mothers
Security code: 2158

September 2020: Expert in big data analysis primarily in the legal tech business using its NLP AI technology, FRONTEO is applying its knowhow in the fields of life sciences and health care.
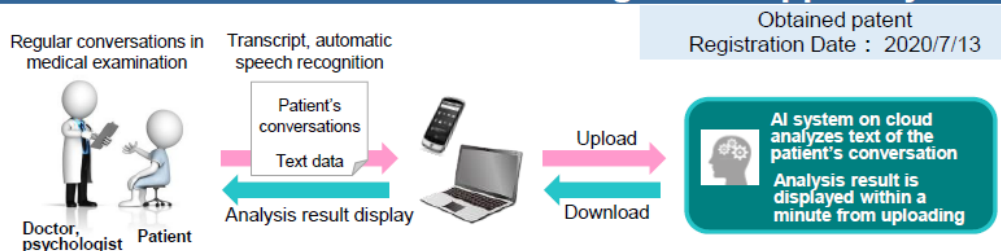
Venture Valuation (VV) interviewed TOYOSHIBA Hiroyoshi PhD, CTO Life Science AI Business Division, and YAMAMOTO Mari, Member of the Board of Directors.

VV: **FRONTEO will start a clinical trial for the dementia diagnosis support system. The system analyzes conversations and text data with Concept Encoder, its unique NLP AI engine.**

Toyoshiba: Concept Encoder applies vectorization of words and documents, which means that it decomposes natural sentences into words and then optimizes them by setting multidimensional variables for words and documents.

Doctors routinely take notes to capture important information such as patients' description of symptoms and their medical observations of relevant signs. With valuable data in cloud storage, the dementia diagnosis support AI system allows doctors to check analysis results promptly after having a 5 to 10-minute spontaneous conversation with patients.
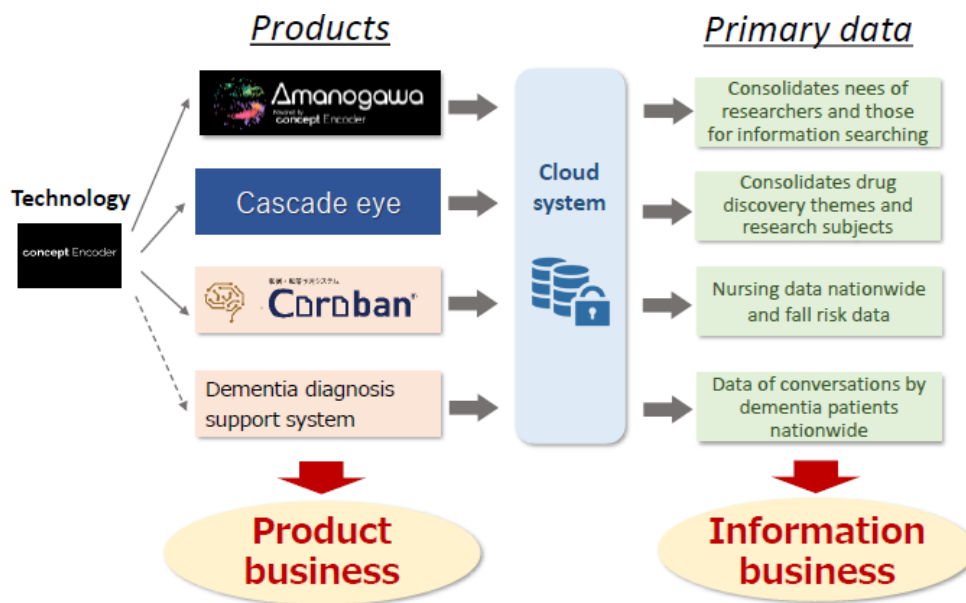

Flow of utilization of the dementia diagnosis support system

The system will aid early detection as well as monitor deterioration of the condition of dementia. Subsequently, it will save health care providers' time as well as medical costs.

VV: **In addition to the dementia diagnosis support system, FRONTEO is developing its product lines and accumulating data through cloud system.**

Toyoshiba: Here is the outline of our product and service lines.
Built on our core NLP AI engine Concept Encoder, the current applications are Amanogawa, Cascade Eye, Coroban, and Dementia diagnosis support system.

Amanogawa is the academic article search allowing researchers to visually retrieve articles from over 16 million papers in PubMed and other medical articles within minutes.

Cascade Eye analyzes information on molecules and genes related to diseases and visualizes pathway maps in 5 to 10 minutes. It shortens time for identifying candidate compounds. In order to help discover therapeutic potential from existing drugs for the Covid-19, we have constructed a pathway map. The results are available on our website.

Coroban analyzes a frail individual's electronic medical records and nursing records and predicts the risk of falls which he/she might encounter. Approved by the Japanese Society for Fall Prevention, Coroban has proven to reduce nursing workload and improve patient safety.

VV: Major IT related companies such as Google and IBM have been actively involved in the life sciences industry. What is your strategy to develop your business in the world arena?

Toyoshiba: Our AI technology demonstrates highly accurate results without requiring a supercomputer and massive data. We call it "micro AI". As far as we know, there is no competitor who has developed such a high-level algorithm for NLP AI technology in the world.

Since its creation in 2015, our Life Science AI Business Division has recruited top-notch professionals. The 20 division members are all experienced in health care and medical institutions as well as in drug discovery and development in pharma/biotech companies. We are good at identifying market needs and creating innovative products.
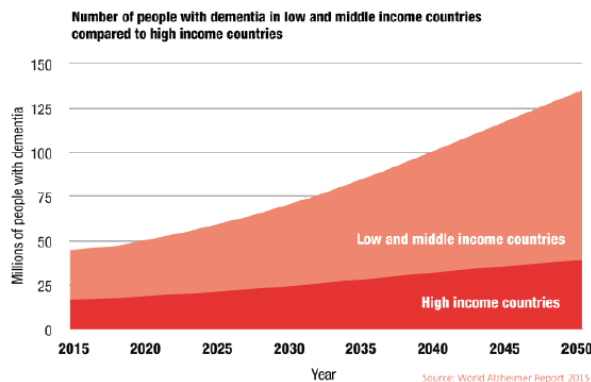
In terms of international business development, we are planning to collaborate with medical and health care experts worldwide, and to partner with pharma/biotech companies for drug discovery. Potential project proposals are welcome.

VV comments after the interview:

FRONTEO specialized initially in the data analysis business in the legal field and serving major law firms, corporate legal departments, government agencies, etc. in Asia and the world. With its expertise on data analysis with NLP AI technology, FRONTEO is contributing to enhancing the life sciences and health care fields.

The global explosion of dementia is an imminent issue for society. The current Covid-19 pandemic has been so hard for people with dementia that they lose social contacts and reduce daily activities under lockdown and restrictions. Medical professionals are concerned that their cognitive decline may be accelerated.

The graph shown below[1] is the estimated evolution of the number of people with dementia in the world.

Number of people with dementia in low and middle income countries compared to high income countries

Low and middle income countries

High income countries

Millions of people with dementia

Year

Source: World Alzheimer Report 2015

In 2020 the number is expected to be around 50 million individuals and it will increase year by year. Especially in the low and middle-income countries, the increase is projected much faster. The world is confronting social and economic

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[1] https://www.alz.co.uk/research/statistics

difficulties to cover medical and health care costs that are estimated to be around 1 trillion USD in 2018[2].

Despite efforts of several pharmaceutical companies, currently no cure is available. It is said that the most promising new therapies will have only a minor impact.

Japan, the country with the largest elderly population in the world (almost a third of its population is over 65), has, as a result, the highest percentage of people with dementia[3]. As The Economist, an international weekly newspaper, points out[4] "How Japan copes with a problem that every country will have to confront is instructive." FRONTEO will certainly make intelligent solutions available.

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Venture Valuation specializes in independent assessment and valuation of technology-driven companies in growth industries, such as the Life Sciences (Biotech, Pharma, and Medtech), ICT, Femtech, Nanotech, Cleantech and Renewable Energy. In addition to valuation products, Venture Valuation offers high-quality, focused information services like the global business development database, Biotechgate.com and this *"Let's Interview Series"* with companies with interesting technologies and services. We select and interview thriving companies and organizations all over the world.

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[2] https://www.alz.co.uk/research/statistics#:~:text=Someone
[3] https://www.oecd-ilibrary.org/docserver/health_glance-2017-76-en.pdf?expires=1600774905&id=id&accname=guest&checksum=03027C01A18DC44D400108844D182A9C
[4] "Special report Dementia" August 29th, 2020 issue