VOICE ANALYSYS OPENS THE DOOR TO THE FUTURE HEALTH SOCIETY

## Dept. of Voice Analysis of Pathophysiology , The University of Tokyo

We are developing techniques to enable disease monitoring and detection by voice analysis. Voice analysis is non-invasive and low cost, because it does not require special measuring instruments and reagents, and it is easy to continuously use in the home and medical front lines. In particular, if we can provide objective indicators to some mental / neurological diseases that have relied on subjective judgment so far, utility value will increase. We have already reached the practical stage for voice monitoring of stress and depressive symptoms. Currently, we are further expanding our target diseases to dementia, Parkinson's disease and so on.

The human machine interface has evolved from the keyboard, through the mouse, to the touch panel. And now the voice is drawing attention as next-generation human machine interface.

According to the latest estimates from WHO, more than 300 million people are now living with depression, an increase of more than 18% between 2005 and 2015. Also, depression is not a problem only for generations of work.

Global prevalence of depressive disorders, by age and sex (%)
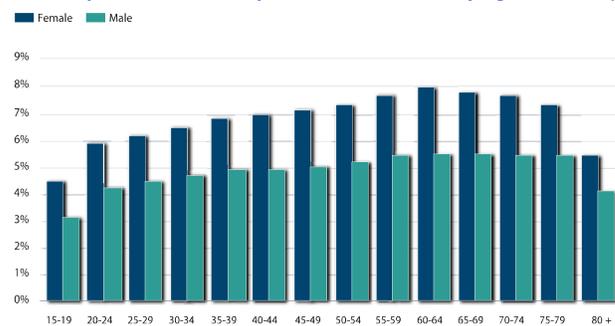
Source: Global Burden of Disease Study 2015 (http://ghdx.healthdata.org/gbd-results-tool)

Dementia is the most problematic disease in the aging society. Dementia and senile depression are highly merging with each other.

The growth in numbers of people with dementia (millions) in high income (HIC) and low and middle income countries (LMIC)
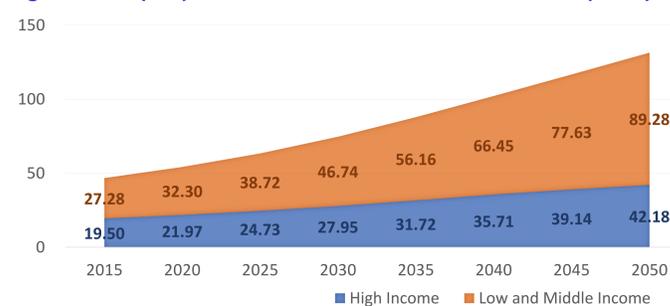
Source: World Alzheimer Report 2015 (https://www.alz.co.uk/research/WorldAlzheimerReport2015.pdf)

So far, we've been focused on detection of stress and depression by voice analysis, and reached to a certain stage of development, therefore now we expand the scope of research into dementia and Parkinson's disease. We will expand that subject further in the future. Our technique installed on personal devices continuously monitoring health will give early notice, promote behavior change of individuals, and consequently realize a long and healthy of individuals.

Our technology does not require special equipment. Recording devices that use voices everyday like smartphones are enough. In recent years smartphones have been spreading not only in developed countries but also in developing countries at astonishing speed. This promises to be able to receive cheap and noninvasive healthcare services anywhere in the world using our technology. The problems of depression and suicide related to stress, and the arrival of an aging society are global problems, and the target diseases that we are developing systems cover a wide range from young people to the elderly. That is, promote a healthy life on all stages.

Monitoring by voice of stress and depression symptom has reached the practical stage, and commercialization in Japan is proceeding as well.

MIMOSYS
Mind Monitoring System

Voice analysis for estimation of severity of depression and Parkinson's disease evaluated by doctors
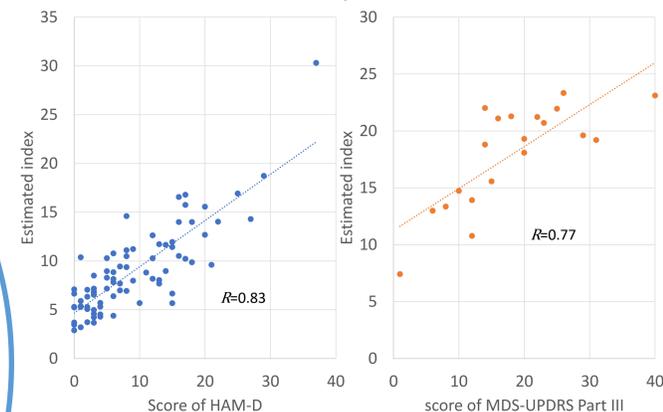

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(The results about dementia are coming soon.)

In theory our technique is not affected by the language. However, there is no evidence to show it, so verification in multilingual is necessary.

Also, algorithms for dementia and Parkinson's disease are approaching completion, but further extensive verification is required. Similarly, verification is necessary not only in Japanese but also in other languages.

Roadmap for achieving our vision
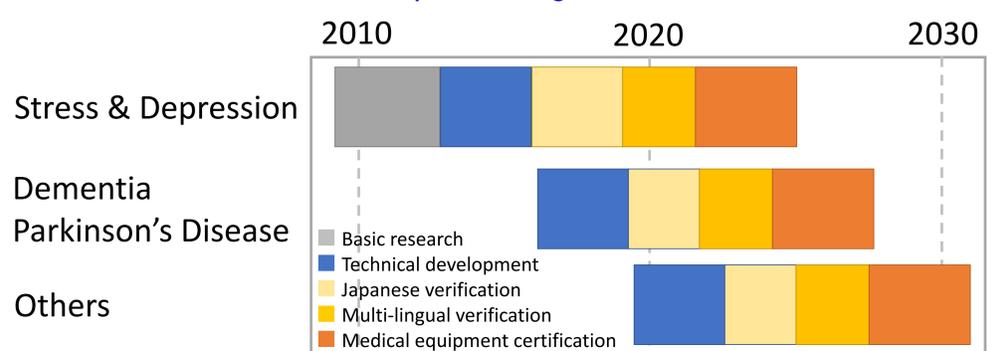
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