



## Case Study

# AI in Geriatrics: Faster and More Accurate Physical Assessment



### Country

Japan

### Domain

Healthcare

### Challenges

- Japan's aging population is putting a strain on healthcare.
- The country's medical resources are dwindling.
- How to quickly detect geriatric diseases in physical assessment while releasing the burden from doctors and nurses.

### Solution

An AI system that analyses basic physical movements to help detect early signs of functional immobility, joint conditions, and strokes based on the test records of:

- Mobility.
- Balance.
- Leg strength.
- Hip-pain sensitivity.

### Benefits

- Faster evaluation as doctors' attentions are drawn to cases flagged by the system.
- Improved accuracy: from 80% before utilizing AI to 95% after utilizing AI.
- Release medical efforts from repetitive tasks.

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# Eldercare in Japan and a Company's Determination for Improvement

Japan's aging population is  
putting a strain on healthcare.

The country's medical  
resources are dwindling.

## How to quickly detects geriatric diseases in physical assessment while releasing the burden from doctors and nurses?

Japan's continuously aging population has long been considered as a strain on the country's healthcare industry. Having more senior citizens means that healthcare systems must take care of a growing number of elderly patients every year.

Additionally, due to the characteristics of the industry, Japanese patients are free to meet any physician they want without reference letters.

Therefore, they tend to see doctors quite often. Japanese people have **13 medical consultations per annum<sup>(3)</sup>**, twice and three times as much as patients from other developed countries. This naturally puts tremendous stress on healthcare service providers to check, diagnose, and treat more and more patients.

The stress of an aging population is further exacerbated by the shrinking of medical personnel in the sector, such as nurses, aid-men, physicians, and geriatricians.





**A client of ours in Japan was explicitly passionate about utilizing technologies to improve healthcare services. They observe that as the population is getting older, the healthcare industry must find a way to both speed up detecting common diseases before they happen to improve the well-being of elderly patients and release the burden off doctors and nurses.**

# Artificial Intelligence to the Rescue

An AI-powered system to detect the diagnosis of some common conditions in old age like:  
Functional immobility and vestibular issues, Alzheimer's Disease, Arthritis problems, Stroke

The client has collaborated with FPT to develop an AI-powered system to detect physical problems on elderly patients, which can contribute to the diagnosis of some common conditions in old age like:

- Functional immobility and vestibular issues which can causes falls
- Alzheimer's Disease
- Arthritis problems
- Stroke

The AI system detects the physical movements of an individual, records, and results in the fundamental analysis; also, relative treatments are sent to geriatricians/ doctors.

Deployed on both desktop and mobile apps, the system is operated by one person who is also in charge of instructing the patients. Cameras which are embedded with AI computing devices record the patients' motion, focusing on some basic physical movement tests, including standing, walking, sit-stand intervals. These tests can help doctors/geriatricians/physicians to assess different patients' health conditions:



- Mobility.
- Leg strength and endurance to detect signs of joint conditions.
- Balance.
- Hip-pain sensitivity and postural steadiness to detect signs of a stroke.

# Artificial Intelligence to the Rescue

An AI-powered system to detect the diagnosis of some common conditions in old age like: Functional immobility and vestibular issues; Alzheimer's Disease; Arthritis problems; Stroke

The patients are instructed to perform their tests in the physical room in front of the cameras with assistance from nurses. Record of patients' movement is run through an AI model that:

- Detects body poses (by extracting body points);
- Detects objects (by detecting marker);
- Removes motion noise by utilizing Butterworth filter;
- Finds out the maximum local spot for counting the tester's footsteps;



All of the detected details are stored as a dataset for relative patients, which later on is analyzed and benchmarked against a pre-defined comprehensive evaluation criteria scheme for each type of test. **The system will highlight patients who show signs of having troubles during the tests.** Geriatricians then evaluate the analyses to decide next step treatments for them.

# One Step Closer to Enhancing Healthcare

Fast evaluation by shortening testing time.

High Accuracy Rate.

Reduces Effort during the Test.

## Fast evaluation for geriatricians by shortening testing time

As motion data of the patients are recorded and roughly scored based on a benchmarking scheme, geriatricians/physicians now have a much faster mechanism for decision-making. Doctors can focus more on unusual cases that the system notifies and can cross-check anytime by revisiting the recorded data.



## High accuracy rate

Misleading/biased assumptions are unavoidable in any examination. The new system minimizes these risks by utilizing a scoring scheme for each evaluation. The accurate rate of the AI - system's analysis & assessment is at 95%, a considerable improvement from the before-deployment rate of 80%.

## Reduces effort during the test

The new system significantly reduces the number of medical personnel involved in the tests. The test used to be observed and evaluated by at least two observers (geriatricians or physicians) as each evaluated different criteria. Now, the new system requires one observer to both guide patients and operate the system as all results are stored and assessed later on. Also, it is no necessary for a geriatrician to perform the task as any trained personnel can operate the system.



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