DXC TECHNOLOGY | SAP Platinum Partner

AI-powered app transforms care for Parkinson's disease patients and clinicians

CUSTOMER
Parkinson's disease Spiral Analysis Project

LOCATION
Australia

INDUSTRY
Healthcare / Life Sciences

Challenge

- Data collection gap with current Parkinson's disease (PD) assessment techniques
- Need to gain optimal understanding of symptom changes to optimise medication management
- Obtaining data to accurately track a patient's 'on' and 'off' states is often limited to clinician appointments

Solution

- DXC Tele-Parkinson with SAP BTP - a mobile app with AI-enabled technology
- SAP Business Technology Platform (BTP)

Results

- Digitised solution for PD patients, carers and clinicians enables collection of spirals and associated metrics from patients outside clinical appointments
- Easily accessible and accurate data points on patients' 'on' and 'off' states
- Enables ongoing assessment for patients who live remotely, have mobility issues, or who may not be able to attend face-to-face appointments regularly
- AI-enabled technology facilitates optimal PD patient management and treatment plans enabling an improved patient and clinician experience

AI-powered app transforms care for Parkinson's disease patients and clinicians

A solution to enable remote monitoring of Parkinson's disease (PD) symptoms is set to become an essential evolution of disease-specific clinical decision support software in Australia.

"The biggest ongoing challenge is achieving adequate symptom control throughout the day."

— Dr Yun Hwang
Neurologist

Working with a team of clinicians led by Neurologist, Dr Yun Hwang, DXC Technology and SAP are helping deliver a digitised solution for PD patients, carers and clinicians, which includes a mobile application that supports the collection of hand-drawn spirals and associated metrics from patients outside of clinician appointments.

About Parkinson's disease

PD is a progressive neurodegenerative disorder characterised by motor features, including slow movements, rigidity and tremors.

Symptoms usually emerge slowly, and as the disease worsens, problems may also arise with cognition, behaviour, sleep, and sensory systems.

It is the second most common neurodegenerative disorder after Alzheimer's disease, with more than 10 million people worldwide living with PD.

While there is no cure, treatment aims to reduce the effects of the symptoms and getting medication dosages right can significantly improve a patient's day-to-day life.

Challenge

According to Dr Yun Hwang, Neurologist and a PhD candidate at the University of Sydney's Brain and Mind Centre, one of the major tasks for clinicians is tracking the symptom fluctuations of PD patients to determine their condition and optimise their medication regime.

"Symptoms of PD include slowed movement, tremors, and difficulty with walking and speech," says Dr Hwang. "The biggest ongoing challenge is achieving adequate symptom control throughout the day."

Both patient and clinician experiences and outcomes will benefit from using the solution. It simplifies PD patients' self-reporting and symptom management processes by leveraging digital technology.

"However, obtaining the data to accurately track a patient's 'on' and 'off' states is often limited to clinician appointments or through patients self-reporting their symptoms," explains Dr Hwang. "This prevents neurologists from gaining an optimal understanding of these states to benefit patients and optimise medication management."

'On' states refer to when a PD patient's medication works effectively, and they experience optimal mobility and energy to function. In contrast, 'off' states refer to periods when the efficacy of the medication wears off, and a patient's symptoms worsen, potentially becoming debilitating. Without accurate data, devising effective treatment plans to move PD patients into the desired 'on' state more frequently is complex.

"This difficulty is heightened for patients who live remotely or have mobility issues who may not be able to attend face-to-face appointments regularly," Dr Hwang explains. "Asking patients to track their symptoms manually between appointments is also challenging, as the frequency of self-reporting is often contingent on the severity of the symptoms being experienced."

He says one established method that can be utilised by clinicians to demonstrate a patient's symptom control objectively is asking them to write or draw a spiral shape using pen and paper.

Solution

In 2020, the Central Coast Local Health District (CCLHD) approved a University of Sydney research project entitled the 'Parkinson's disease Spiral Analysis Project', to deliver a solution for PD patients, carers and clinicians.

Neurologists and clinicians from CCLHD worked alongside SAP, DXC and participating patients at the Gosford Hospital site to refine and test the solution. The goal was to provide more easily accessible and accurate data points pertaining to the 'on' and 'off' states of PD patients, leading to improved patient and clinician experiences and outcomes.

The mobile application is designed for PD patients to log their symptoms and spiral drawings, which are uploaded and sent to their neurologist. Patients also enter additional information, including their blood pressure, current sentiment and whether they have taken their medication.

This data is then passed onto the artificial intelligence (AI) engine to determine a patient's "on" or "off" status. This status, along with the data points collected by the patient app, is integrated into the desktop view of the solution for clinicians to devise more optimal PD patient management and treatment plans. This AI engine will be leveraged to enable continuous machine learning and improved data insights to support clinician understanding of causal factors and treatment options for individual patients.

The solution is built on the SAP Business Technology Platform (BTP) for deployment on desktop for clinician use and mobile for patient use. SAP focused on creating the AI model and algorithm to power data point analysis, which they have OpenSourced, and leverages ancillary services to integrate with SAP BTP, while DXC concentrated on solution and user interface development for data collection and project delivery.

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>
> — **Simon Grace**
> Business Architect, SAP Australia and New Zealand

Says Dr Hwang: "The project excites me because it will allow clinicians to manage patients more effectively and deploys the latest artificial intelligence technology in clinical practice."

Future intended capabilities of the solution include the ability to set reminders, the use of digital calendars to monitor specific actions, the sharing of updated medication schedules and providing continuous monitoring of PD symptom fluctuations, all aimed at improving the quality of life and treatment for PD patients.

Results and benefits

The solution marks a leap forward in innovation for digital medical technologies.

Simon Grace, Business Architect for SAP Australia and New Zealand, says the potential of the solution could see it used for multiple applications.

"Because of its scalability, it could become the foundation of a dedicated digital architecture for telehealth assessments. This type of mobile application and dual clinician/patient interface could also be used to monitor

and manage other diseases such as Alzheimer's disease."

Implementing continuous machine learning within the solution is designed to support the work of neurologists by providing exponentially more refined data insights to inform diagnoses and treatment plans.

Both patient and clinician experiences and outcomes will benefit from using the solution. It simplifies PD patients' self-reporting and symptom management processes by leveraging digital technology. For patients who live in remote areas or have mobility issues, it will improve access to their neurologist and may reduce the need for a face-to-face appointment.

For clinicians, this solution delivers more data points capturing a patient's 'on' and 'off' states to improve medication management and assist in creating more effective treatment plans. Neurologists gain access to critical patient data through the clinician user interface more frequently. They can trust the high accuracy of the AI algorithm to assess the spirals, allowing them to focus on individual patient needs during clinical appointments.

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>
> **— Dr Yun Hwang**
> Neurologist

Dr Hwang concludes, "This app allows patients to convey a snapshot of their daily symptom fluctuations over many weeks to their treating doctors, who receive an overview of each patient's symptom control over, say, a month at a glance to help with their treatment decision-making process.

"I am very excited to be working with SAP and DXC on one of the first projects to deploy AI to assist in clinical decision-making and improving the lives of patients with this debilitating disease."

Warren Vonghack, Development and Integration Practice Manager for DXC Practice for SAP, says the solution is empowering lives, one tap at a time.

"Our PD patient and clinician application will bridge the gap between technology and hope. It will bring support and information, and help develop a community of care and understanding."

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