ANNEXE: Healthcare InnoMatch 2022 Finalists' Project Synopses

CoNEX Healthcare
Project Name: PreSAGE®
Summary PreSAGE® is the only privacy-preserved image-based solution widely adopted in hospitals, nursing homes and now into residential homes. Powered by artificial intelligence and predictive analytics, PreSAGE can now accompany patients from hospital to home. This enables a continuous care cycle as patients recuperate and age in place in the comfort of their homes. Predicting and preventing falls, PreSAGE empowers clinical teams with data and insights into living patterns, behaviour changes, and even nocturnal activities that can guide interventions and rehabilitation. What is the problem? Falls at home is a very common occurrence, with many going unreported. Some fall multiple times a day until a serious fall occurs, requiring emergency response services and hospital admissions. More than 85% of elderly admissions into emergency departments are due to fall injuries at home. While there are numerous fall detection solutions with varying accuracy levels, these do not prevent fall occurrences that continue to take up valuable healthcare resources. PreSAGE aims to address this – fall prediction that enables clinical teams to intervene and thus prevent falls. Moreover, elderly monitoring at home has multiple challenges, primarily due to compliance and privacy. This is another gap PreSAGE addresses with its continuous, non-intrusive and privacy-preserved features. Value proposition PreSAGE empowers clinical teams with insights into patient recovery and health statuses to provide timely and effective personalised care and intervention, reducing unnecessary visits and utilisation of resources. Furthermore, patients can possibly be discharged earlier from hospitals to continue their recovery at home, where they can continue receiving 24/7 remote care. In case of adverse events, real-time notifications on patient conditions can also be sent to clinical teams for immediate intervention. The impact Preventing falls will reduce healthcare resource utilisation, from emergency response services, overloading ED visits, and taking-up valuable bed space in hospitals. Elderly patients already in hospitals can possibly be discharged earlier when they can continue their long-term recovery at home, reducing reliance on valuable healthcare resources. Clinical teams are now armed with insights into patients' recovery journey at home, where they can provide personalised and targeted care when needed, saving time from unnecessary treatment or tedious work such as history taking. Beyond fall prediction, it is even possible for PreSAGE to venture beyond fall prediction into observing dementia or frailty progression.


PreSAGE

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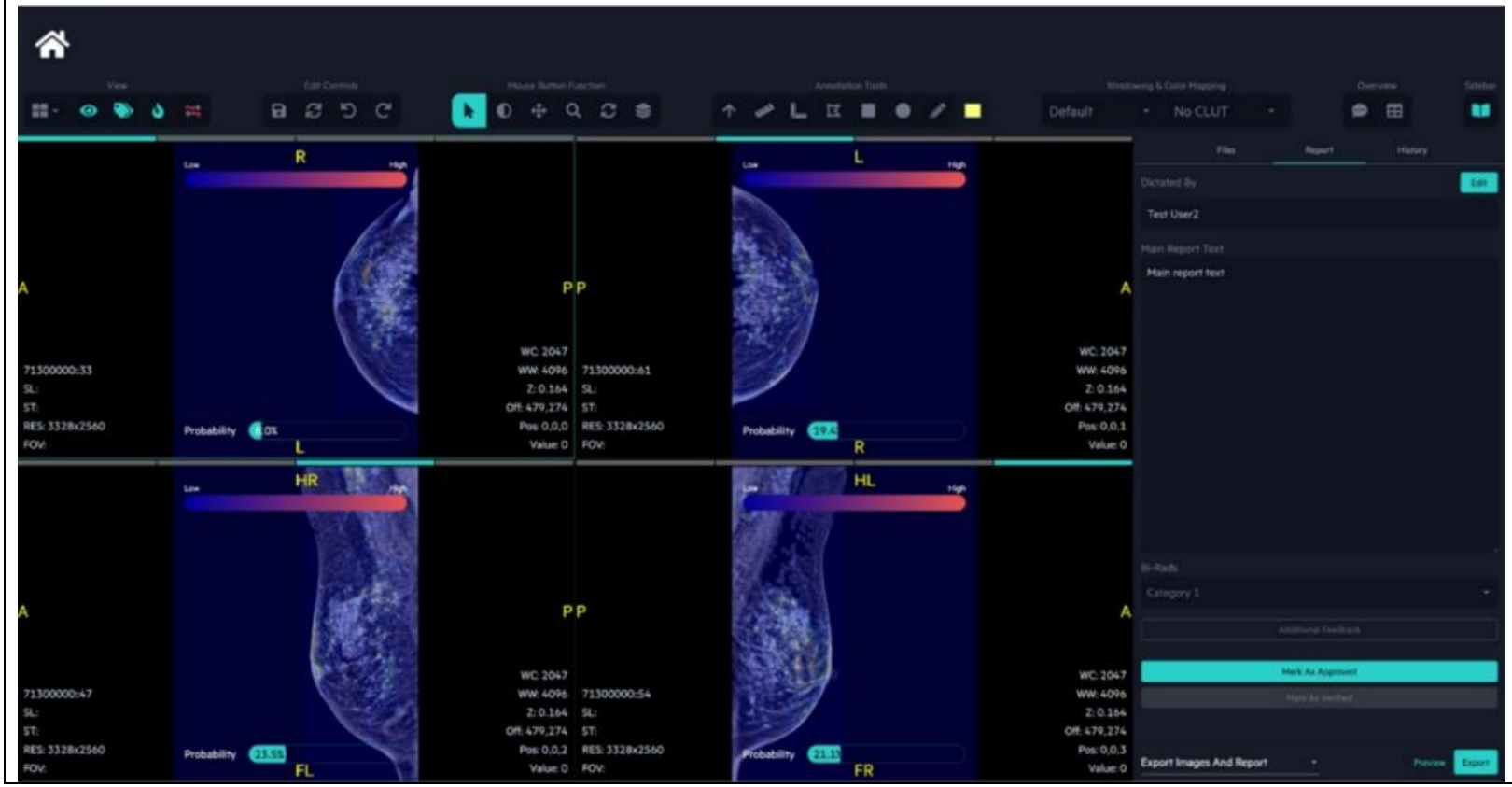
FathomX
Project Name: FxMammo
Summary FxMammo is an AI assistant that analyses mammograms to assist early detection of breast cancer. With deep learning technologies and clinically validated parameters, the software improves both the efficiency and accuracy of existing methods, thereby reducing the burden on clinicians. The technology utilises an algorithm that gathers information from four AI models, each analysing one of the four views obtained from the digital mammogram scan. The product is developed following international standards like IEC62304, IEC62366, and ISO14971. It is also approved by the Singapore Health Sciences Authority as a Class B device. What is the problem? There is a difference in quality and expertise between junior trainee radiologists and senior radiologists specialising in reading mammogram images. This difference is evident in a clinical setting where junior radiologists need approval from a senior radiologist when reading a mammogram image during breast cancer screening/diagnosis. However, an ageing population in Singapore would mean more women will need to go for a mammogram. Currently, approximately 200,000 women are going for screens, but there are only about 20 breast specialised radiologists. There is a capacity gap between the number of trained qualified radiologists and the number of patients. Value proposition FxMammo aims to serve as an AI Assistant to help ease the workflow by serving as a tool with a high accuracy level. It empowers a junior radiologist to use the tools to make the right decision. This allows the capacity issue to be resolved in dealing with many mammogram screens. The technology has undergone multiple clinical validation studies to prove its accuracy and is in line with global standards. It has a specific niche focus on reading dense breast datasets that are more prevalent among Asian Women. The purpose of test bedding is to set up and monitor several milestones in a local healthcare cluster by tracking key clinical milestones in the form of false recalls, cancer detection for interval cancers and accuracy measured by AUC for a junior radiologist using the AI. FathomX has strong experience in integration, test-bedding and deployment with risk management processes set in place to mitigate errors and will be able to execute a smooth test bed of FxMammo across this project. The impact • Minimum of 10% reduction in false positive rates among junior trainee radiologists • Minimum improvement of 10% of cancer detection (sensitivity) among junior trainee radiologists

- Overall performance (ROC-AUC) of a junior trainee radiologist equipped with FxMammo AI is equivalent to that of a breast imaging specialist (no statistically significant differences will be found).

Successful tracking of these milestones would mean that the AI tool performs well to augment a junior radiologist in a Singapore setting and can be used to augment the process of breast cancer screening/diagnosis in Singapore.



ANNEXE: Healthcare InnoMatch 2022 Finalists' Project Synopses

Kinexcs
Project Name: KIMIA Recovery Management System
Summary KIMIA Recovery Management System is a post-surgical recovery management product comprising a smart wearable sensor device built upon patented and proprietary sensing technologies. It allows remote monitoring of the joint condition and provides regular live feedback to patients. It comes with an AI-based digital therapist that allows for guided at-home exercises and proprietary algorithms used to detect complications during the post-surgical recovery period (such as wound infection, excessive discharge, or bleeding). What is the problem? There is a chronic need for home-centric post-operative care that is engaging and effective, reduces post-surgical complications, and cuts down the number of hospital visits without adversely affecting patient outcomes. The solution promises to reduce the required number of post-operative outpatient visits by up to 80%/patient (from 5 post-operative visits to 1 visit), provide tools for remote and early detection of post-operative complications such as wound infection/excessive discharge or bleeding or joint stiffness, thereby reducing the risk of such complications from progressing. In addition, deliver a possible improvement in patient compliance, recovery experience and outcomes. Value proposition The innovation will reduce the number of post-operative clinical visits and save costs for payers while improving clinical outcomes, patient compliance, motivation, engagement, and satisfaction. It is estimated to save up to 80% of visits for post-surgical patients, i.e., from 5-6 post-operative visits to 1-2 trips, saving an estimated up to $600 in costs per patient. Early detection of complications is another key advantage. In a trial with Total Knee Replacement (TKR) patients at Singapore General Hospital, KIMIA Recover solution is able to detect complications such as wound infection, excessive wound discharge and bleeding in about 10% of patients and alert the care providers promptly. The impact In Singapore, a total of up to 5,000 patients undergo TKR/THR surgeries every year and will benefit from the innovation, which will enable: 1. 24-hour discharge (Enhanced Recovery After Surgery (ERAS) program) to be expanded from the current 600 patients to the entire batch of 3,000 patients at Singapore General Hospital and up to 5,000 patients in Singapore 2. Detect and mitigate costs associated with post-operative complications for a TKR patient of >$500k across 10% of patients who experience such complications 3. Enable savings of up to $700/patient by a reduction in post-operative specialist outpatient consultation visits and physiotherapy visits to zero

Globally, the KIMIA Recover solution will be scaled to benefit more than 2 million TKR patients.

ANNEXE: Healthcare InnoMatch 2022 Finalists' Project Synopses

Project Name: NuCalm®
Developed by: NuCalm

Summary

NuCalm® is the world's first and only patented neuroscience technology clinically proven to reduce stress and improve sleep quality without drugs by balancing the human autonomic nervous system. Without pharmacological intervention, side effects and compromise, NuCalm delivers preventive self-care beyond hospital walls, providing significant tangible benefits for Singaporeans to manage baseline stress and anxiety for better health and performance.

What is the problem?

Stress negatively impacts mental health, emotional control, and well-being. Medical research estimates that as much as 90% of all illness and disease is related to stress. Existing methods to address stress-related issues – including psychosocial support and medical interventions – are resource-intensive on healthcare systems and unpredictable across the population. Some national studies have found that 60-80% of primary care doctor visits are stress related.

Considering its wide-reaching impacts, stress is better managed as preventive self-care rather than institutional. Social stigmas associated with poor stress management and mental health further reinforce self-care as a meaningful mode. However, the initiation of help-seeking behaviour tends to be symptomatic, requiring any effective solution to be easily scalable within healthcare systems for a smooth transition of care.

Value proposition

- Patented – NuCalm has been awarded 2 patents, including "Methods and devices for applying dynamic, non-linear oscillations and vibrations" to elicit a physiological state change in humans.
- Safe and effective – Clinically proven. No drugs or side effects.
- Fast-acting – The benefits of NuCalm take effect in minutes.
- Predictable and repeatable results – Peer-reviewed research has consistently found that NuCalm predictably induces parasympathetic nervous system dominance.
- No habituation – NuCalm was invented to treat addiction and provide self-regulation.
- Portable and easy deployment – NuCalm comprises three easily self-administered components.
- Accelerate recovery – According to research by Dr C.K. Peng at Harvard Medical School, 20 minutes of NuCalm is equivalent to 2 hours of restorative sleep.

The impact

Anyone with a high-stress lifestyle or poor sleep quality will experience significant tangible benefits by using NuCalm to reduce stress and improve sleep quality without drugs.

Multiple studies have provided clear evidence that Singapore is a society of high-stress density. NuCalm can help Singaporeans better manage baseline stress and anxiety. When scaled, this can build towards a more stress-resilient, balanced, and healthy community and reduce healthcare system burden and cost.

Specific to patient healthcare, NuCalm has been clinically proven to provide life-changing benefits for patients facing medical anxiety (including cancer diagnosis), depression, and Post-Traumatic Stress Disorder (PTSD).

ANNEXE: Healthcare InnoMatch 2022 Finalists' Project Synopses

QuantumTX
Project Name: QTX Magnetic Mitohormesis
Summary Post-stroke disability is a major health and socioeconomic burden. Community rehabilitation improves outcomes but is arduous with poor compliance. Supplementary Muscle activation using a novel Singapore-developed muscle-mitochondria activating technology, Magnetic Mitohormesis (MM). It can supplement existing community rehabilitation programmes to improve post-stroke recovery and functional independence. What is the problem? There are 80,000 chronic stroke patients (26 new strokes every day). Two in three face chronic disabilities after 3 months, and one in two suffer chronic disabilities at 1 year. Recovery and rehabilitation are challenging, and compliance with community rehab programmes is poor (only 1 in 20 compliant after 1 year). These stroke-related disabilities cost the Singapore healthcare system $180Million annually and add a significant socioeconomic burden (3,300-4,000 hours per patient per year) to caregivers. Regular rehabilitation exercise is key to providing the necessary muscle activation and retraining to enhance the body's recovery response. The progress can be slow and discouraging for many with stroke impairments and poor functional control. Value proposition MM provides supplementary muscle activation without additional physical exercise. It can be easily deployed in the community and integrates easily into existing rehab programmes to boost muscle activation, leading to enhanced recovery outcomes. This ground-breaking technology from NUS uses safe and gentle magnetic signals to activate muscle-mitochondria and trigger localises and systemic adaptive responses similarly to exercise. Prior scientific studies have shown that MM improves muscle energetics needed for recovery and regeneration, resulting in the higher release of pro-regenerative signals from activated muscle. Community studies with hundreds of seniors have shown that 12 weekly sessions improve balance, walking speed and lower-limb strength by 14%-27%. Pilot clinical trials have shown higher muscle energetics and recovery trends of 25% faster return to baseline. The impact QuantumTX intends to work with Day Rehab Centres to integrate MM as a supplementary muscle-activation platform to improve stroke patients' post-stroke recovery outcomes and functional independence. MM Devices are easy to site, brief 10-minute sessions integrate easily with existing programmes and devices require minimum assistance to operate.

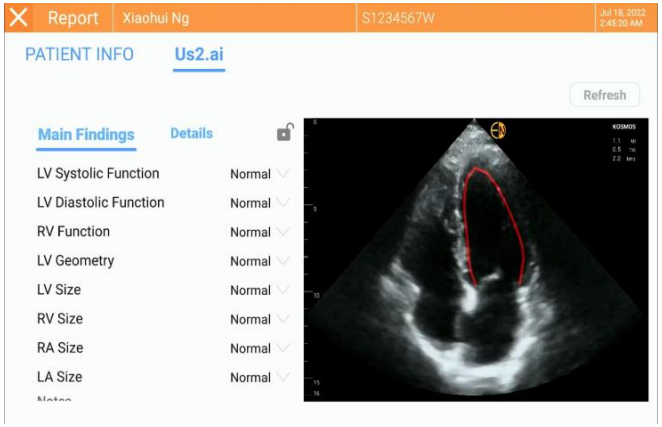
By improving the functional independence of 10% more patients with chronic stroke-related disabilities (or 600 more patients), we hope to reduce significantly post-stroke disability-related healthcare costs (~$9.8million annually) as well as reduce the significant socioeconomic burden to caregivers (2.4million hours saved annually). Further, patients with lower levels of disabilities will enjoy more healthy and active lives. Resultantly reducing their risk of developing long-term chronic diseases too.

ANNEXE: Healthcare InnoMatch 2022 Finalists' Project Synopses

Us2.AI
Project Name: Us2.AI
Summary Us2.AI is an AI-driven solution to acquire and analyse cardiac ultrasound images to diagnose Heart Failure (HF) by nurses in a primary care setting, providing clinical decision support to non-cardiac-expert medical practitioners. It is integrated with point-of-care (PoC) ultrasound devices with an AI assistant to guide the acquisition of images by novices combined with automated interpretation and serves as a one-of-a-kind solution to diagnose HF in a primary care setting at a fraction of the costs of a traditional echocardiographic exam. What is the problem? There is an urgent need for early identification and aggressive HF prevention among high-risk individuals with diabetes mellitus (DM). DM is a disease of epidemic proportions. In Singapore, the number of >40y individuals with DM will increase to ~600,000 in 2030; by 2050, 35% of Chinese and 50% of Malay & Indian males aged 60-69y will have DM. HF is among the most common long-term complications of DM and—with macrovascular disease—accounts for over half the mortality and morbidity among patients with DM. Cardiovascular complications contribute 20-49% of the direct costs of treating DM. Direct and indirect productivity loss costs among working-age adults with DM in Singapore will be US$1.87 billion by 2050 Value proposition Echocardiography remains the most used cardiac imaging modality. It is considered the primary method for assessing cardiac structure and function in the diagnosis of HF. A regular echocardiographic study takes at least 45 minutes, including 15 minutes to acquire images and 30 minutes for a full review. Staff must be highly trained, requiring at least 4-years of full-time training to acquire and interpret echocardiographic images. This reliance limits cost-effectiveness and accessibility in primary care settings. Us2.AI is the only solution that can completely automate a complete echocardiogram report with zero manual intervention on devices 1/10 the price of standard CART-based machines; in other words, it's the only scalable, practical solution available to address this epidemic at affordable price points. The impact Diabetes mellitus (DM) is a disease of epidemic proportions, with a projected increase in worldwide prevalence from 360 million in 2011 to 552 million by 2030. Asia harbours 60% of the global diabetes population (4.7 billion), with the highest prevalence in Southeast Asia. Therefore, there is an urgent need for early identification and aggressive HF prevention among high-risk DM individuals in Asia. The impact of this solution will be to deliver a low-cost, fast, full functionality and accurate, FDA and HAS cleared, patented solution that increases access to healthcare and drives productivity gains, making cardiac analysis affordable and understandable in the hands of non-specialists.


RESULTS
MAIN FINDINGS
MEASUREMENTS
DETAILS
LV Systolic Function
Normal
LV Diastolic Function
Normal
RV Function
Normal
LV Geometry
Normal


EF
A4C
KOSMOS
RV
LV
TV
MV
RA
LA
Depth
64%
Gain
Body type
TGC
TRIO
A4C
KOSMOS


Report
Xiaohui Ng
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Jul 18, 2022
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PATIENT INFO
Us2.ai
Refresh
Main Findings
Details
LV Systolic Function
Normal
LV Diastolic Function
Normal
RV Function
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LV Geometry
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LV Size
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RV Size
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RA Size
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LA Size
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