CHINOINT

SENSE CONNECT

AIOT

SENSE CONNECT

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Who is ChinoINT?

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v20210601

Customers & Solutions

IOT Smart Facility Management	Smart Site Safety System	AI + Predictive Maintenance
建築署 Architectural Services Department 機電工程署 EMSD M+ westKowloon 西九文化區 The Hong Kong Polytechnic University 香港理工大學 香港 國際機場 Hong Kong International Airport 啟德 Kai Tak Sports Park SIEMENS DSV	CLP 中電 suez Nga Ying Decoration Ltd Por Mee Factory Building	The Hong Kong Polytechnic University 香港理工大學 CLP 中電 仁安醫院 Union Hospital SIEMENS ITChannel

ChinoINT Know-How & Strengths

Hong Kong R&D

- local R&D team
- local expert support
- Chartered Engineer

Software Capability - AIOT Platform

- Complete Feature
- Deployed
- AI-integrated

Hardware Design Capability

- IOT sensor design
- Gateway design
- NRE cabability

AI & Algorithms Development

- 11 innovation patents owned by executives
- deployed 4S with AI
- deployed AI solutions at local univeristy, and government building

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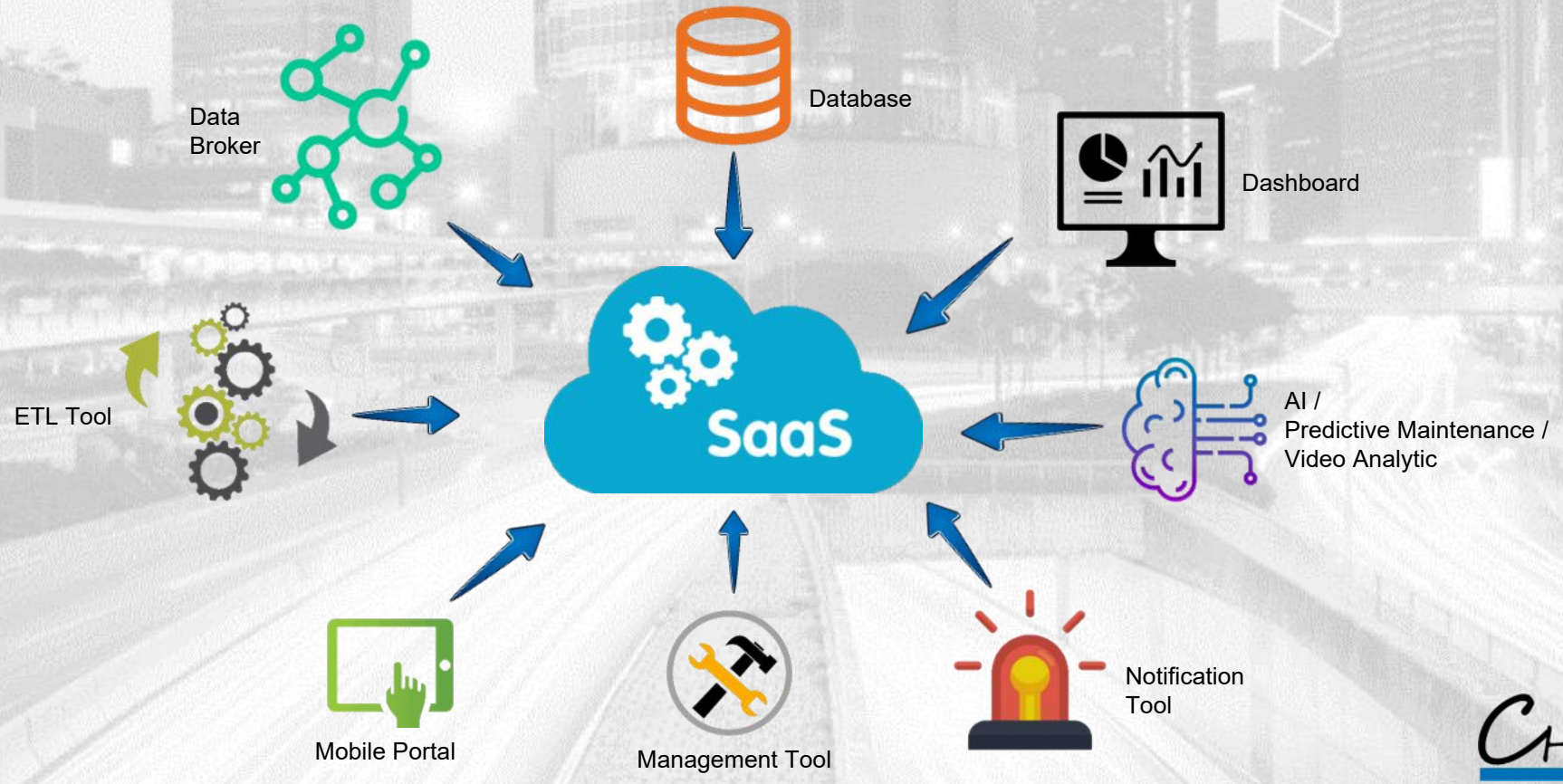
ChinoINT SaaS

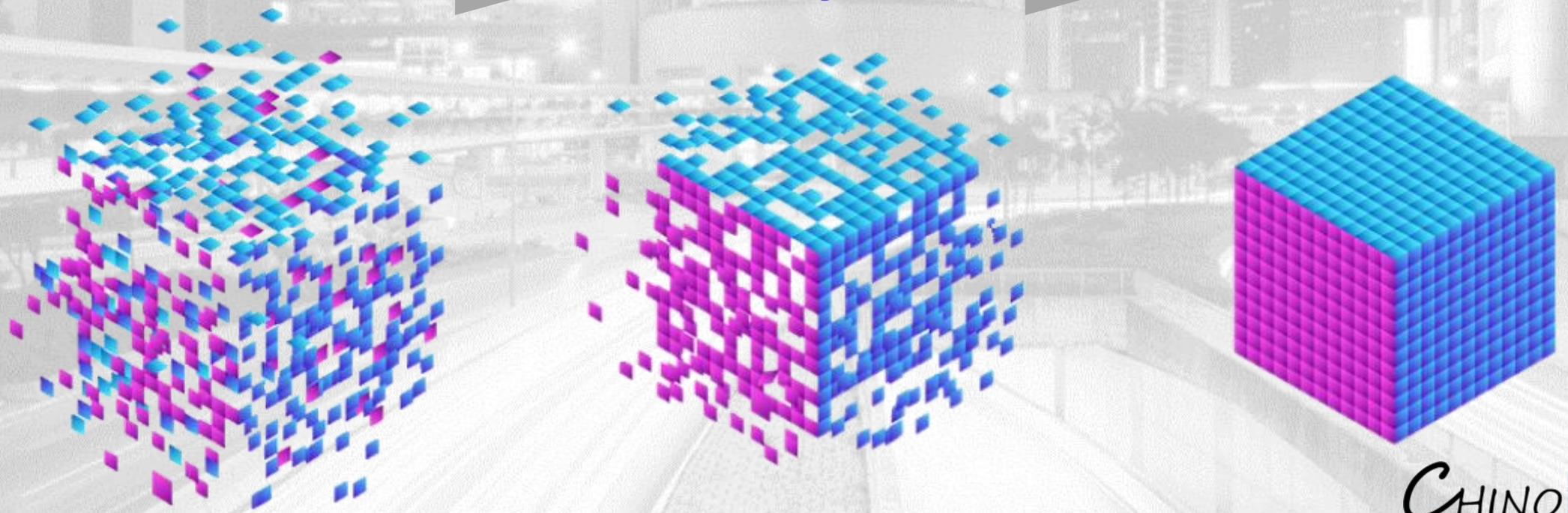
ChinoINT creates the next generation SaaS and IOT platforms.
The SaaS is a complete platform including data broker, ETL tool, Database, dashboard, management tools, mobile portal and notification tools, etc. This fulfills all your IOT needs and generates extra values to our clients.



ChinoINT Big Data Analytic

ChinoINT is the Data Expert.
Not only expert in wireless sensor design, but also in data consolidation, storage, manipulation, analytic and data visualization.
Our experts help you to drill into the hidden meaning of data, and generate insight from the data.

BIG DATA → Analytic → INSIGHT



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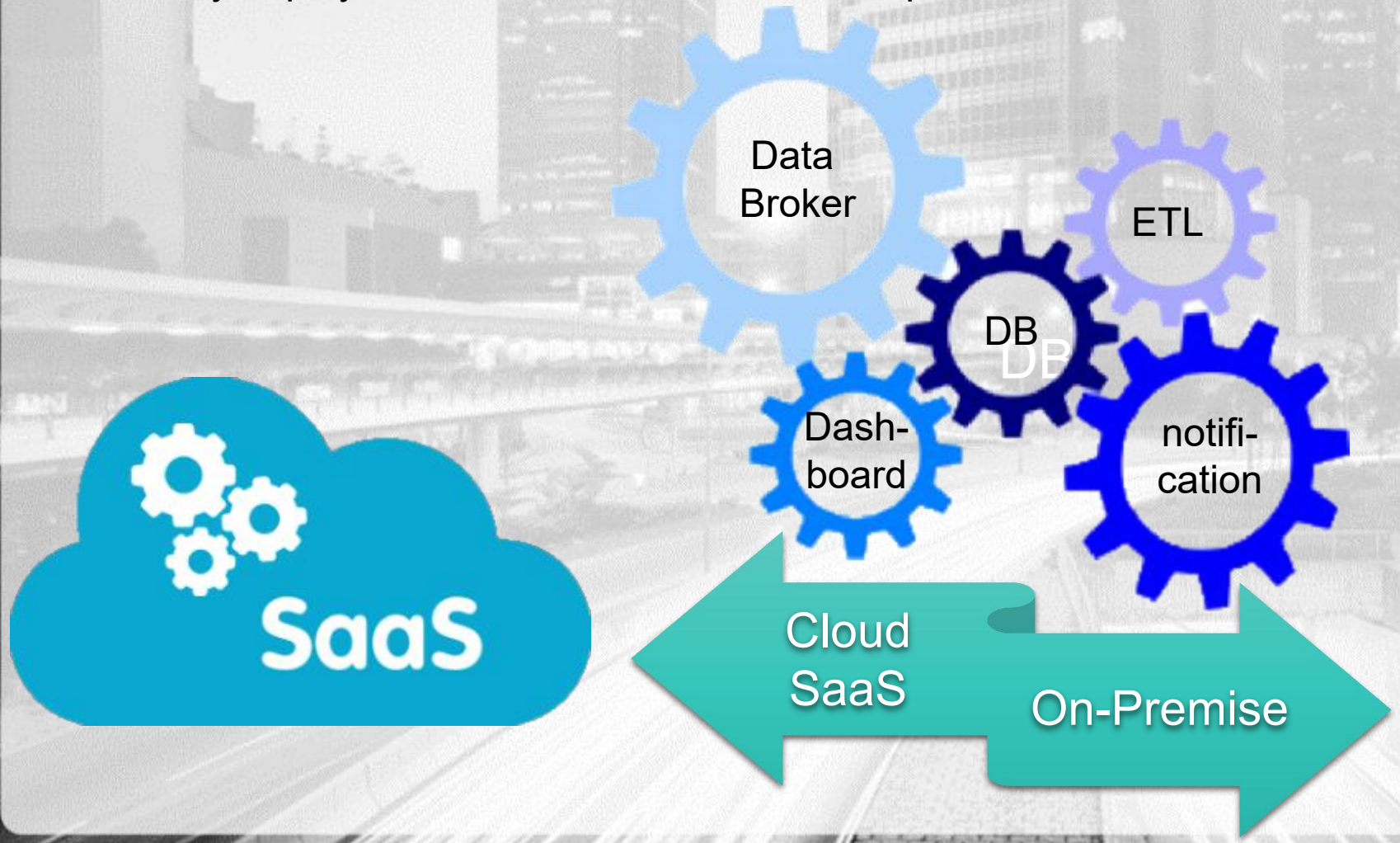
Software Platform

The Software Platform consists of Data Broker, ETL tool, Database, Dashboard and notification modules
For esay deployment, both Cloud Saas and on-premise version is available



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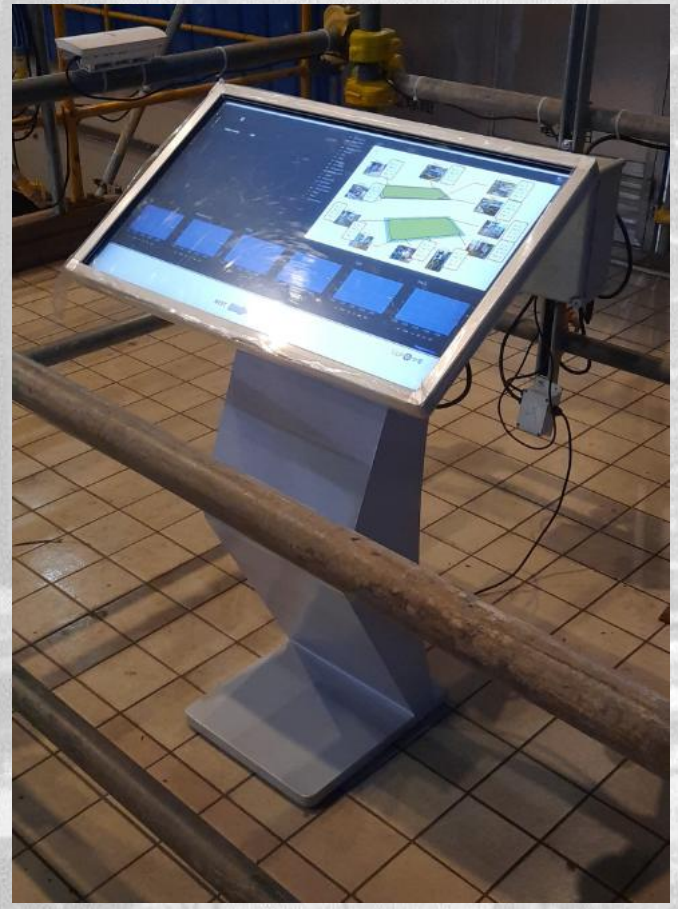
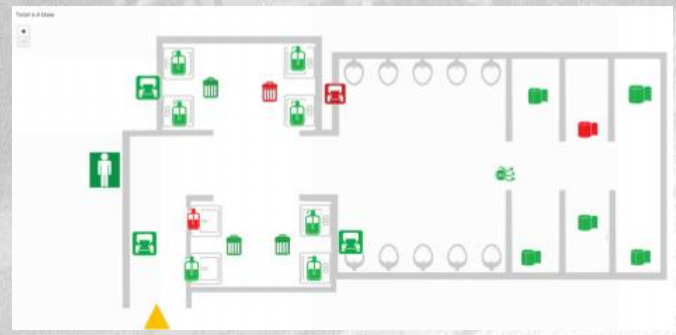
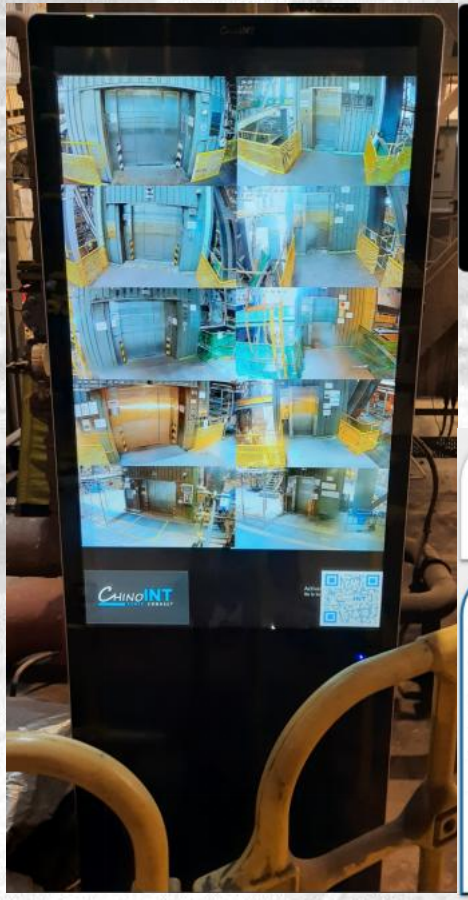
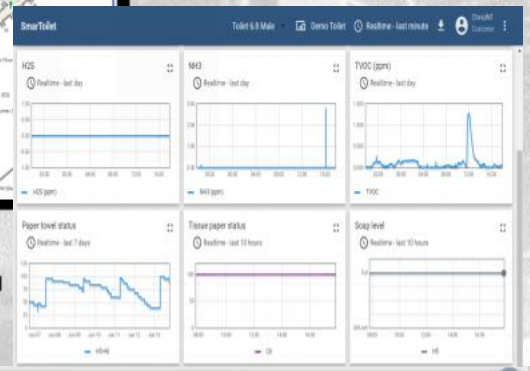
Dashboard

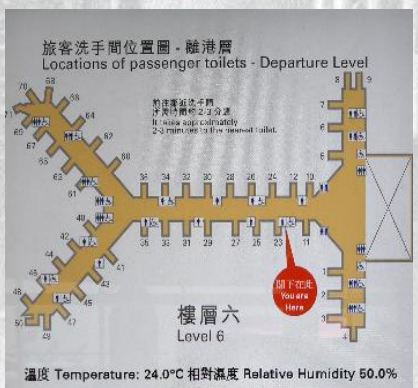
Clean and clear dashboarding is one of the key element in an IoT system. The Smart Toilet platform provides easy to use dashboard, with multi-layer user account settings. GUI Maintenance Portal is provided with the platform. Both desktop and mobile version (Android and IOS) are available.

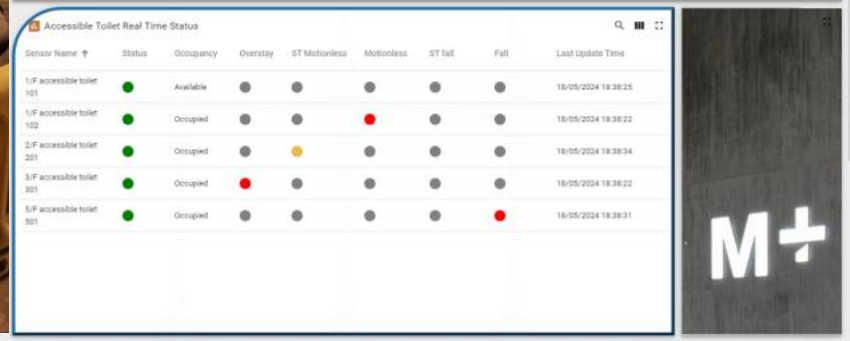












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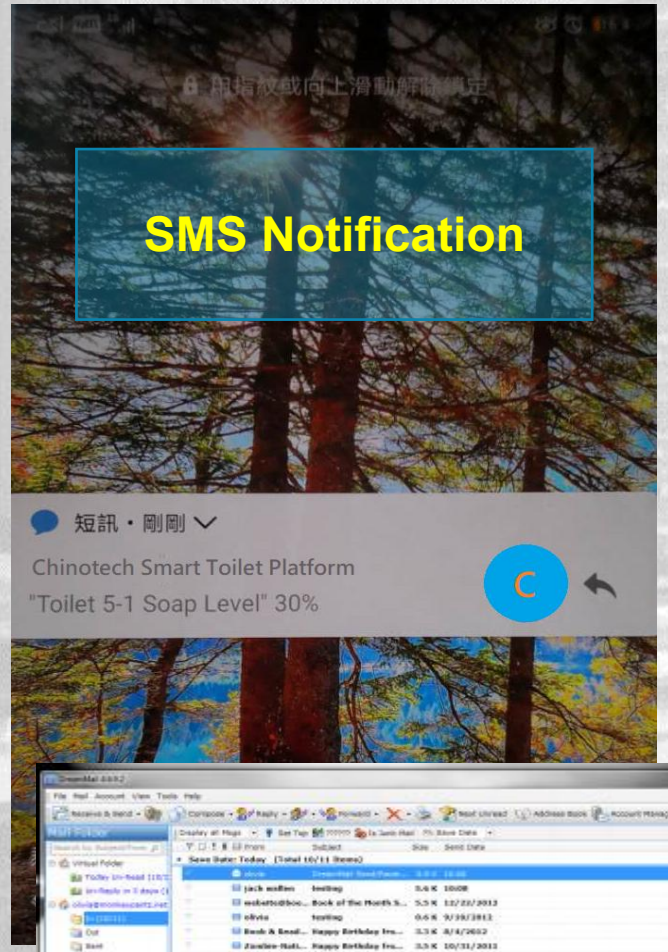
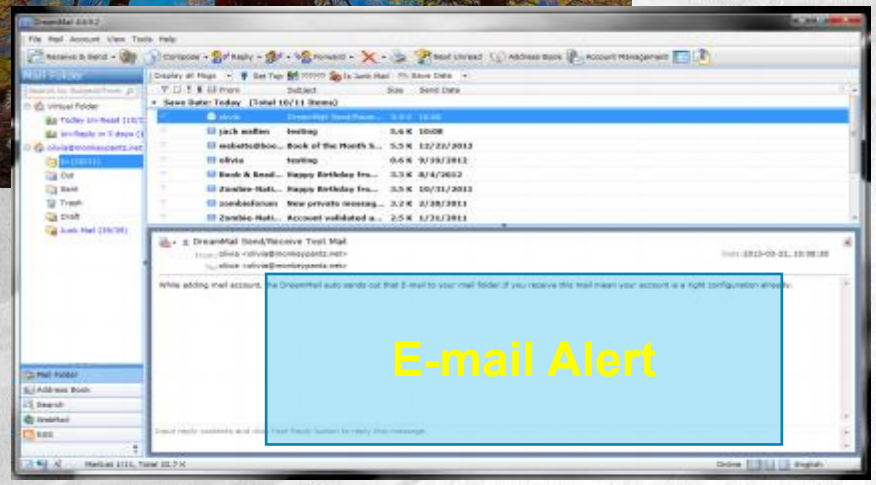
Notification

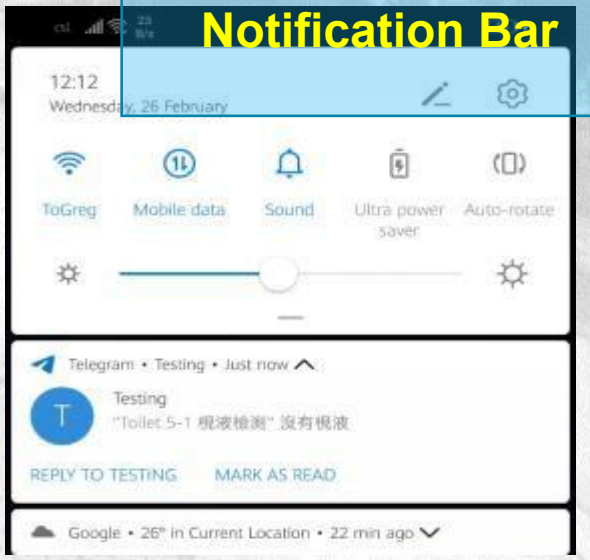
Notification is one of the crucial feature for Smart Toilet, in order to achieve on-demand cleaning and best resource utilization.

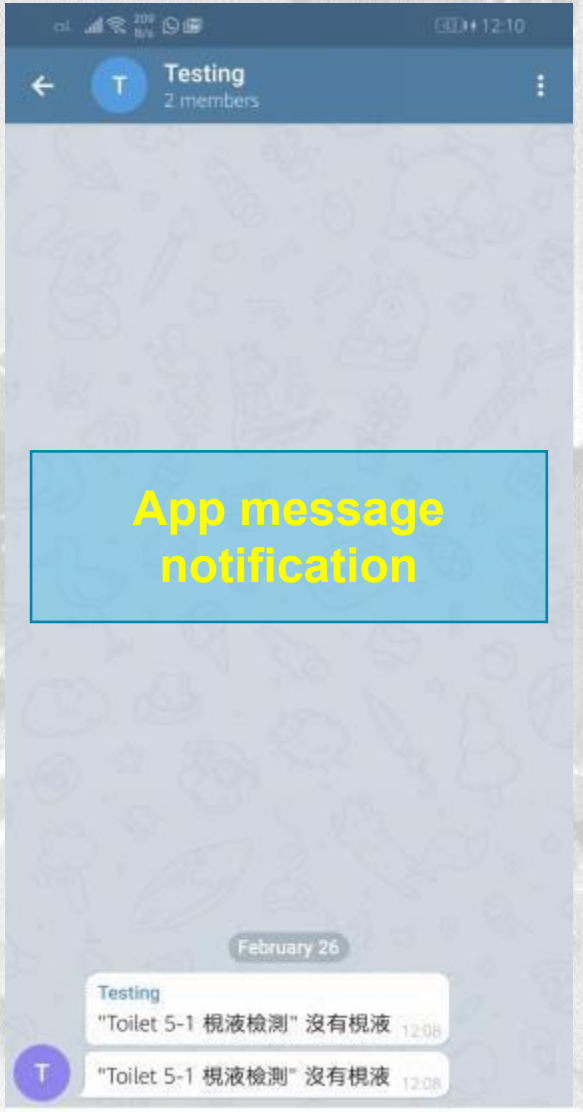
Notification can be done through app, notification bar alert, SMS and through e-mail.

App message notification can be configured as group alert, and individual alert.









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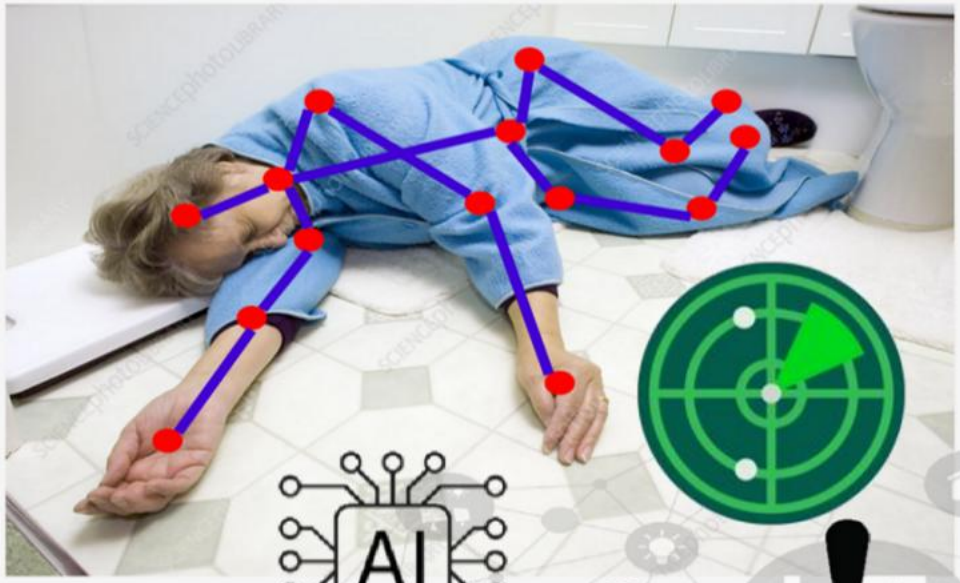
ViGiSense

A.I. Safety Monitoring Platform

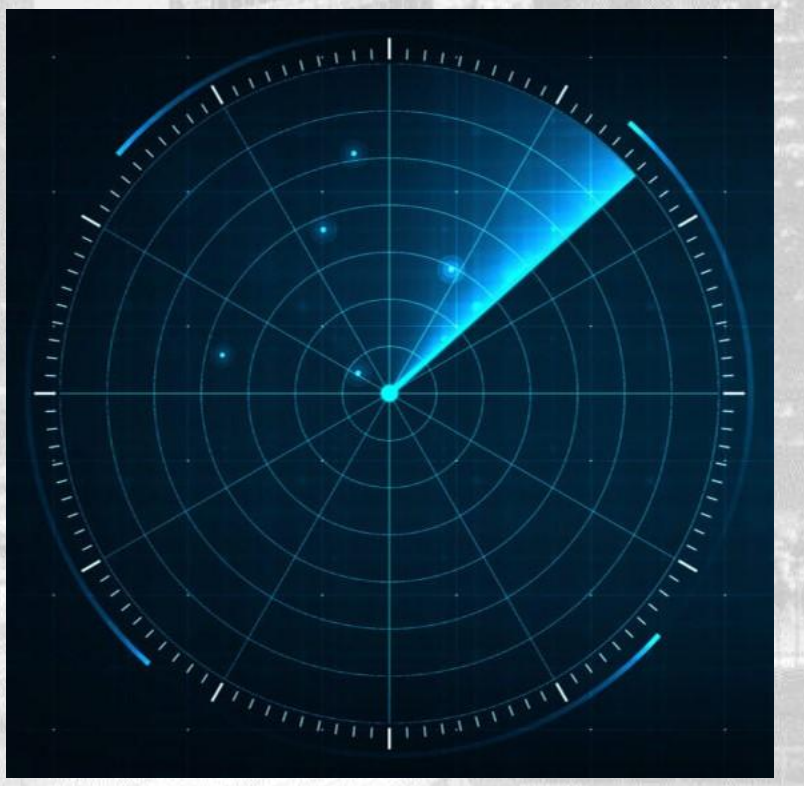
preserve your privacy while protecting you



What is ViGiSense ?

CHINOINT SENSE CONNECT

What is ViGiSense ?



Advanced Radar Technology

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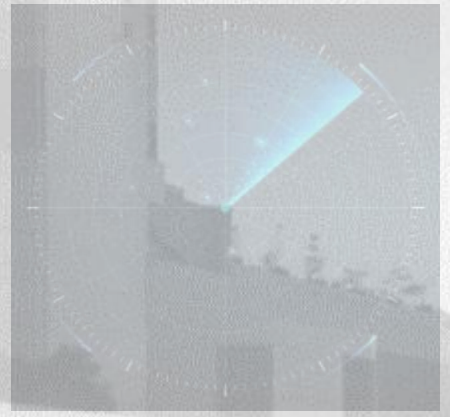
What is ViGiSense ?



Digital Signal Processing

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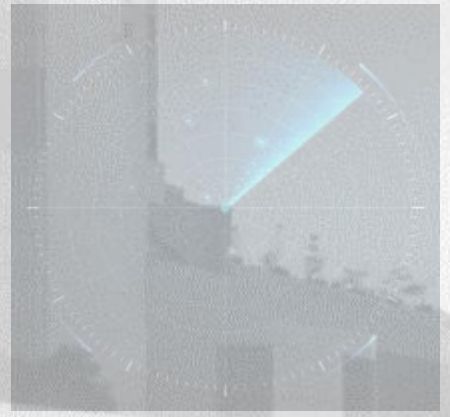
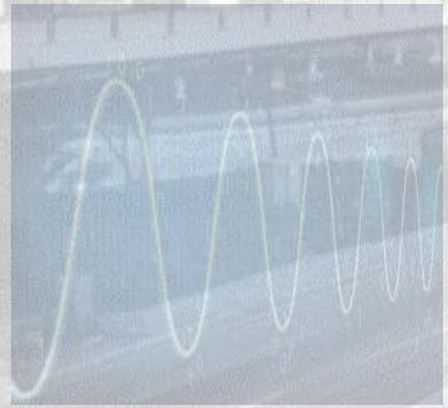
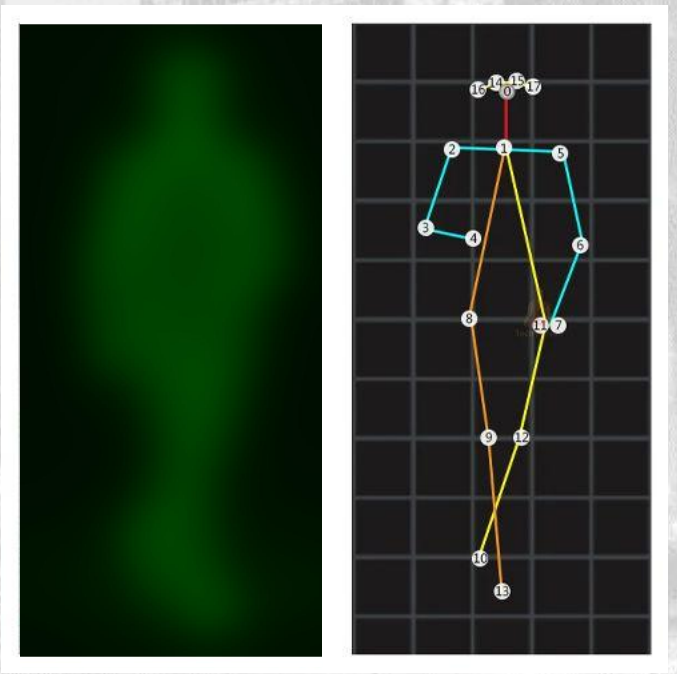
What is ViGiSense ?







Artificial Intelligence

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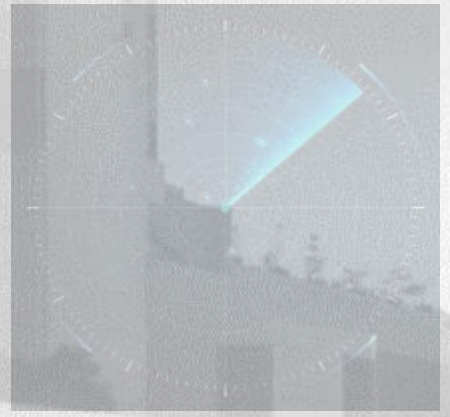
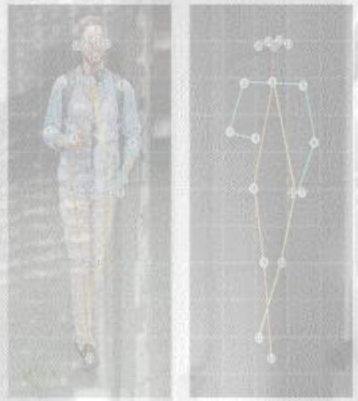
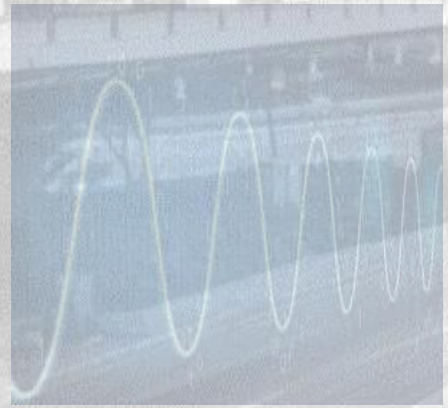
What is ViGiSense ?







Machine Learning Models

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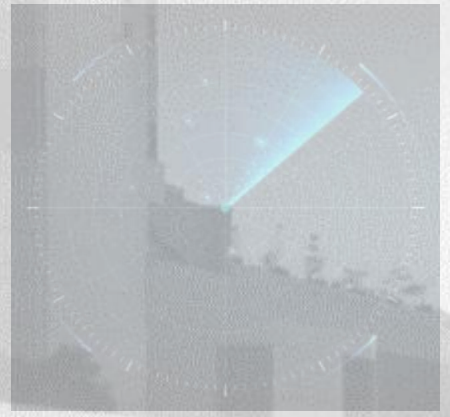
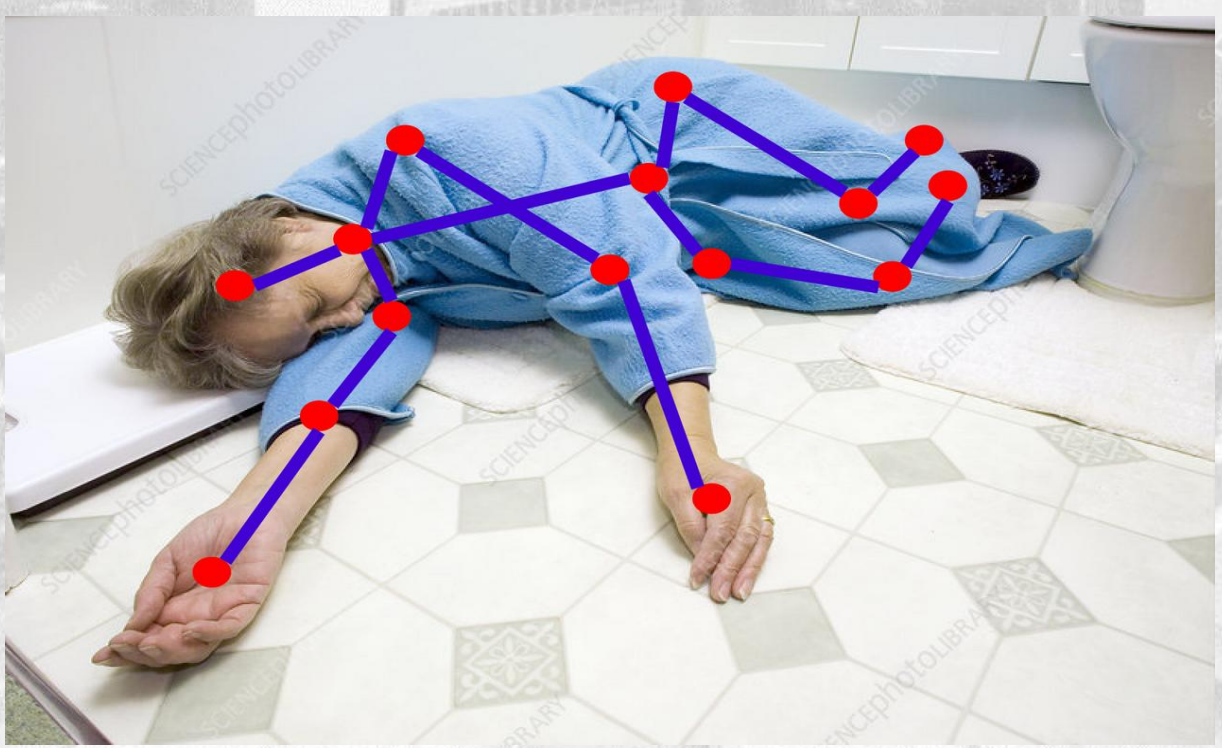
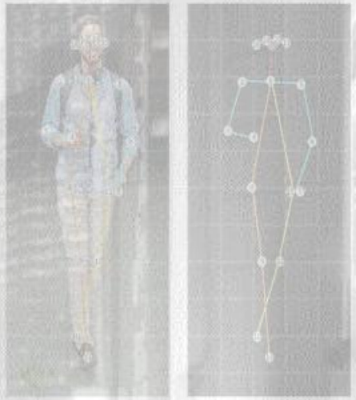
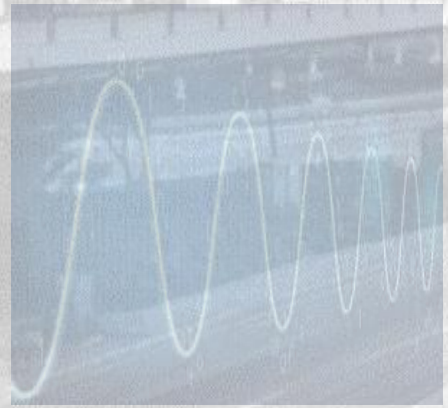
ViGiSense =

A.I. Safety Monitoring & Well-being Platform



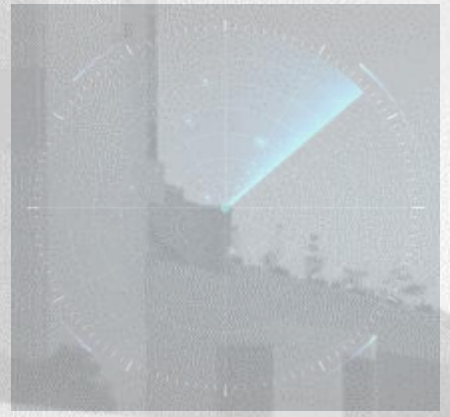


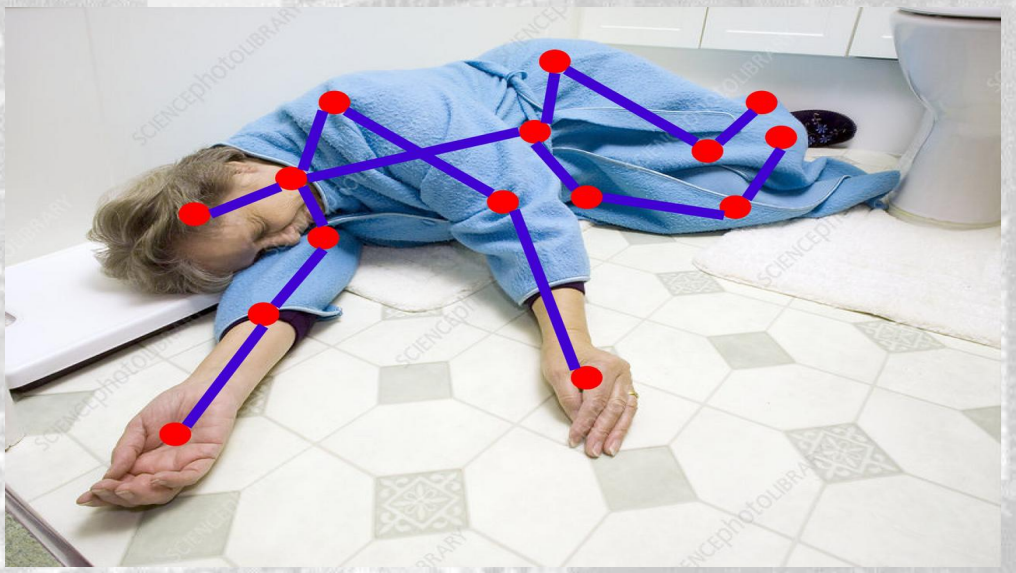


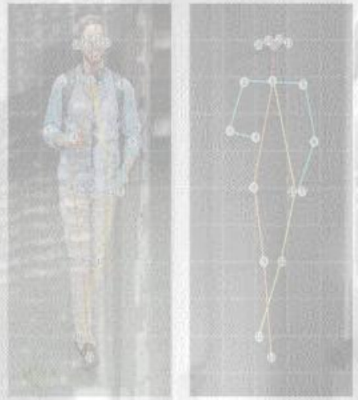


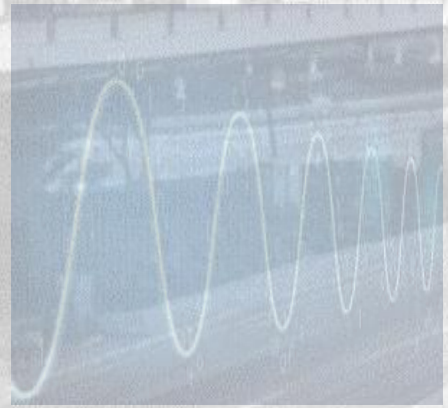
CHINOINT SENSE CONNECT

ViGiSense =
A.I. Safety Monitoring & Well-being Platform





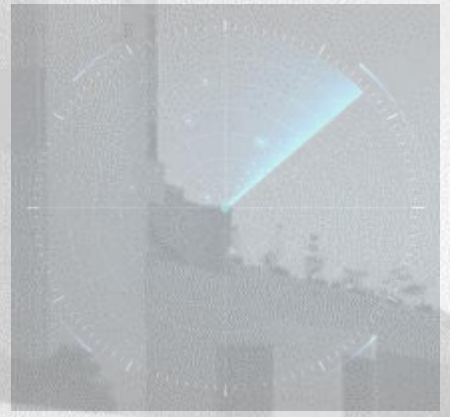


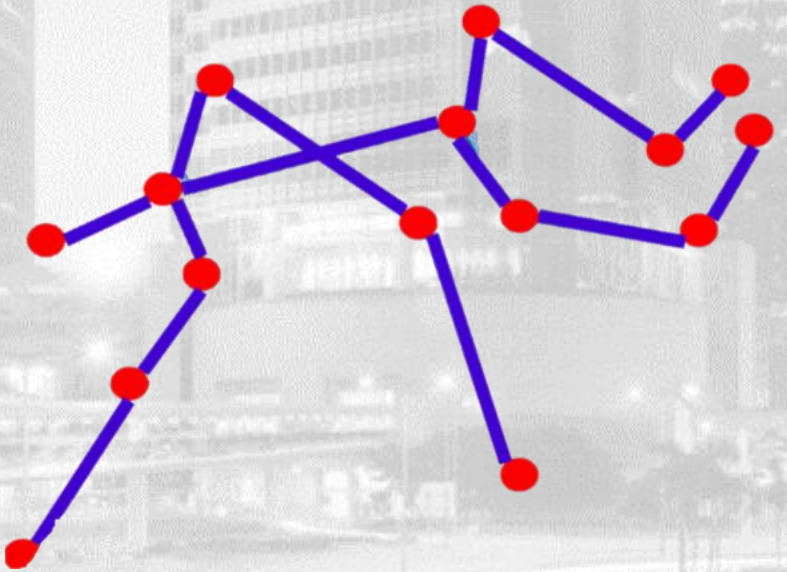


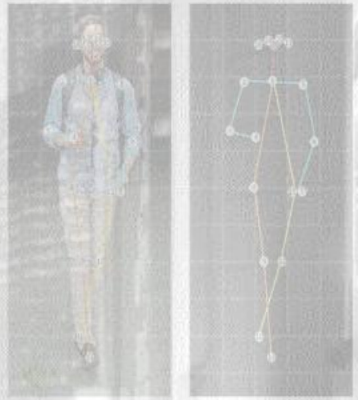
Protect 7 / 24, and.....

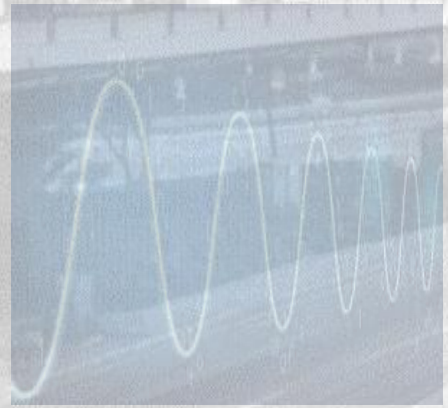
CHINOINT SENSE CONNECT

ViGiSense =
A.I. Safety Monitoring Platform









No Privacy Issue

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ViGiSense
Understands Human Behavior

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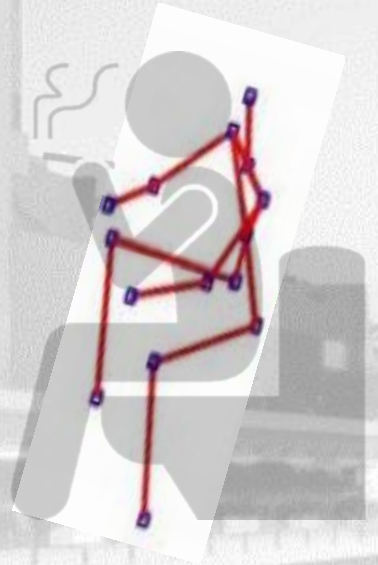
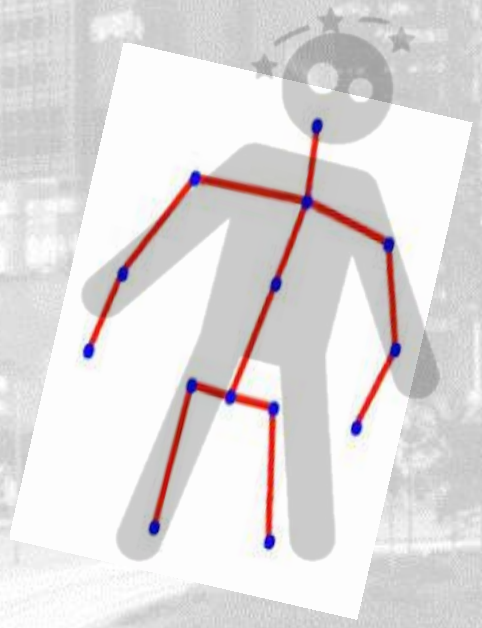
SENSE CONNECT

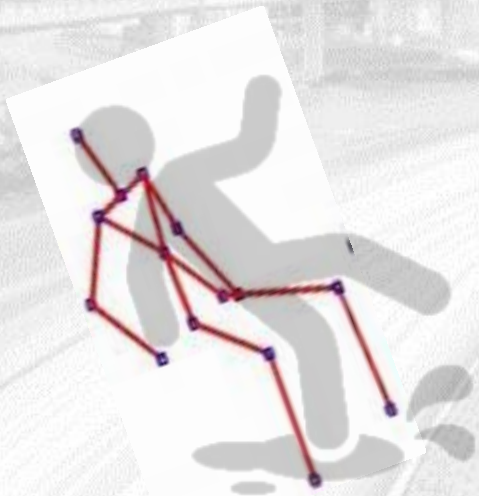
ViGiSense

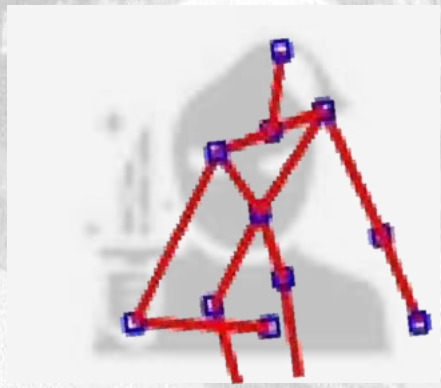
Understands Human Behavior

But Not Recognizing YOU









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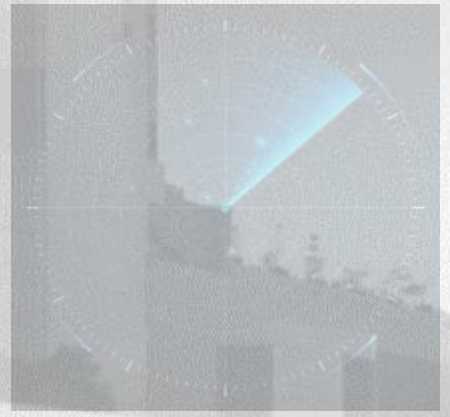
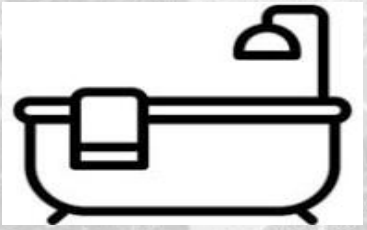
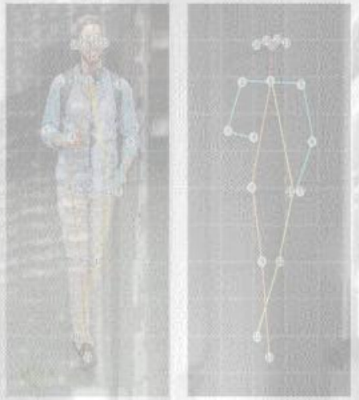
ViGiSense =
A.I. Safety Monitoring Platform

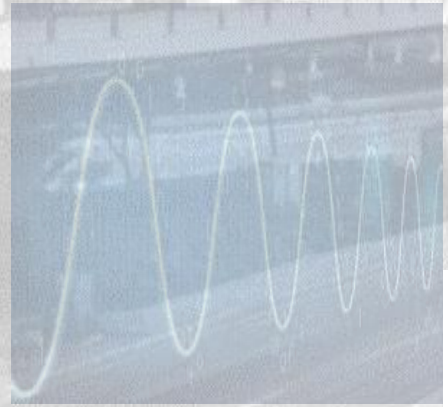






No Privacy Issue

- **bathrooms**
- **toilets**
- **bedrooms**
- **elderly center**
- **hospitals**



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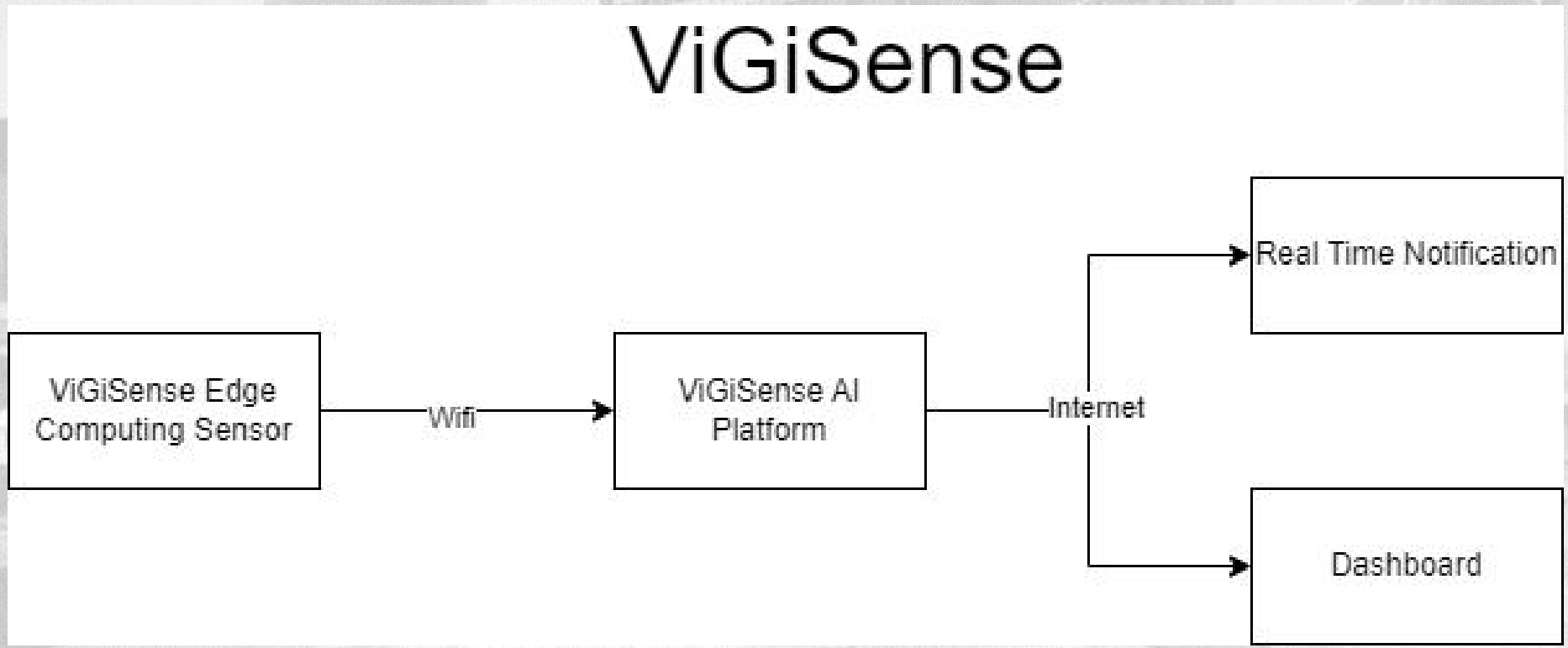
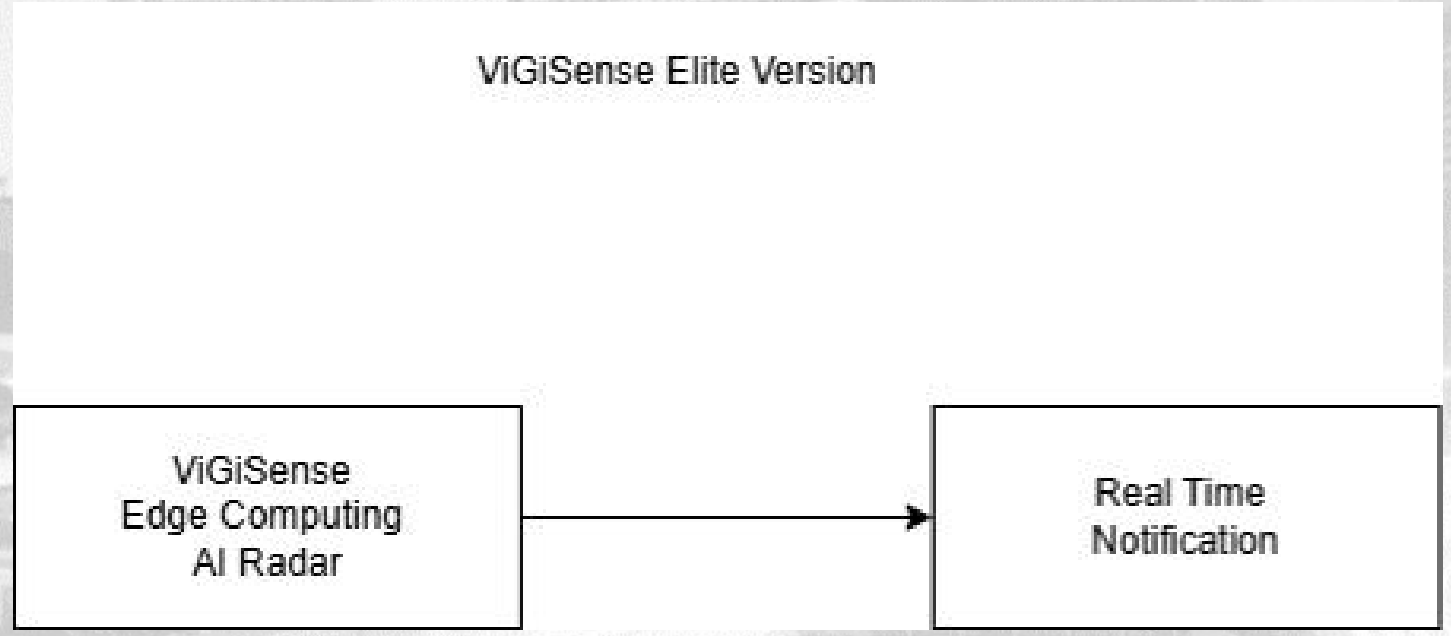
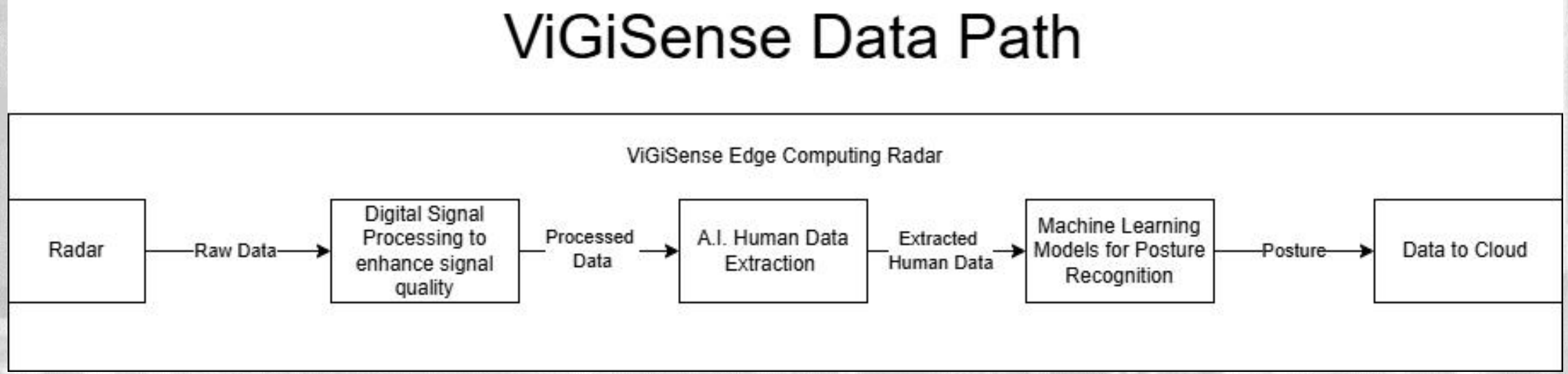
ViGiSense - System Diagram



ViGiSense Elite @ Pine Care Point 松齡樂軒 - System Diagram



ViGiSense - Data Path



ViGiSense	Radar - Solid-state Radar - T-O-F technology - measure phase shift - sense the environment	DSP - advanced DSP - enhance Signal-to-Noise ratio	A.I. - tailor mode algorithm - extract potential human informaiton - overcome environment interferences	M.L. Models - pre-trained models - posture recognition from radar data - extensibility	Data Export - data send to cloud platform - centralized data management - business logic
ViGiSense Elite	Same	Same	Trimmed version of AI Segmentation Algorithm	Light weight ML Models for edge computing	same

Innovation - DSP

The radar chosen is intentionally low quality.
This is not only a cost concern, but this is to make sure the data captured is anonymous, not able to capture any data that coud identify anyone. This protects the privacy.
Thus, we need advance Digital Signal Processing to enhance the signal-to-noise-ratio (SNR).
These DSP algorithms including noise prediction, noise mitigation, noise removal, etc.
The result is illustrated below. With noisy raw data, we are still able to pinpoint the meaningful data with the advance DSP algorithms.
Without the DSP, raw data will be too noisy to be useful, leading to low accuracy and poor performance for monitoring purposes.

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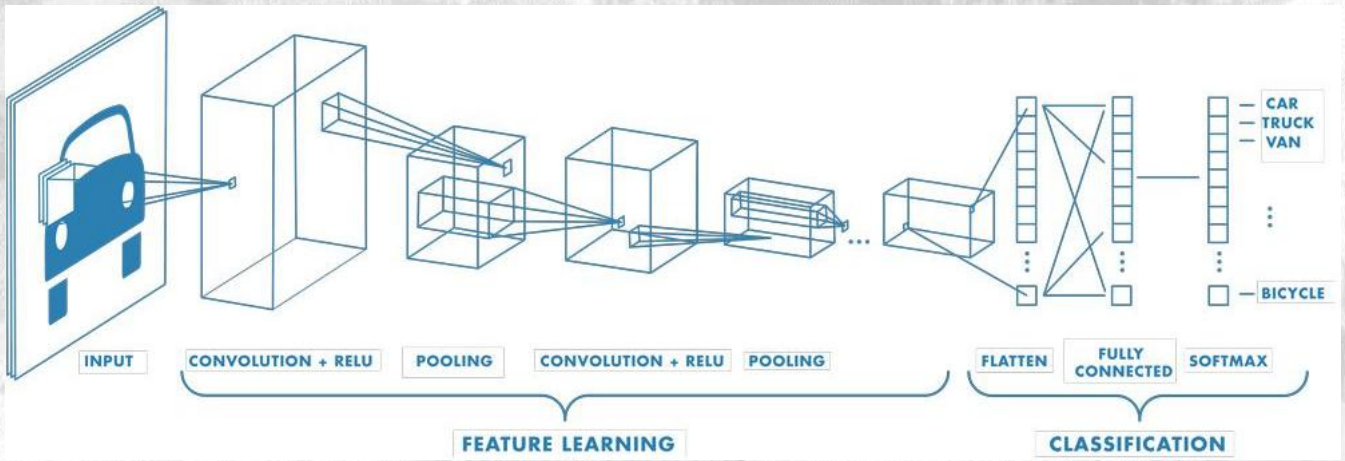
Innovation - A.I. Segmentation

DSP alone is not the answer on how to correctly grab the human data from a noisy raw data.
Our in-house developed A.I. algorithms analyse the raw data, segment the human data from the noisy raw, and exaggerate the contrast such that it becomes easier to grab the frame of a human.

The segmentation algorithm consists of a mask that is trained using a Convolutional Neural Network (CNN).
The CNN mask shows how confident it is that the raw data represents the presence of a human.

Then a multiply function is implemented to exaggerate the raw data that represents the human, such that the human data can be extracted from the noisy environment.

The multiply function is adjustable to offer flexibility to adapt to different scenario.



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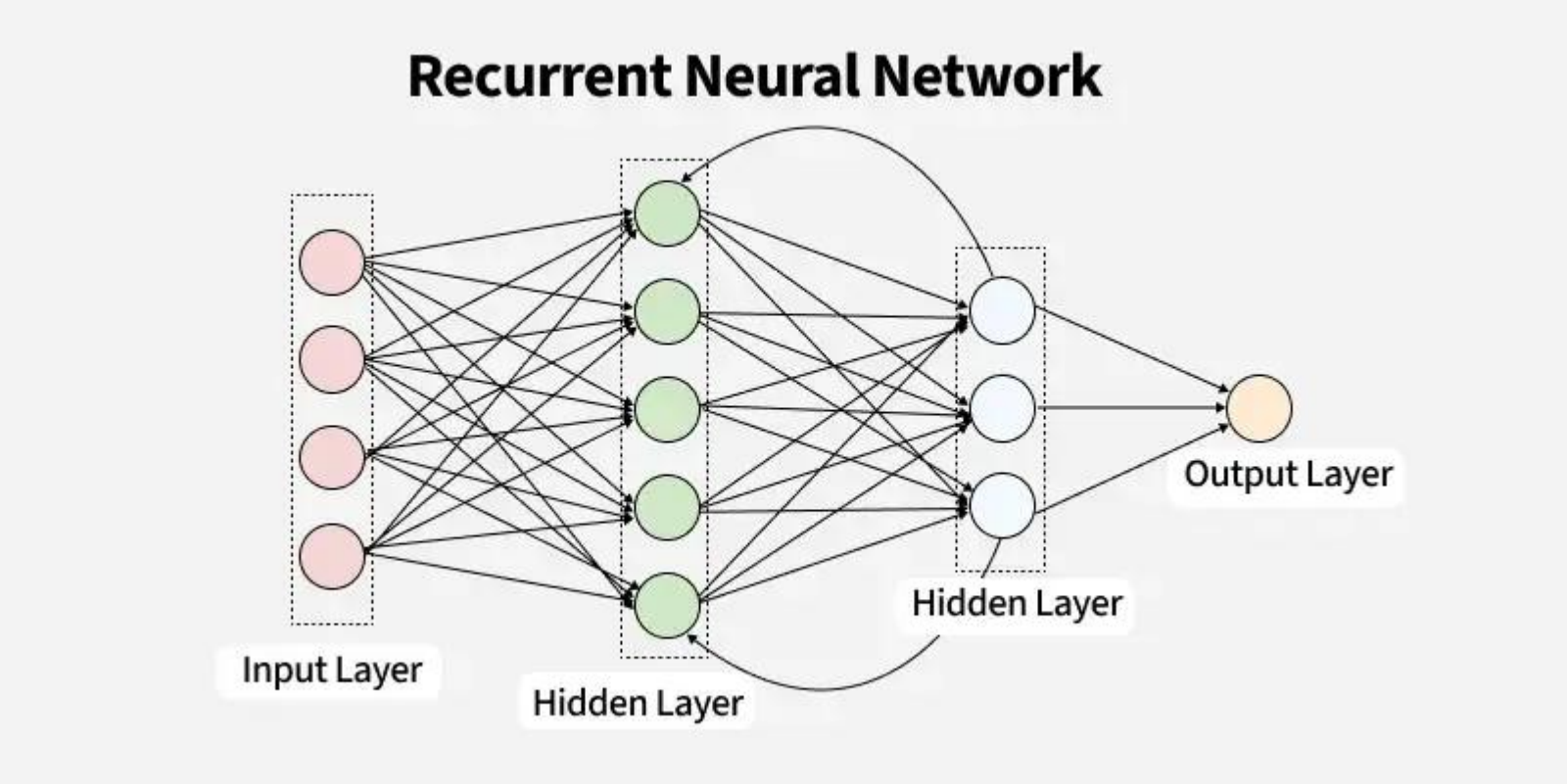
Innovation - Machine Learning Models

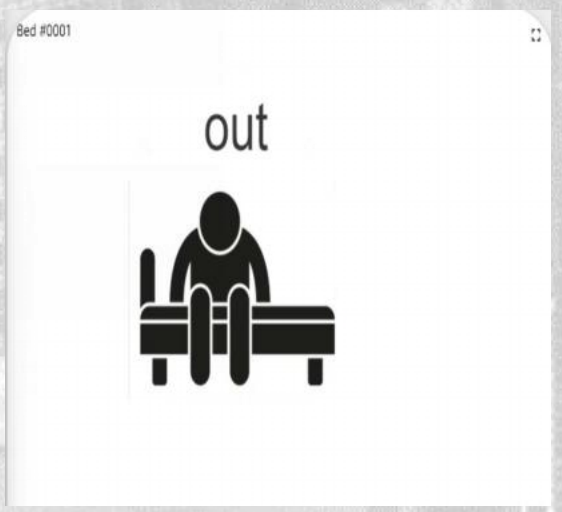
After obtaining the segmented data for human, the next task is to find out the what the human is doing. This involves extracting the skeleton data from the raw data.

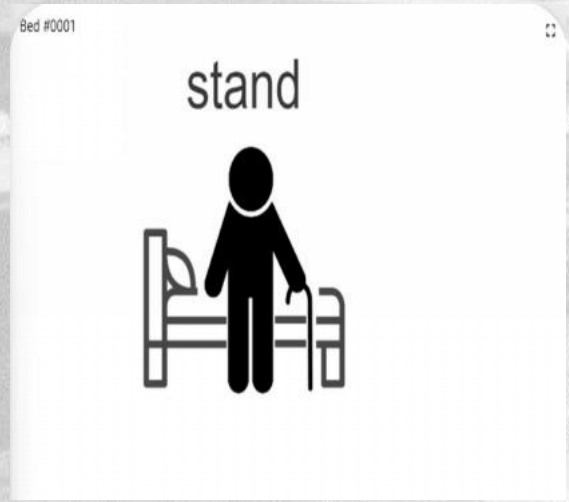
The model to extract skeleton is inspired by the recurrent neural networks (RNNs). Using the output of segmentation result as input and finally get the skeleton.

In Elite version, to enable edge computation. A reduced set of models have been deployed.



Fall Prevention @ ChinaChem





Location	Pine Care Point
Room	302, 319
A.I. Radar Quantity	2 sets
Recognition Set	6 Postures
Notification	Telegram Real Time Notification

ViGiSense recognizes human behavior.

Video Link: https://video.wixstatic.com/video/b81849_a7948bcfce0442c7b8984a459ec0701f/480p/mp4/file.mp4

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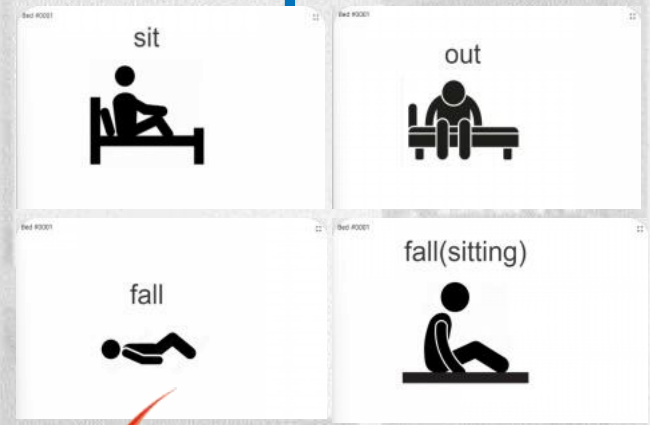
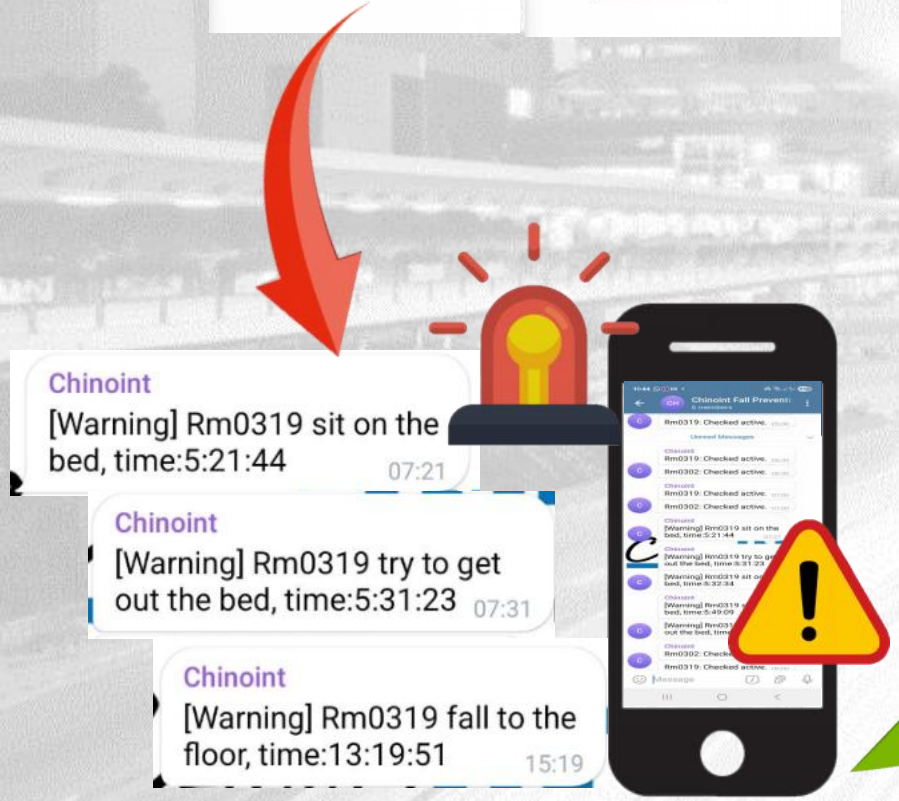
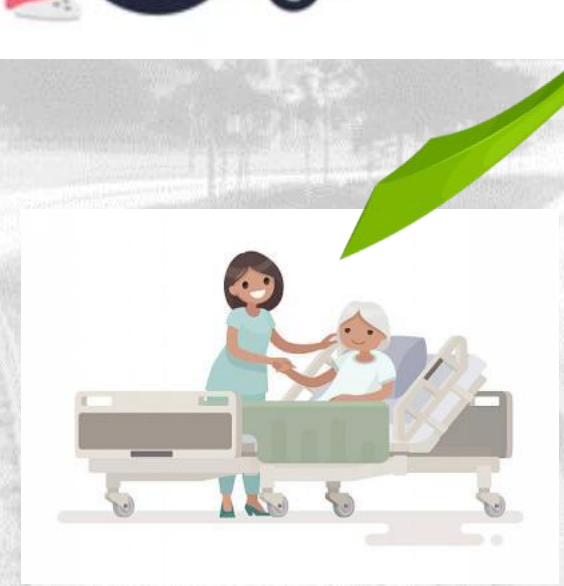
Keep the Elderly Safe & Reduce Nurse Workload







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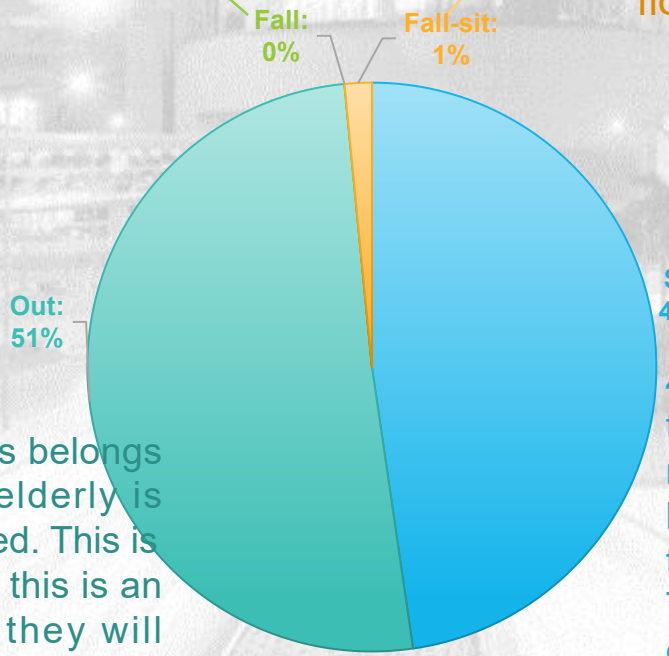
Usage Data

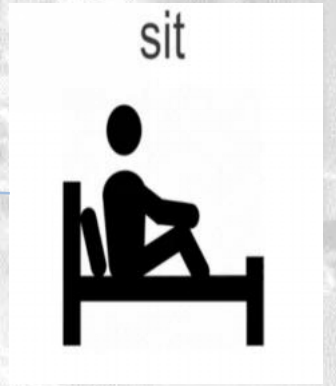
FACT

Deployment Date: 28th March, 2025
Data analysis period: mid May 2025 to end of June, ~6 weeks
Each radar processes around 864,000 frames of raw data each day
Average alert per day = 70 times

Occurance almost 0%.The AI radar has captured a couple of times that someone has fallen on the floor. Verified by looking at the raw data, this is eligible cases. Good that this occurance tends to 0, meaning the system is doing a great job monitoring and protecting our elderlies.

1% of the Fall(sitting) posture is due to the fact that sometimes the nurse is bending the body helping the elderly, and the model believes that someone is sitting on the floor. This is an area of improvement.





51%of reported postures belongs to OUT, meaning the elderly is trying to get out of the bed. This is being reported because this is an obviously action that they will need help with.

48%of reported postures belongs to sitting on the bed. This is being reported due to the fact that before the elderly gets out of bed, they usually have to sit up first. Thus, this is an indication that the elderly may need help.

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A.I. Radar Validation (Metric)

By analysing the data collected from deployed sensors.

Indicators	definition	Calculation
Accuracy	proportion of overall correct predictions	(TP+TN)/Total case **= 97.7958754%**
Precision	proportion of samples predicted as positive that are actually positive	TP/(TP+FP) **= 92.6265027%**
Recall/Sensitivity	proportion of correctly identified samples in actual positive samples	TP/(TP+FN) **= 95.0467357%**
Specificity	proportion of correctly identified samples in actual negative samples	TN/(TN+FP) **= 98.3832987%**
False Positive Rate(FPR)	proportion of negative samples that are incorrectly predicted as positive	FPR = FP/(FP+TN) = **1.6167013%**
F1 score	harmonic mean of balanced precision and recall	2*((Precision*Recall)/(Precision +Recall)) = **93.8210135%**

Note
TP = True Positive
TN = True Negative
FP = False Positive
FN = False Negative

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Thank You

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