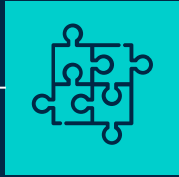


TremorGuard

The background is a dark blue gradient. It features several thin, vertical white lines of varying lengths scattered across the frame. Interspersed among these lines are numerous small squares in three colors: light pink, light blue, and light orange. Some squares are solid, while others are outlined. The overall aesthetic is modern and minimalist.

Table of Contents



01

PROBLEM



02

OUR SOLUTION

- Live demo
- How it works



03

Interesting
Aspects

8,000

People affected by PD



Rising trend with aging population

22% increase from 2013 to 2017 in
neurological conditions (includes
stroke / dementia)





Motor Issues

slow and rigid movement, tremor, difficulty speaking



Non-Motor Issues

cognitive impairment, mental health disorders, dementia, sleep disorders, pain, sensory disturbances



Problem 1

Is there a more convenient way of tracking patients' long term disease progression?

We have a voice analyser that can remotely monitor the severity of PD :)





Problem 2

Inefficient dose titration process - over weeks/ months

Difficult to optimise frequency and dosage

Sure! We can detect tremor intensity to recommend medication prescription timings !





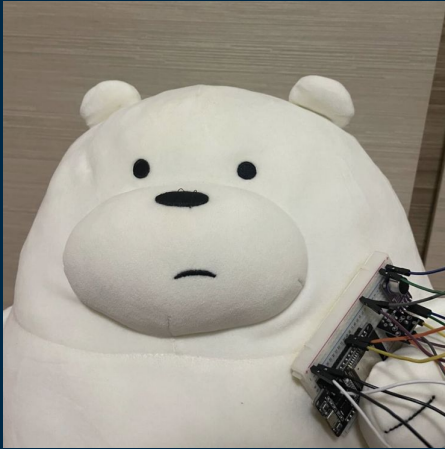
Problem 3

Inconsistent recording of patient diary -
associated with neurodegeneration /
forgetting

We can detect their activity and
automate the patient diary!



TremorGuard Devices



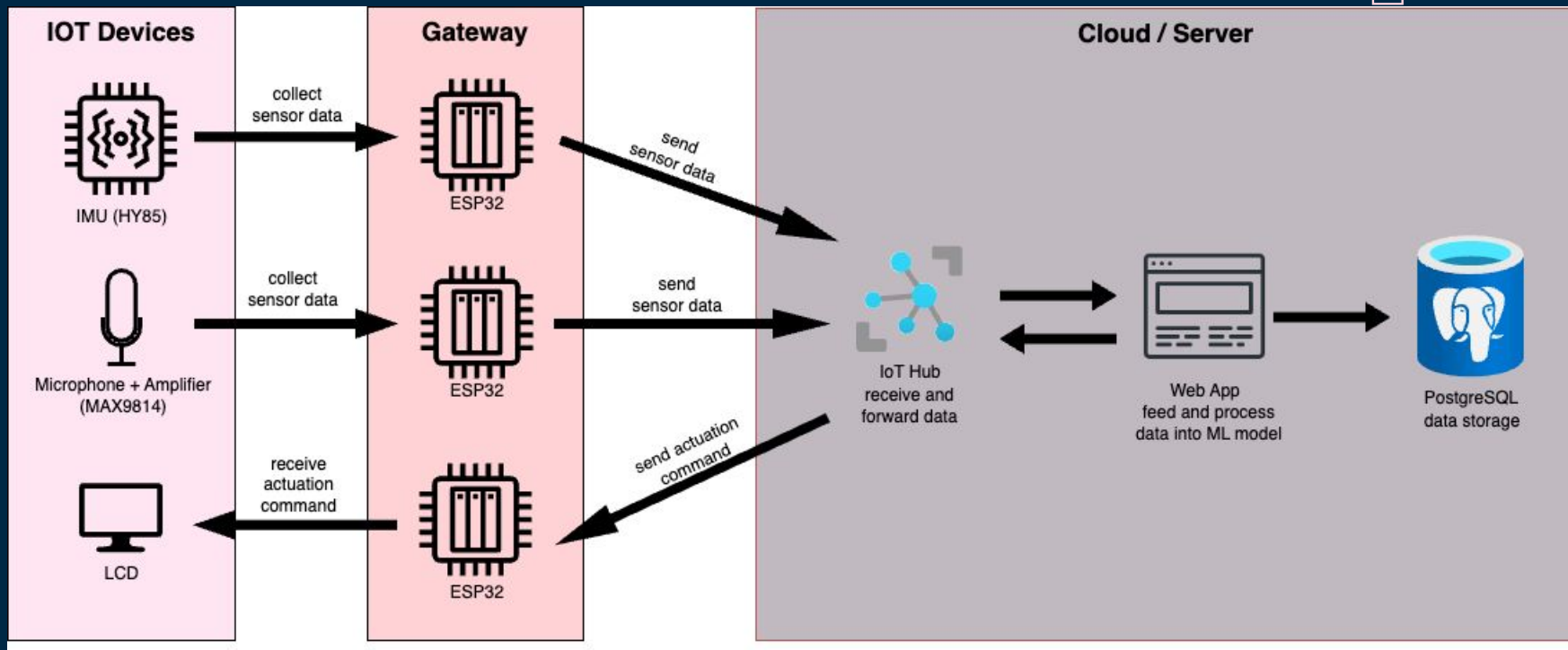
PREDICT DISEASE PROGRESSION
Based on voice recordings

MEDICATION PRESCRIPTION
Check symptom control status

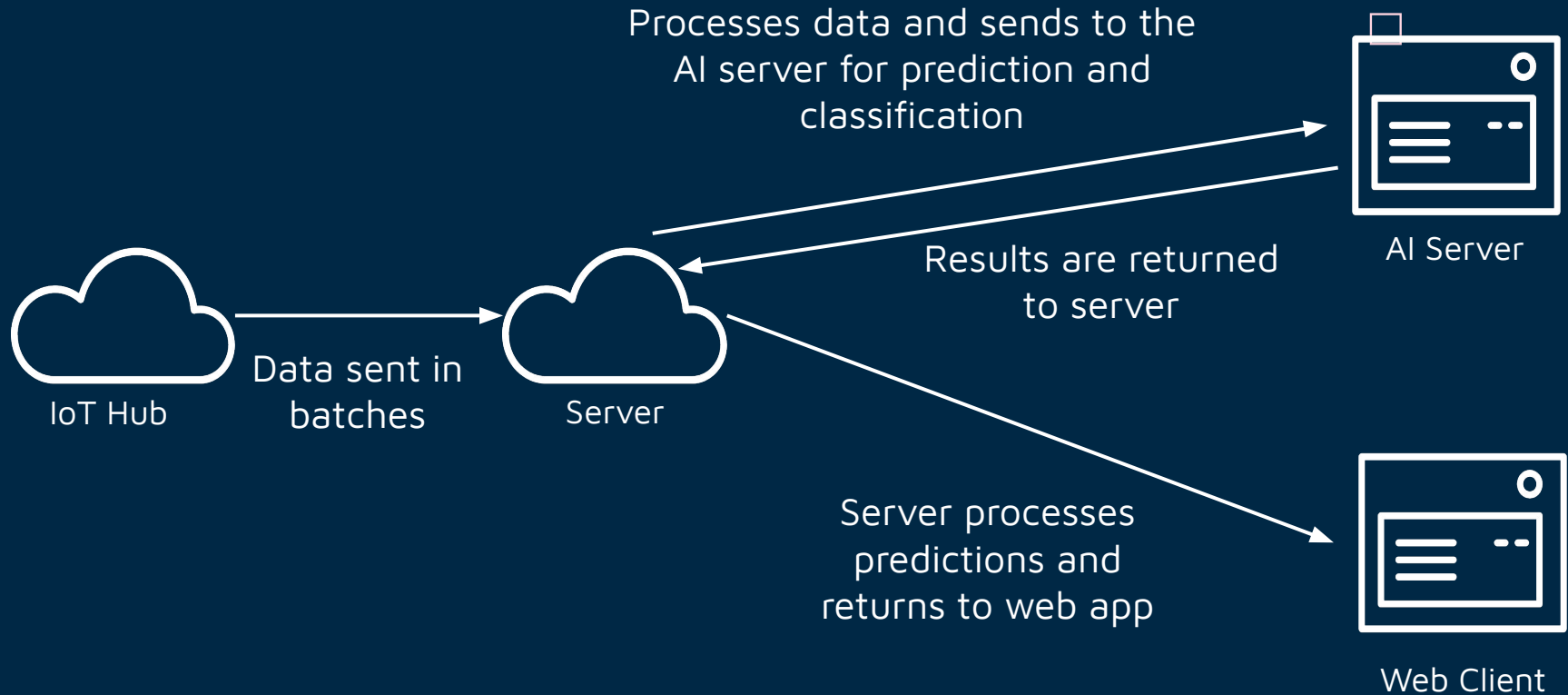


AUTOMATED PATIENT DIARY
Detect activity using IMU

Overview of TremorGuard



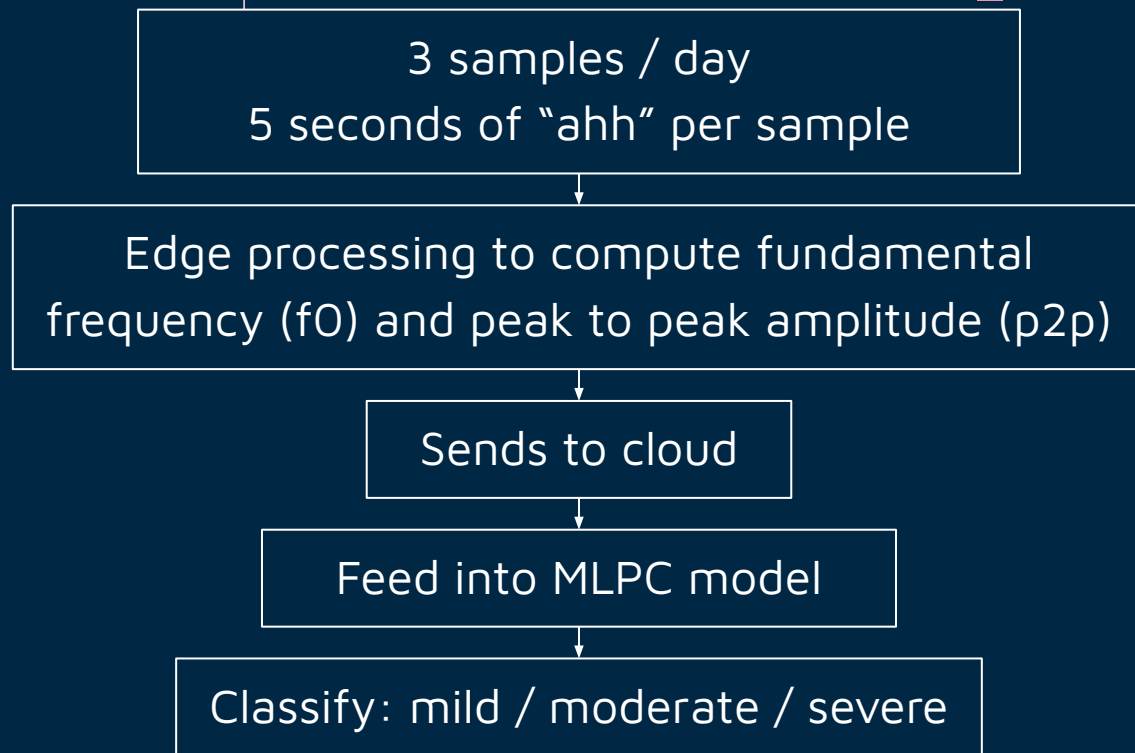
General Flow



The background is a dark blue field decorated with a sparse, abstract pattern of geometric elements. These include small squares in solid colors (pink, cyan, orange) and thin white lines of varying lengths, some of which are vertical and others horizontal. The elements are scattered across the frame, creating a modern, minimalist aesthetic.

LIVE DEMO

Voice Analyser



Classification Results

TremorGuard

IMU Microphone

UPDRS (Microphone)

Classifications (Microphone)

UPDRS

3

Voice Analyser



Deep sleep most of the time

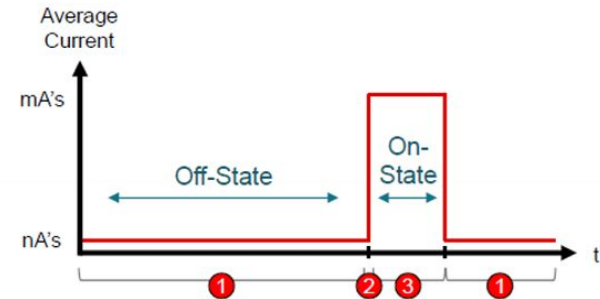
- Duty cycle sensing

Edge processing

5000 raw amplitude values per second

5 pairs of f0 and p2p per second

Duty-cycle sensing



1. Sleep very efficiently
2. During interrupt event, radio wakes up
3. Get sensing data, process, transmits, then go to sleep

Armband – attached with IMU



Measures 30+ readings / second

Collates 5 seconds of data

Sends to cloud



Armband – attached with IMU

Feed into CNN model

Classify ON / OFF status

ON: symptom: OFF: poor
under control symptom control

Trigger LCD medication notifier



MEDICATION PRESCRIPTION

Check symptom control status

Armband – attached with IMU

Feed into LSTM model

Recognise activities:

- Relax
- Fine-motor
- Eating
- Moving



AUTOMATED PATIENT DIARY

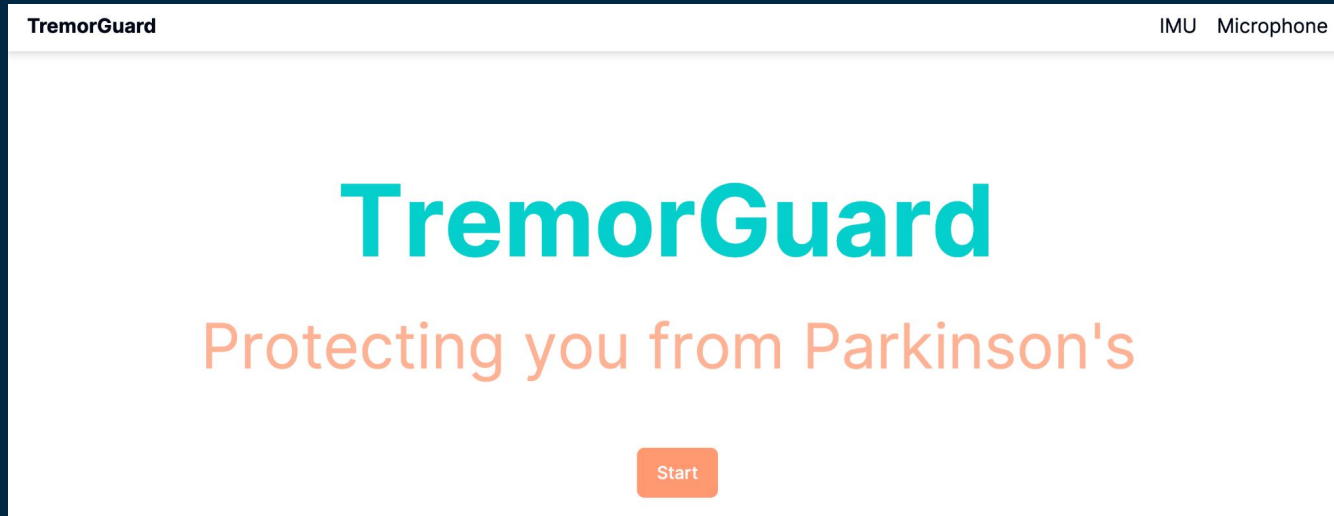
Detect activity using IMU

Classification Results

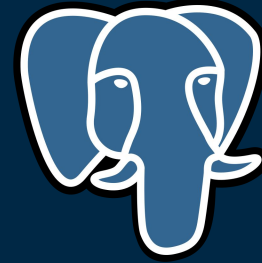
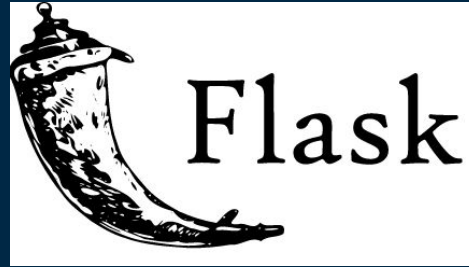
TremorGuard			Home	IMU	Microphone
Tremors (IMU)			Activities (IMU)		
			Classifications		
Timestamp		Medication ON/OFF		Activity Type	
17:12:08 GMT+0800 (Singapore Standard Time)		OFF		fine-motor	

Web App Features

- View IMU and microphone readings live
- Collect and label your own data for additional model training
- Consolidates all collected data into neat classifications for doctors to view easily (e.g. activity diary)



Tech Stack



Features

IMU

1. Helps to detect tremors and current activity patient is doing

Microphone

1. First calculates the fundamental frequency and peak-to-peak values before sending to server
2. Used to track the disease progression of a patient



WHAT MAKES US UNIQUE

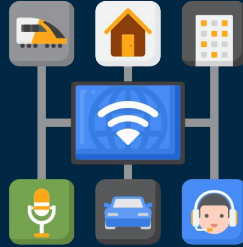
INTERESTING ASPECTS

STORAGE



Secure data storage
on local computer

ENHANCED COMMUNICATION SECURITY



Edge processing to
aggregate data



Established cloud
service provider
Secure transmission
protocol

WEBPAGE



User-accessible.
Latest results
available 24/7

POWER MANAGEMENT

	Arm Band	Voice Analyser	Medication Notifier
Usage Scenario	Strapped to arm everyday	Standalone device used once a day, deep sleep	Always running
Power Source	1000 mAh powerbank	1000 mAh powerbank	Wall plug
Battery Life	9 hours	Weeks	Forever



Only device available
in singapore



TREMOR GUARD

PKG

Kinesia360

DETECT MEDICATION STATUS



AUTOMATED PATIENT DIARY



PREDICT DISEASE
PROGRESSION



 USER FRIENDLY WEB APP



The background is a dark blue gradient. It is decorated with various geometric elements: small squares in teal, orange, and pink, some of which are solid and others are hollow outlines. Thin white vertical lines of varying lengths are scattered across the composition, some extending from the top or bottom edges. The overall aesthetic is modern and minimalist.

GET TREMORGUARD NOW

THANKS

Done by:

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Joy Ng Jing Ru

Loh Wei Yu Celestine

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