

Robots, IoT and AI in Supporting SEN Students amid COVID-19 Epidemic

Robots, IoT 及 AI 在COVID-19 疫情下對SEN 學生支援的一點分享



Robot for Future

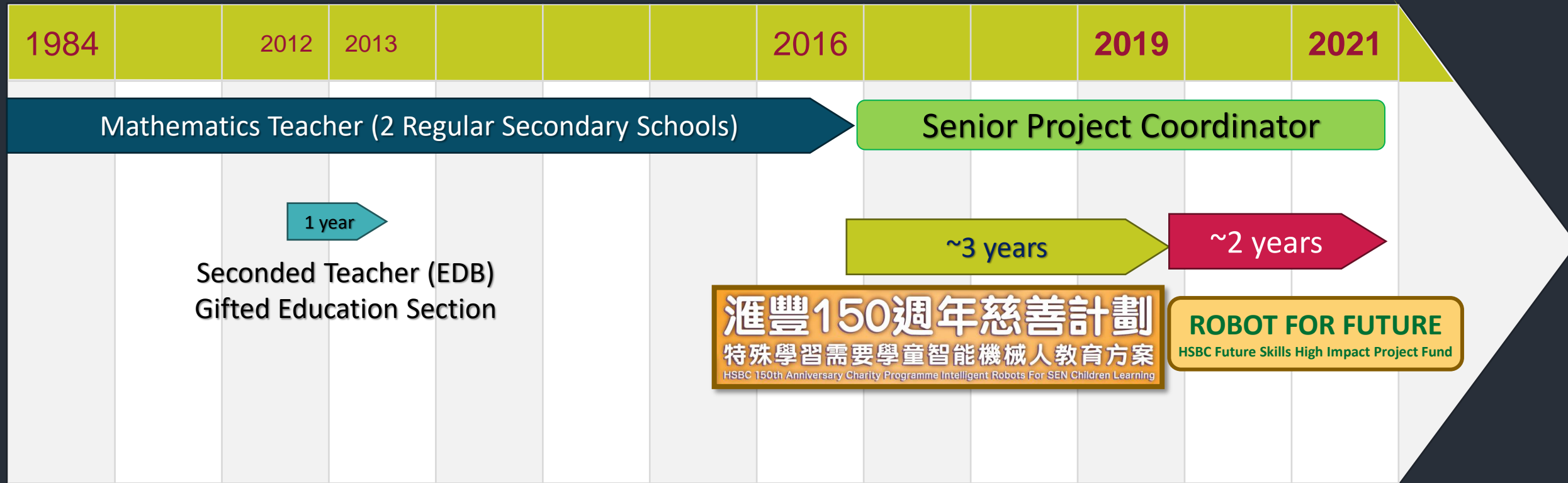
Project Team (TWGHs Kwan Fong Kai Chi School)

Au-Yeung Fu

11 Dec 2020





Sharing my experience as an Instructional Designer

Background Information



Sharing my experience as an Instructional Designer

Planned Major Duties

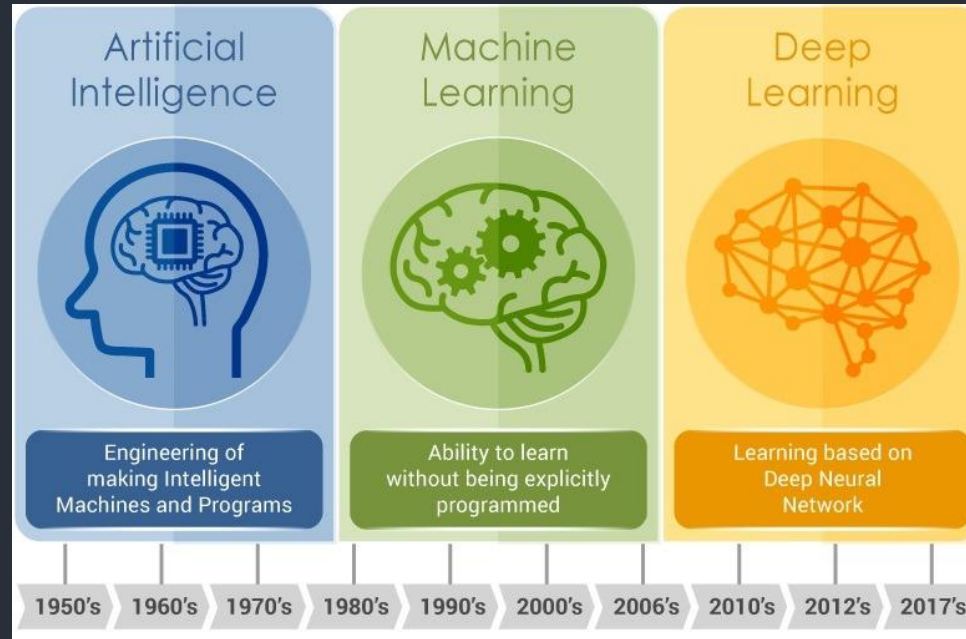
- 1** **Research into Smarter Use of Robots** 
- 2** **Program Robots for Use with AI and IoT** 
- 3** **Provide Training for School Teachers and Students** 
- 4** **Using robots to provide training for autistic students with interview skills** 

ROBOT FOR FUTURE project

One of the project outcomes:

Participating students will know more about Stem Skills

IoT



How does it benefit the SEN students ?





Training Objectives

To allow student and teacher participants:

- to have a more in-depth understanding of the new technologies
- to understand even a simple device is sufficient to build applications on AI and the basic principle of its operation
- to understand how these devices can support robots to create more interesting and practical applications despite the limitations of costly robots
- To inspire students' creativity and innovation in inventing practical robotic aids

Stages of Change in Project Conduction

2019

Original
Program Plan

2020

Outbreak
of Covid-19

Support for
SEN Students

2021

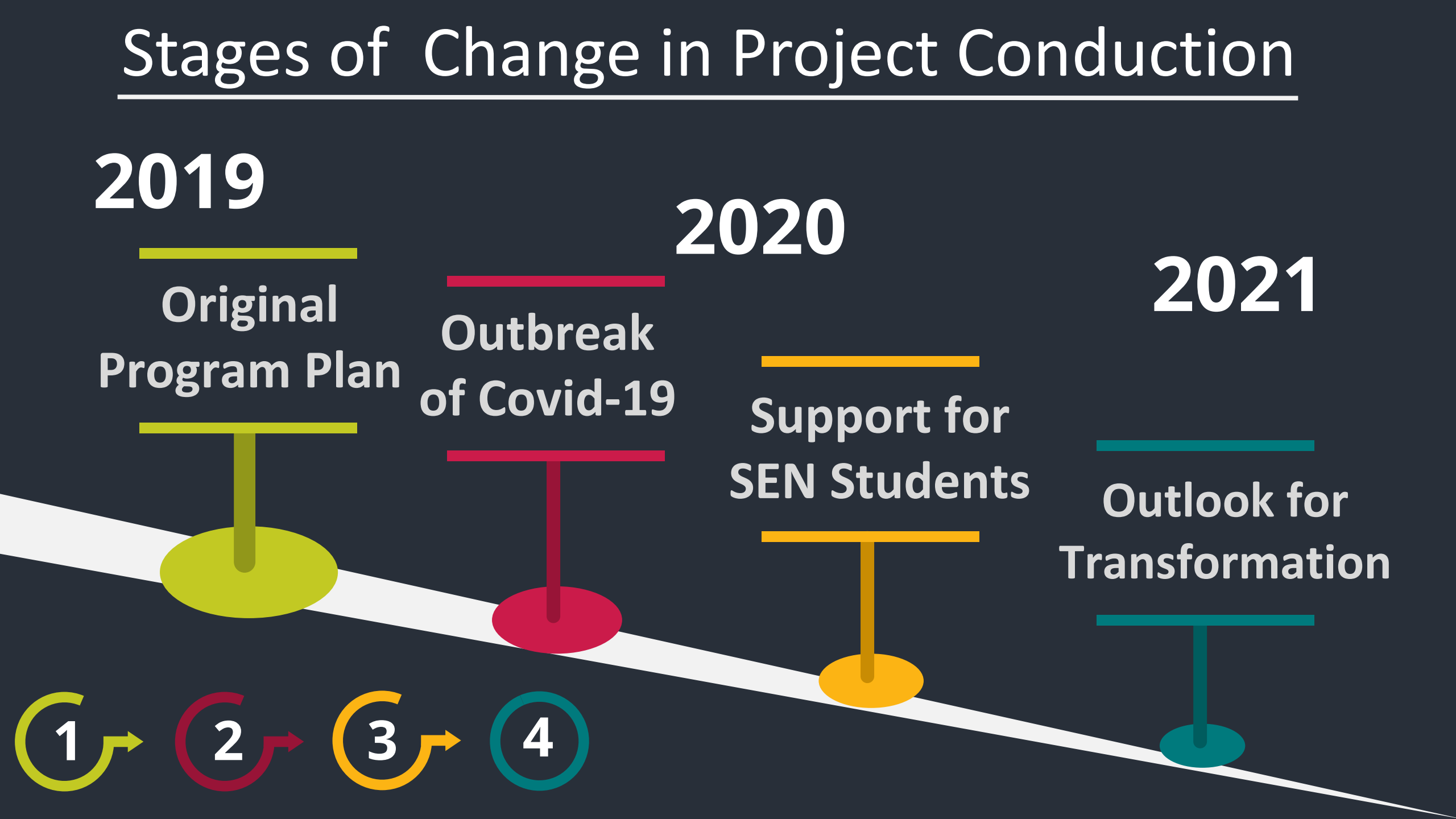
Outlook for
Transformation

1

2

3

4



Original Plan of Training related to Stem Education ← 1

General Enrichment

For
Whole
Class
Teaching



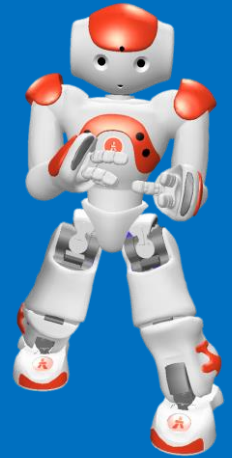
IoT Applications

Training for Elite Students in each Participating School



Robots Programming

Stages 1 - 2



Tasting program for Elite Students to experience the applications of IoT, AI with Robots

Stages 3 - 4

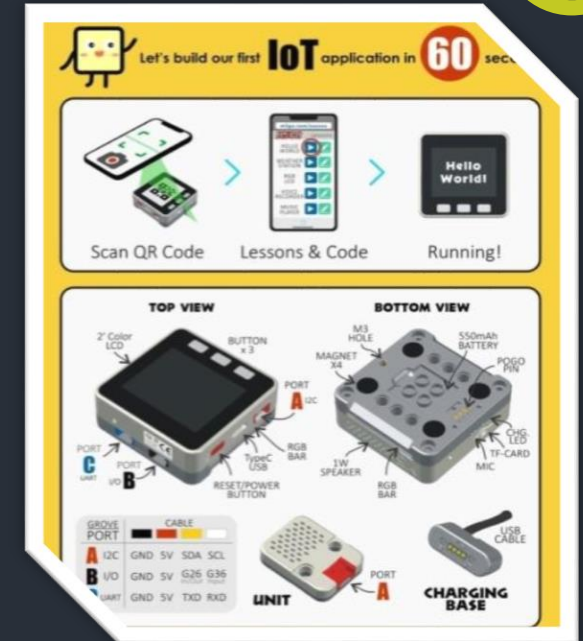


Competitions



Reasons for choosing M5Stack to develop IoT :

- Simple concepts with complicated details
→ **reduce entry learning barrier**
- Appealing design and sufficient built-in hardware (display screen, wifi, bluetooth)
→ **makes learning interesting and user friendly**
- Similar in coding systems to other stem devices but are more versatile than them. Built-in battery and can be run by itself
→ **highly portable**
- Various sensors available. No welding and breadboard are needed
→ **highly extendable**



Robot For Future

Sharing & Training Session

Introduction to M5Stack Core



- 01** Download and Install the driver CP210X.
- 02** Download & Install the M5Burner, **UIFlow Desktop IDE**
- 03** Flash the most updated Firmware



- 04** Setup WiFi connection for the M5Stack
- 05** Connect with the UIFlow platform
- 06** Discussion on the teaching approaches in School

To be conducted in the afternoon or Day 2 session

01

02

03

04

05



An Example of IoT using M5Stack



Ui FLOW V1.4.3 Project Remote1_HA Blockly Python

Event
UI
Hardwares
Units
Modules
FACES
Variables
Math
Loops
Logic
Graphic
Emoji
Timer

Text
Text
Text

Units
ON OFF +

ON_OFF Bright
Temperature: 24.00°C
Humidity: 42.8%

Setup
Remote qrcode show in x 100 y 50 size 176

Loop
set t to Get env0 Temperature
set h to Get env0 Humidity
Label label0 show Get env0 Temperature
Label label2 show Get env0 Humidity
if Get env0 Temperature > 27
do Label label1 show " Too hot ! "
else if Get env0 Temperature < 15
do Label label1 show " Too cold ! "
else if h > 30 and h < 70
do Label label1 show " Comfortable ! "
else Label label1 show " -- "
Wait 1 s

Add Remote Switch Button ON_OFF with: x index 1
if x = 1
do Speaker.beep freq: 1800 duration: 200 ms
Set RGB Bar color
else Speaker.beep freq: 300 duration: 200 ms
Set RGB Bar color

Add Remote Slider Bright with: x index 1
Set RGB brightness x

Add Remote Temperature label Temperature index 1 interval 3000
return t

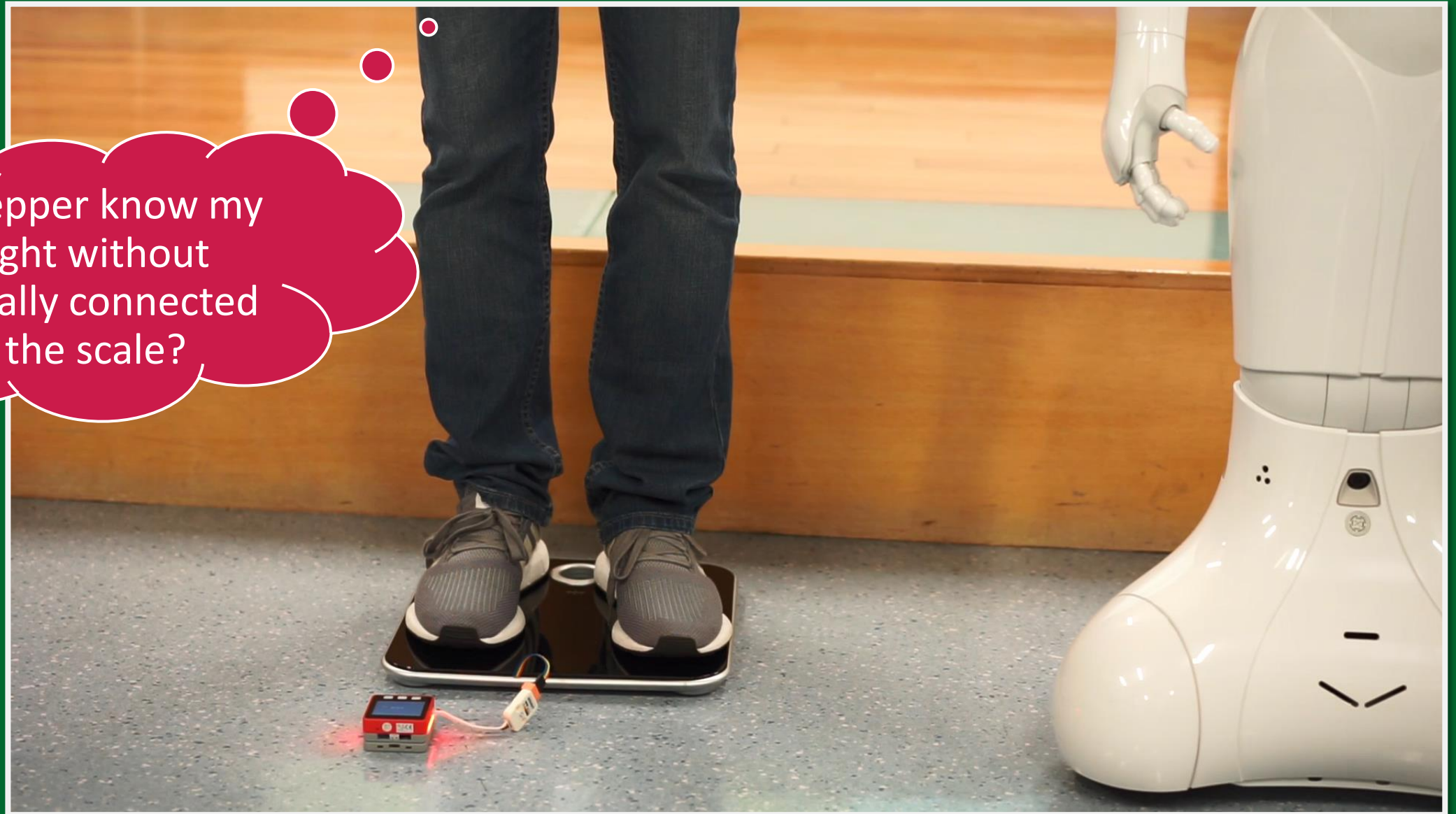
Add Remote Humidity label Humidity index 1 interval 3000
return h

Api key: 56D14C01 [Connected] version: V1.4.2

An Example of IoT using M5Stack with Robots



Can Pepper know my weight without physically connected to the scale?



Outbreak of Covid-19

Outbreak of Covid-19

2



Adjusting the Training Arrangement

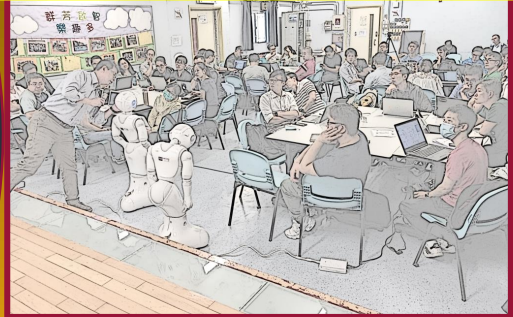
Outbreak of Covid-19

Training Mode

Training Time

Training Content

Competitions

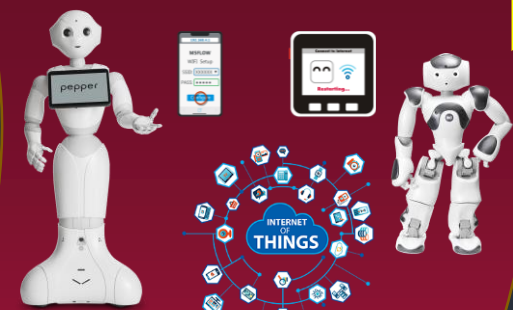


February 2020						
SUN	MON	TUE	WED	THU	FRI	SAT
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

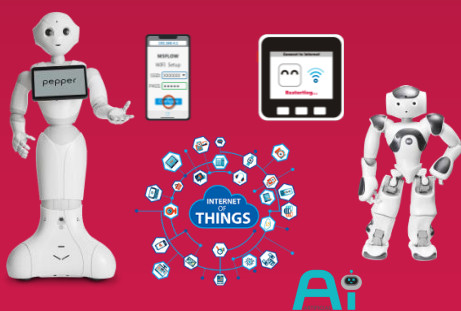
March 2020						
SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

MAY	JUNE	JULY	AUGUST
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



Ai
ARTIFICIAL
INTELLIGENCE

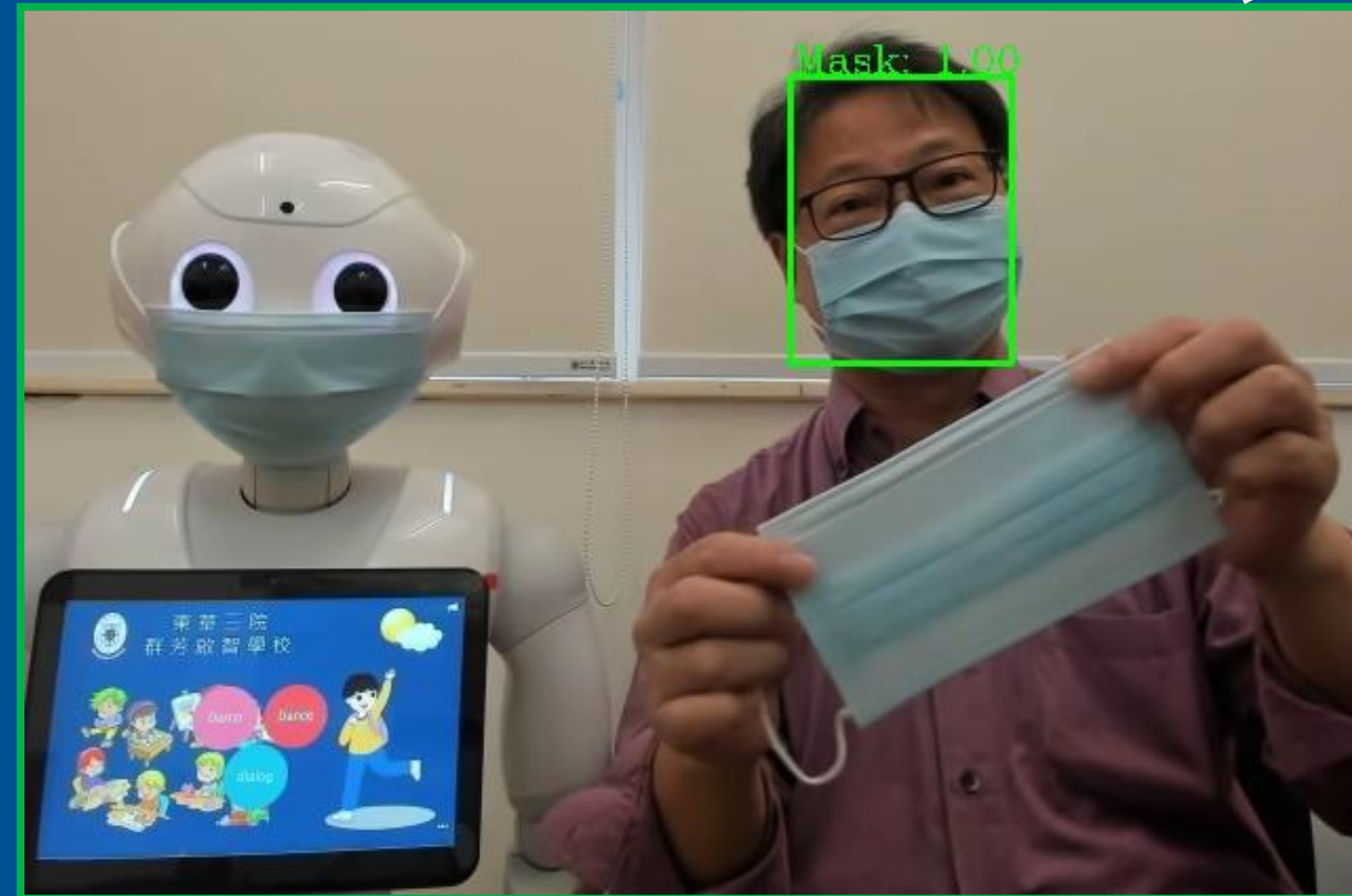


CREATE VIDEO PRESENTATIONS



New Idea of using AI after outbreaks of Covid-19 2

Can I do that too?





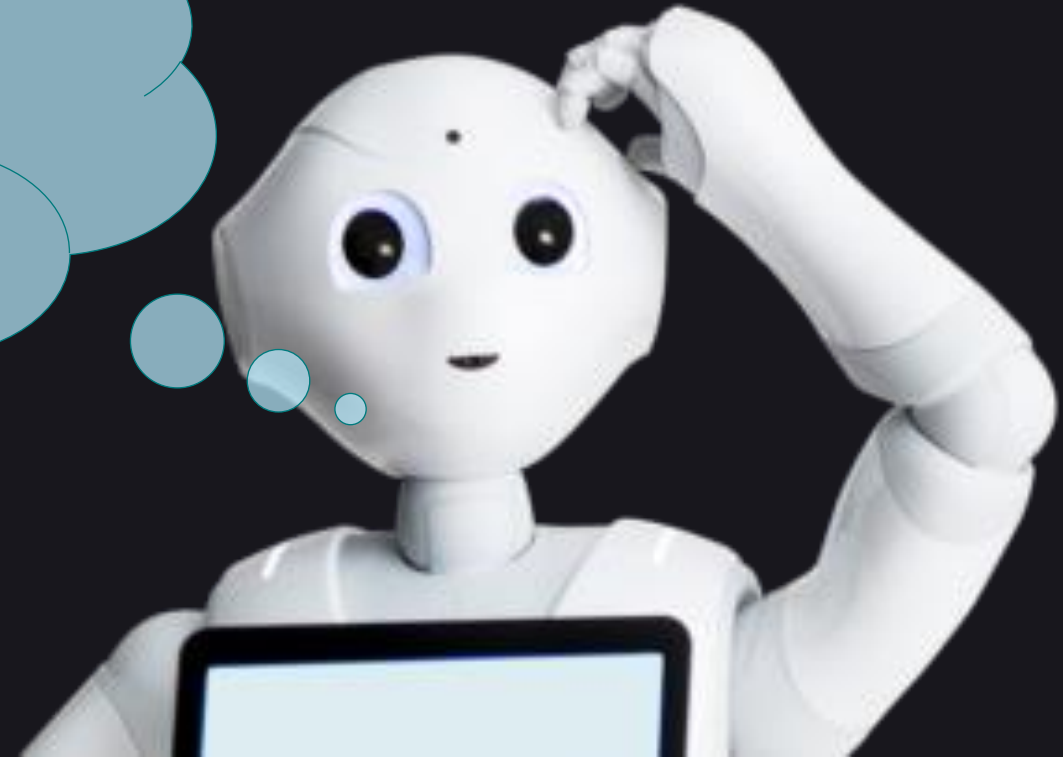
To support Children with Moderate Intellectual Disability

Support for SEN Students



BACK TO SCHOOL

What can I do to help my friends adapt to changes?





To support Children with Moderate Intellectual Disability

Support for SEN Students

3



先探熱

BACK TO SCHOOL



用搓手液搓手



洗手歌



To support MOID Children

Support for SEN Students

3

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利用機械人Pepper簡介防疫要點

Robot's IP: Connected

192.168.24.199

Connect

Battery: 100%

TOP 320x240 RGB View Set Vol 50 15



Autonomous Off

Stand

HEAD Movement

Up Down

Left Right

Body Movement

Ahead Back

Left Right

Body Rotation

L30 R30

L60 R60

L90 R90

大家過來,我哋一齊睇吓..

防疫期間,大家記得要帶口罩..

為咗大家同自己著想, ...

不如我哋一齊睇吓點樣洗手..

抗疫小知識, 你..imageB

同心抗疫,HKedcity

停課期間校長發給家長..

麻煩大家等一等, 聽咗..

你做得好好呀

Good Morning

Esay

WebPage1,2:

Esay

WebPage3,4:

Esay

Csay Screen: Show Hide 8 Vol Reset

Csay Video: http://video3.mingp: P R S

Image: A B http:// Go

http://www.twghkfkcp.edu. Go https://www.youtube.com/ei Go

https://www.youtube.com/ei Go https://youtu.be/56ewV3O4 Go

ANIMATION

RaiseRHand Bow

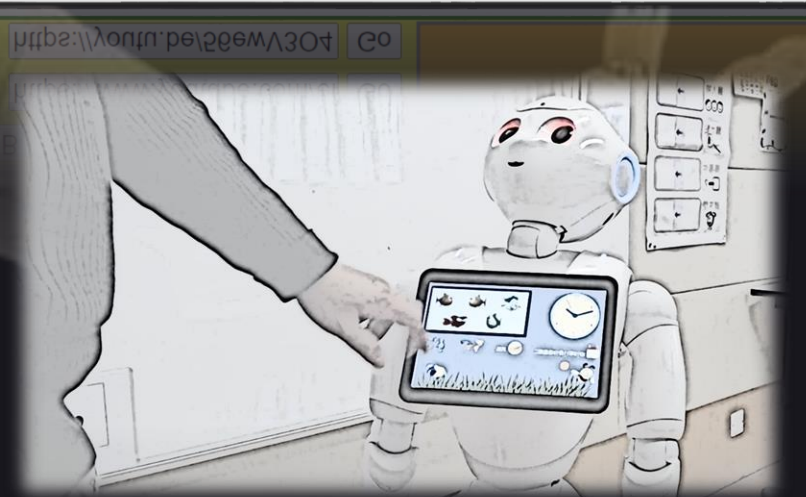
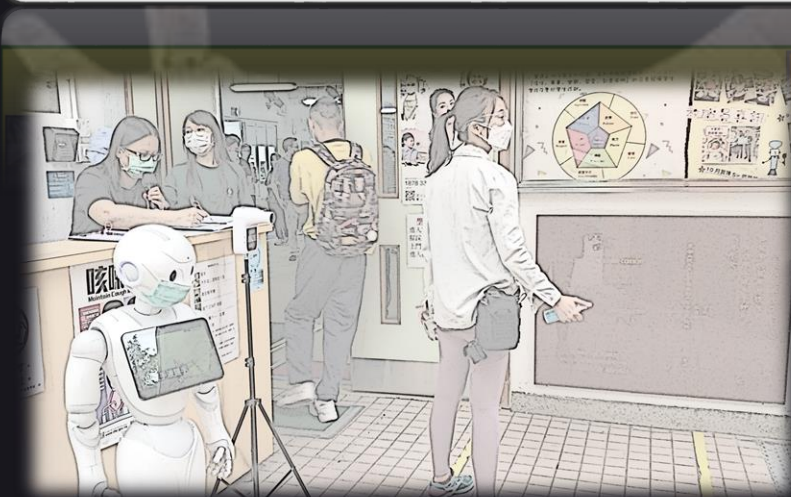
Hey Salute

Show Sky Dancer

HideHands Wake Up

Happy Birthday Bye

搖搖頭 Stop搖搖頭





To support MOID Children

Support for SEN Students



Using M5Stack and Pepper to develop authentic applications

Social Distancing



PIR Sensor



TOF Sensor



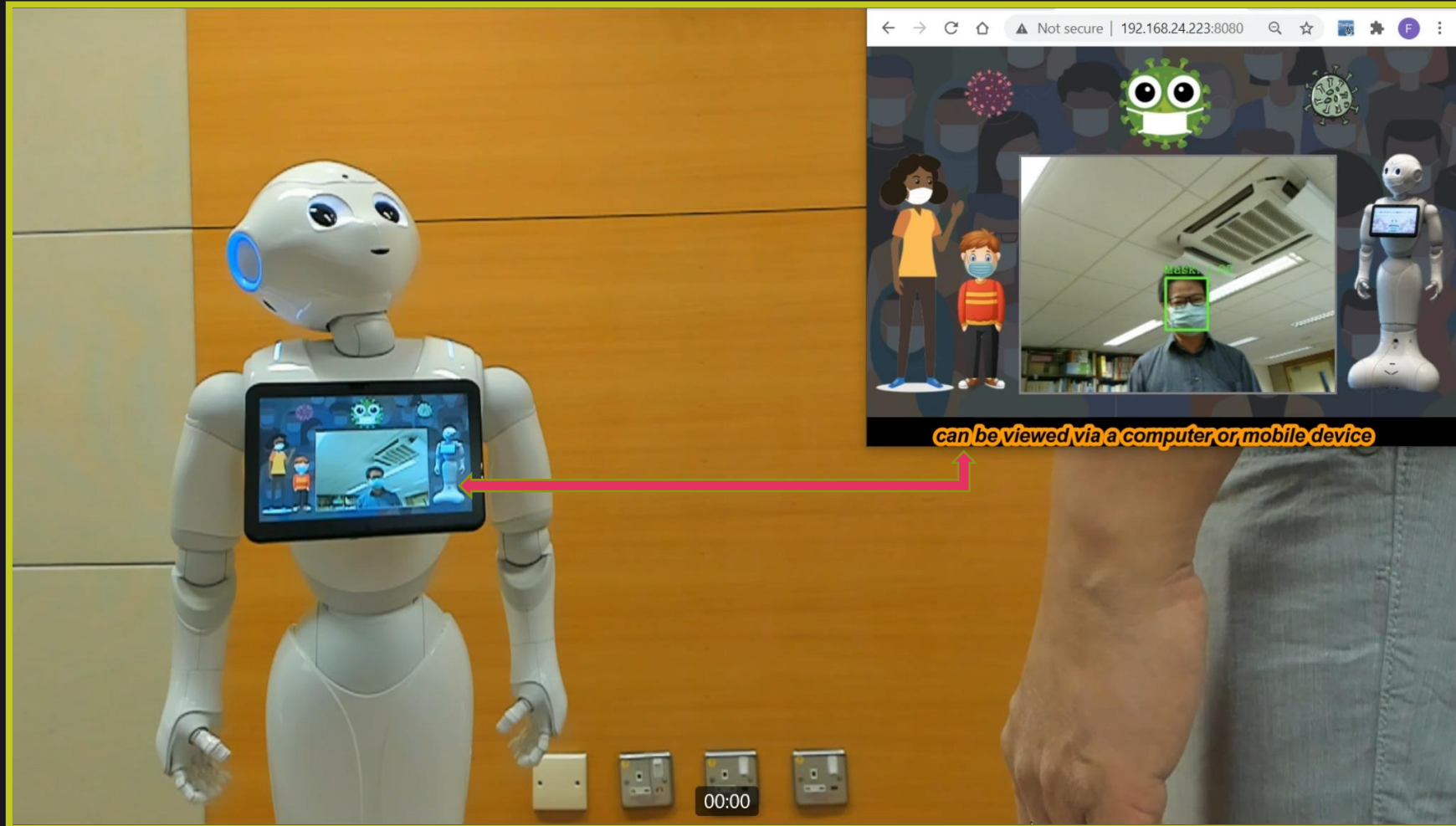
To support SEN Children

Support for SEN Students



Using AI and Pepper to develop authentic applications

Mask Wearing





To support SEN Children

Support for SEN Students

Using Pepper to develop authentic applications



Interview Skills Training System using Robot 'Pepper'

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Robot's IP: Connected
192.168.8.113 Battery: 22% Vol: 50

TOP 320x240 Color View Vol



Autonomous: On

HEAD Movement

Whole Body Movement

Whole Body Rotation

Screen: 8

Video:

Good Morning Image:

Music: S Web:

ANIMATION

EYE LEDS

POSE

Interview Start(0)

Interview Q(2)

Interview Q(1)

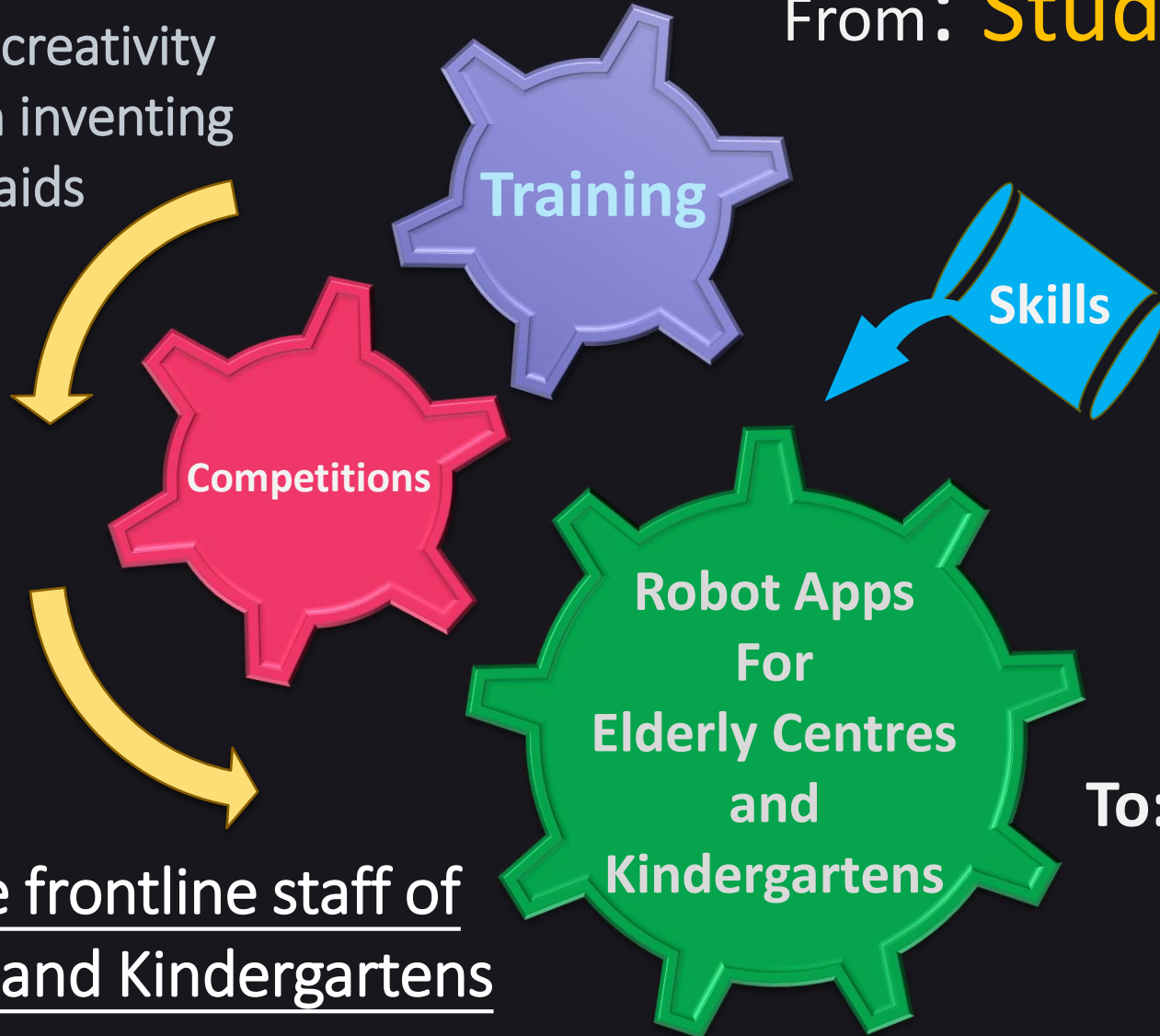
Interview Q(3)

Outlook for Transformation

4

Inspire students' creativity and innovation in inventing practical robotic aids

From: **Student Learner**



Support from Project Team

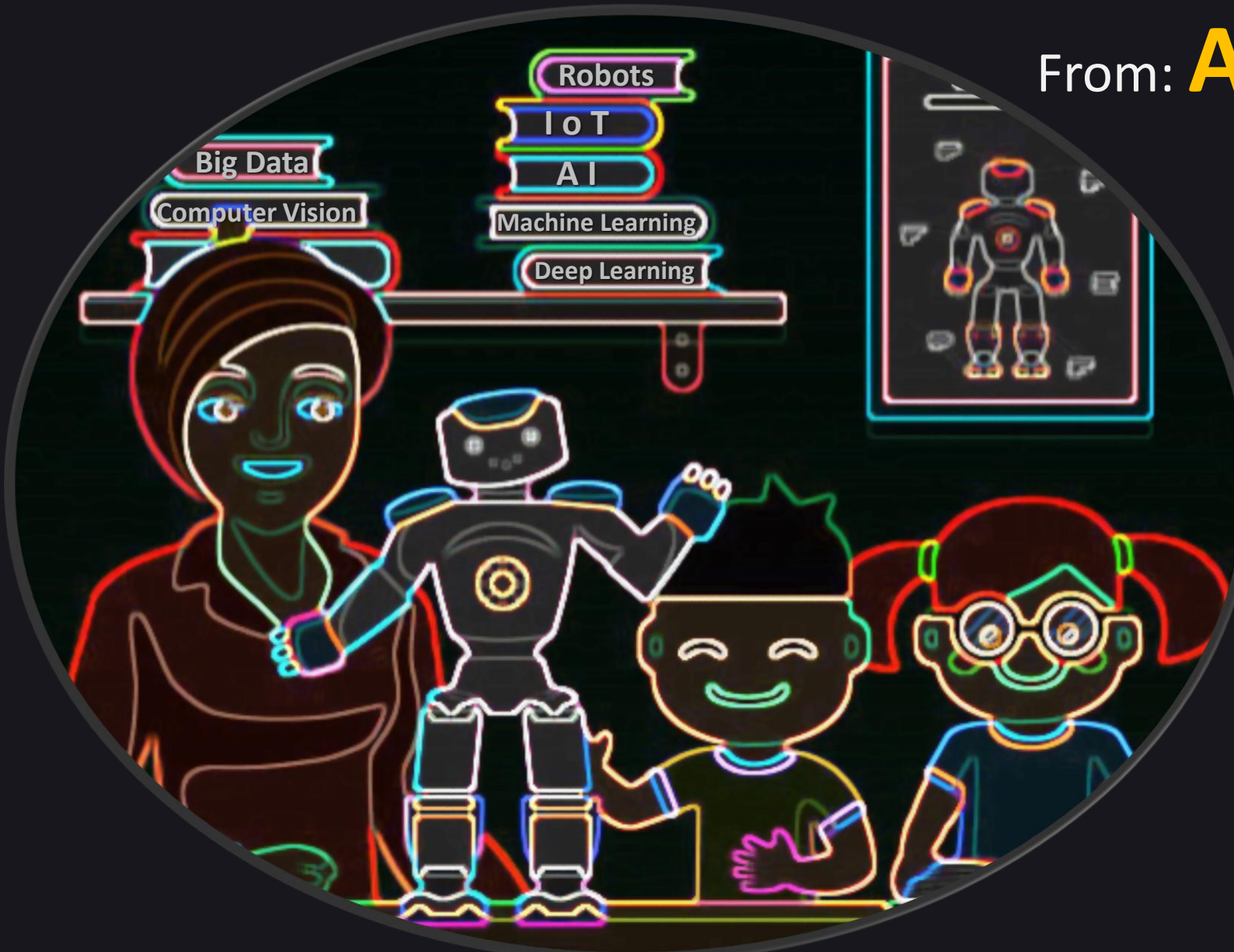
To: **Amateur Robot Apps Developers**

Advice from the frontline staff of Elderly Centres and Kindergartens

Outlook for Transformation

4

From: **AI Ed 4 Gifted**



SEN

To: **AI Ed 4 All**



Thank You
Any Questions