APAS
汽車科技研發中心

5G IoT

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Content

Cellular Technologies Evolution

Use Cases

5G & V2X Related Projects at HKPC

HKPC 5G IoT test bed

Technologies Evolution

1G

- AMPS
- Analog based
- Basic Voice service
- 2.4Kb/s
- 1981

2G

- GSM, CDMA
- Digital
- Designed for Voice
- Full Coverage
- Low Cost
- 64kb/s
- 1991

3G

- WCDMA
- Voice & Data
- Broadband
- 2Mb/s
- 300ms
- 2001
- Internet
- iPhone 2007
- IoT data 2008

4G

- LTE
- NB-IoT
- Data & Voice
- IP v6
- 100Mb/s
- 40ms
- IoT info
- 2011

5G

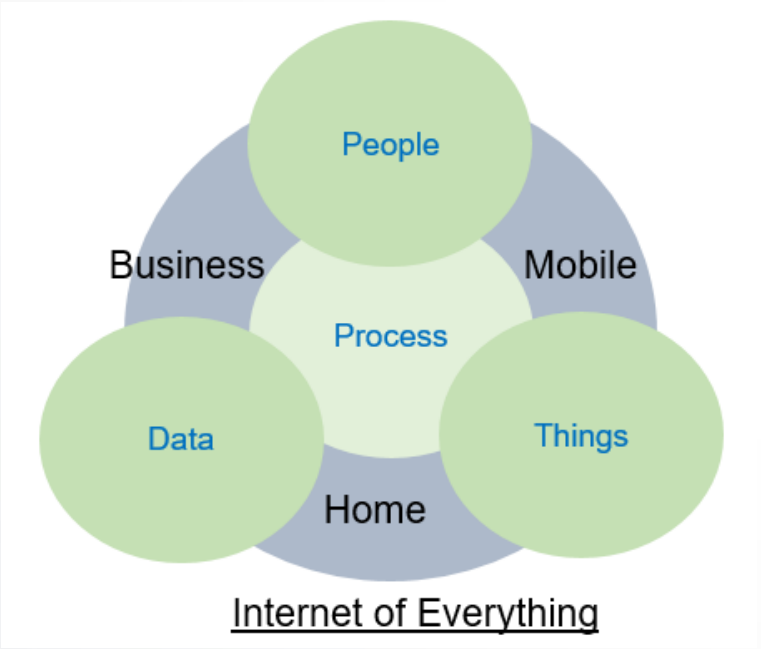
- 1Gb/s
- 10ms
- Big Data
- AI
- IoT wisdom
- Real time
- Smart Factories
- Smart Transportation

IoT and 5G

IoT Device: any device that is able to communicate with each other or the internet

IoT Network creates an intelligent

>90% not connected



Artificial Intelligence

Devices collect and process data

make decision and act on that data without involvement by human

Cloud Computing w/ 5G connectivity

- Low energy
- High density
- High capacity
- High data rate
- Strong security
- High latency
- Big Data
- Data Analytic
- Model, Pattern, Prediction

Unleash cloud computing, AI, human intelligent

5G Use Cases

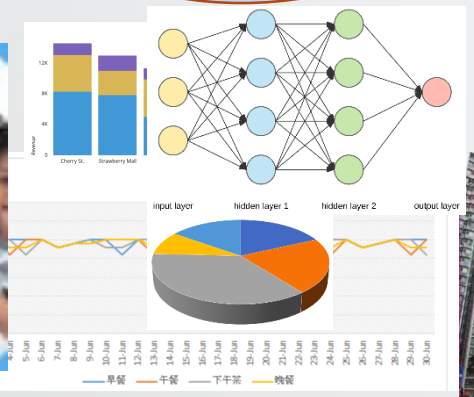
Smart Farming	Autonomous trucks, sensors
Digitized Education	AR, VR
Connected Healthcare	Real time diagnosis and treatment of patients everywhere AI ability to assist with data processing and analytics mean more accurate modelling
Smart Factories	Predictive maintenance
Connected Smart Cities	Smart Street Lamp, Smart Prison
Better Venue experience	Smart ticketing, indoor navigation, smart parking, autonomous ride share
Smart logistics at container ports	Autonomous trucks
Smart Airport	Asset tracking, autonomous luggage vehicles, passenger assistance, gate boarding pass
Smart Transportation	Pedestrian safety warning, smart lighting, smart parking, truck platooning, Vehicle telematics, Infotainment
Public Safety	Real time video, secure communications

Connected Healthcare

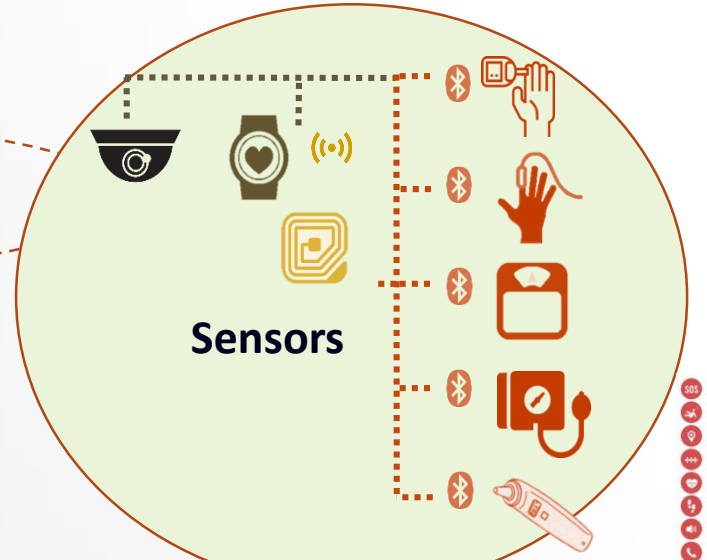
Services

- *Professionals*
- *Monitor centre*
- *Caregivers*
- *Family*

Cloud Computing



Sensors



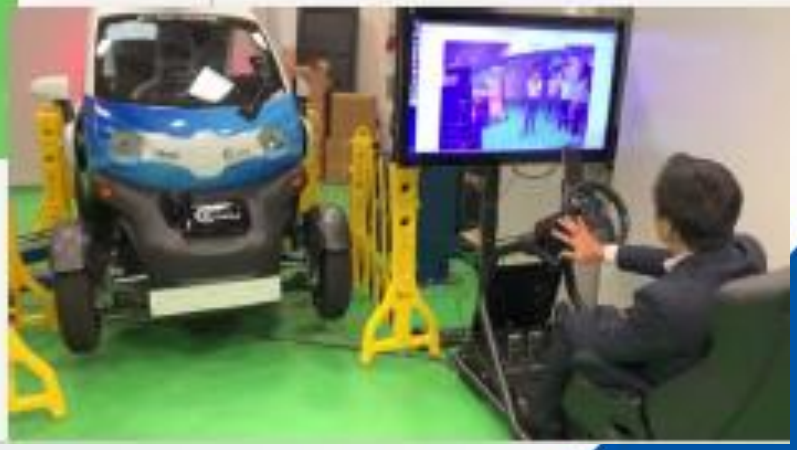
- One press SOS
- Fall Alert sensor
- Positioning (GPS/Wifi/LBS)
- Geo-Fence (Circle/Polygon)
- Heart rate monitoring
- Activity monitoring
- Voice menu/ Voice control
- Two ways voice call

- *Ageing in Place*
- *Elderly Home*
- *Medical Centre*
- *Community Centre*

Autonomous Vehicle Development Platform

Teleoperations for Autonomous Driving via 5G

5G

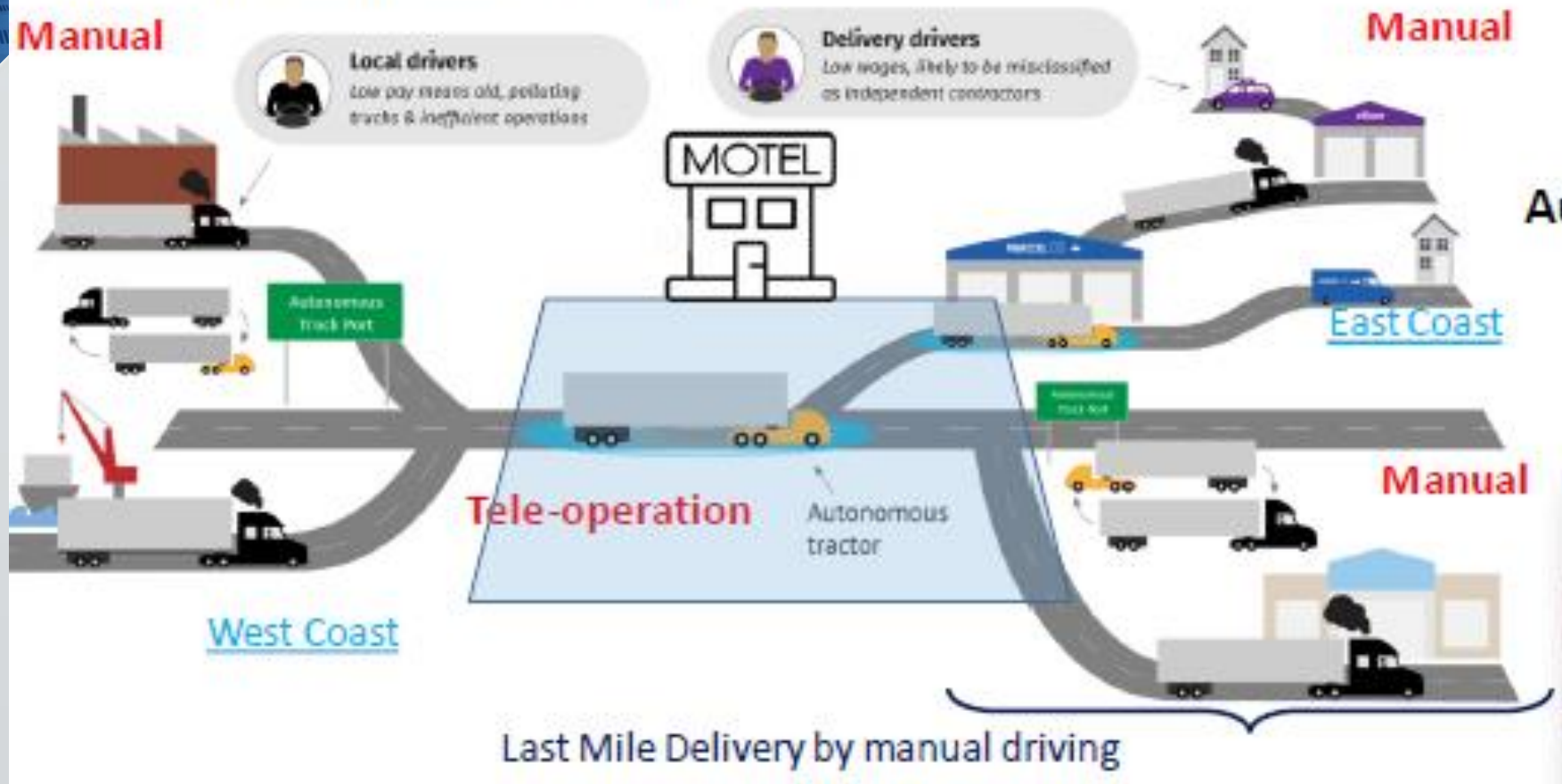


- Real-time HD front video streaming
- Steering control
- Brake control
- Throttle control

} Drive-by-Wire (DbW)

Teleoperations for Autonomous Driving via 5G

Last Mile for L4/L5 autonomous or teleoperated driving in highways (e.g. US east coast – west coast)



- Long hours of isolation far away from home
- High turnover & a shortage of drivers

Autonomous + Teleoperation

- Centralized control centers
- Home driving

Platooning Operations for Fleet Vehicles

Full-Scale Autonomous Truck Platooning Operations

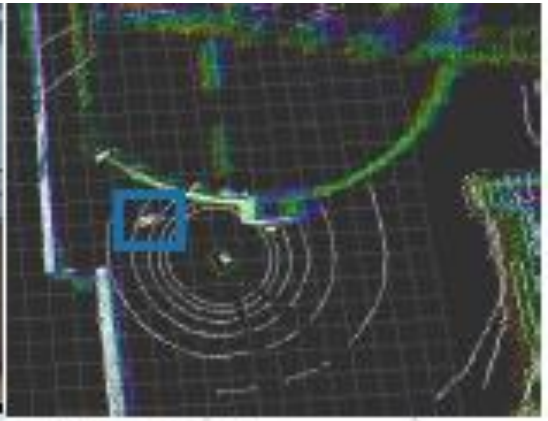
- Lead truck + 3 trucks autonomously driven
- Precise docking / undocking of cargo
- Save lives & decrease environmental impact
- Fuel savings and increased road safety

- Lv.4 driverless with Safety
- Fuel savings 7% (4.5% lead truck, 10% for followings)
- Intelligent pairing by Network Operations Cloud (NOC)
- Teamwork

Low Speed Autonomous Mobility – Mini Mover

- Capable of moving to destination autonomously
- Plan suitable path with collision avoidance by A.I. and sensor fusion technologies
- Perform short distance delivery tasks in a less labour intensive way

Object recognition with distance estimation



LiDAR - Simultaneous Localisation And Mapping (SLAM)

New version

5.9G Hz band for ITS applications

V2I (traffic lights)

V2P (vulnerable road user)

V2V Safety

HKPC 5G IoT

推「5G應用平台」 供測試自動駕駛

讚好 0

奎力局汽車零部件研發中心總經理潘志健（左）說。研發中心新推 .....（朱安妮攝）

訊】5G網絡今年4月陸續推出，政府為鼓勵各界及早使用技術以推動創新和智慧城市，透過第二輪「防疫抗疫基金」推出「5G技術資助計劃」，每個項目上限資助50萬。力促進局於旗下的汽車科技研發中心推出「5G應用測試平台」，提供測試專用的5G內外場地、小型自動駕駛平台等，冀與5G應用的開發商合作開展研發項目。

汽車科技研發中心總經理潘志健表示，自去年中已開始籌備「5G應用測試平台」，今年3月初正式推出，現與中國移動合作，於佔地約1.3萬平方呎地方安裝3.5吉赫5G網絡，包括

5G IoT with HKPC

to accelerate industry evolution to 5G network and services

Bridging industry partners together
to accelerate their 5G journey to reality

Incubator 5G technologies
5G & WiFi 6 Coverage
5G Test Bed
Data Security
EMC Test
Cloud Computing
Patent Application
Funding Schemes
Consultation & Training
Publicity

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build business case

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Automotive Platforms and Application Systems (APAS) R&D Centre
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