People Tracking & Counting mmWave Radar Products

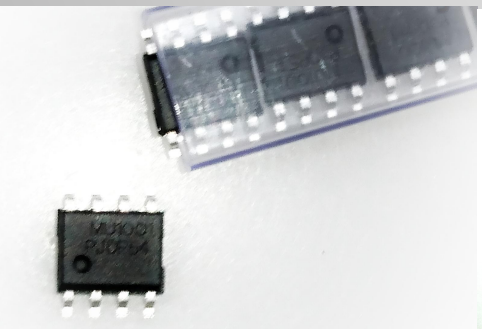
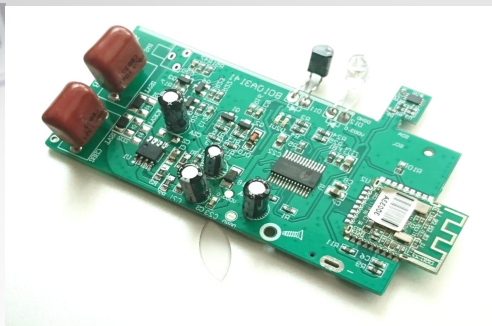
2018-10

About MIoT MIoT Limited

The member company of Incu-Tech Programme
Hong Kong Science and Technology Park

Focus in IoT Power Devices and Frontend Modules since 2017
Fabless design house and Electrical solution provider
Making Integrated Circuits (IC) and Electrical Modules
Providing the IoT solution with modules

Key partners in the IoT solution
Security devices with Infineon as Independent Design House
Software and Cloud with Remotec & KingCity
Processors with Dragonchip

People Tracking Radar

Technology derived from automotive radars for auto pilot

Radar signal sent out and bounced back when hitting obstacles

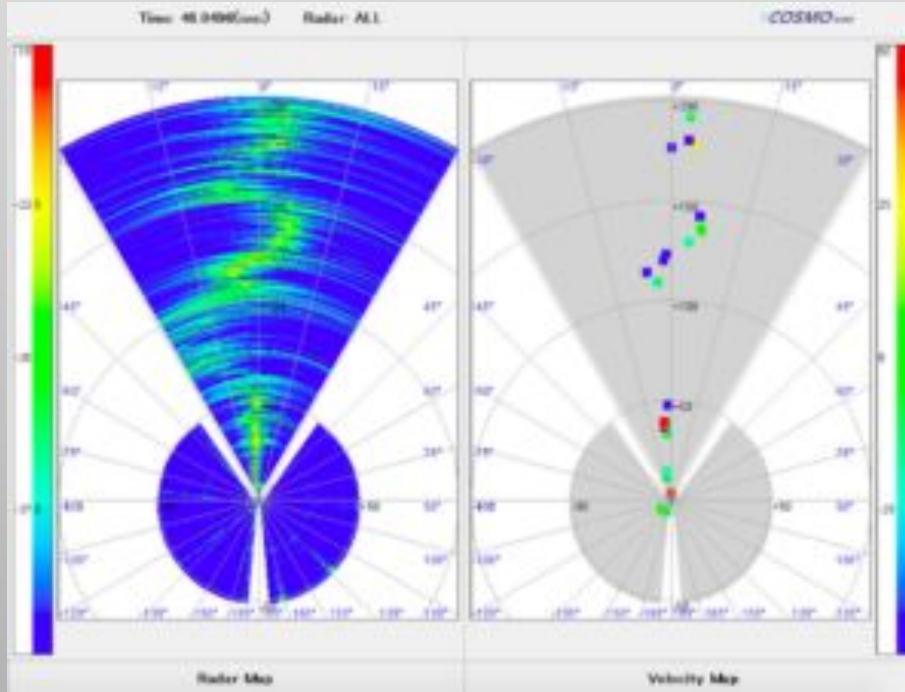
commercial use : scan range from 1m to 20m (limited by RF power)

identify motion speed (doppler),
object location and size (FMCW)

detect multiple objects concurrently

no exposed antenna
hidden installation

self-contained processor
no powerful server or network needed



Commercial Market Needs

replace human

anti-wandering 防遊走 : bring down the cost of facial cameras

offline visitor count report for marketing analysis

active visitor count for crowd control

people tracking and customer behaviour study

staff tracking and KPI management

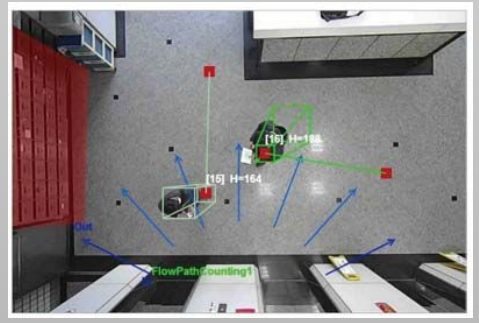
face recognition + customer tracking for long-term behaviour study

Today's Technology

CCTV + People Counting Software

Widely adopted for counting on floor area
limited by the ceiling height
limited scan area 3x3 meters
low accuracy <80% with missing human heads
tracking takes many many cams

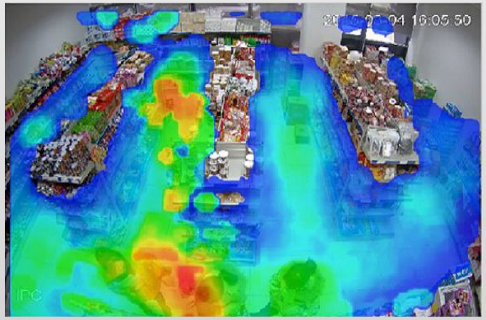
3D Camera Stereo + Powerful Computer



newly adopted for counting on floor area
limited by the ceiling height
higher accuracy >80% by 3D scan of heads
high speed computing with every cams
wireless impossible

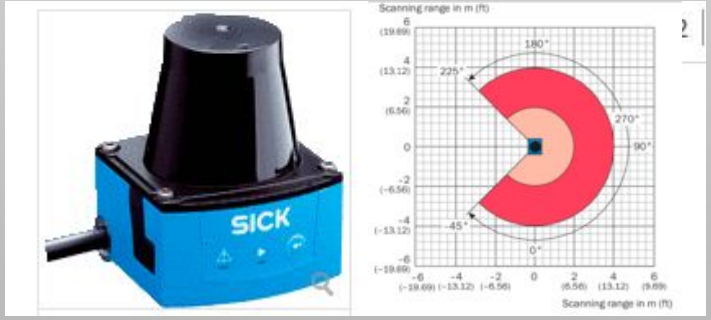
Today's Technology

Heat map camera



newly adopted for counting on floor area
limited by the ceiling height
good to discount non-infrared emitter (non-human)
indicate people flow but no accurate count
not for all weather conditions
tracking not possible

2D Lidar



newly adopted for counting at doors
limited by the scan area and obstacle
tracking not possible

Customer's problems

High accuracy >90%

Large floor area and partitioning

Privacy

Real-time tracking and computing power

Study customer behavior

Manage retail staff behaviour

About mmWave Radar

mmWave Radar
= wavelength in millimeters = 30G~300GHz
start with automotive radars :
park assists, blind spot detection, collision detection for auto pilot
commerized for people counting & tracking
with two major players for mmic sensors : TI and Infineon

24GHz Doppler/FMCW
lower resolution & cheaper
object detection <3m
gesture control

60/77GHz FMCW
higher resolution & powerful
tracking : distance, angle, direction
range<20m

77 GHz People Tracking Radar

Features

- people counting scan range in 5x10m^2
- high accurate counting ~90% in open field
- background adaptation to obstacle elimination
- no camera recording, no violation of privacy

Scanning

- human body above 1 meter typically
- number of scan objects under 10 typically
- scanning different moving speed & phase

System Context

- King City people counting & tracking algorithm
- TI mmWave radar 77GHz
- networking 10/100 or WiFi or NBIoT
- DC or PoE power with 7.5W
- water splash proof case
- safe radar power far below FCC EIRP limits (1/10 power of WiFi router)

Test Site in Wanchai car park

24 GHz People In-out Counting Radar

Features

- object detection scan spot in 2x5m^2
- high accurate counting ~90% in open field
- tiny module hidden after ceiling / inside lamps
- no camera recording, no violation of privacy

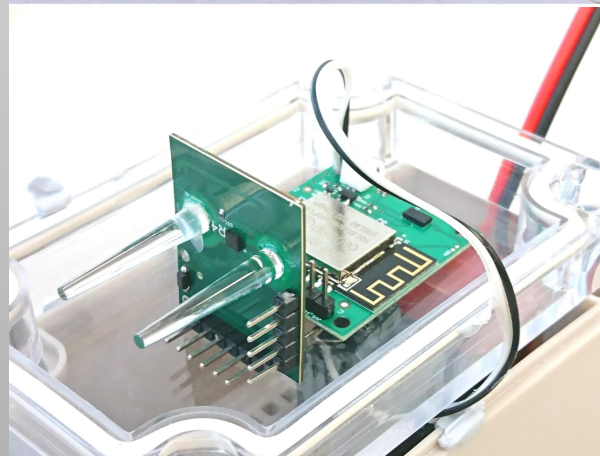
Scanning

- human body above 1 meter typically
- scan internal of 1 second
- scanning different moving speed

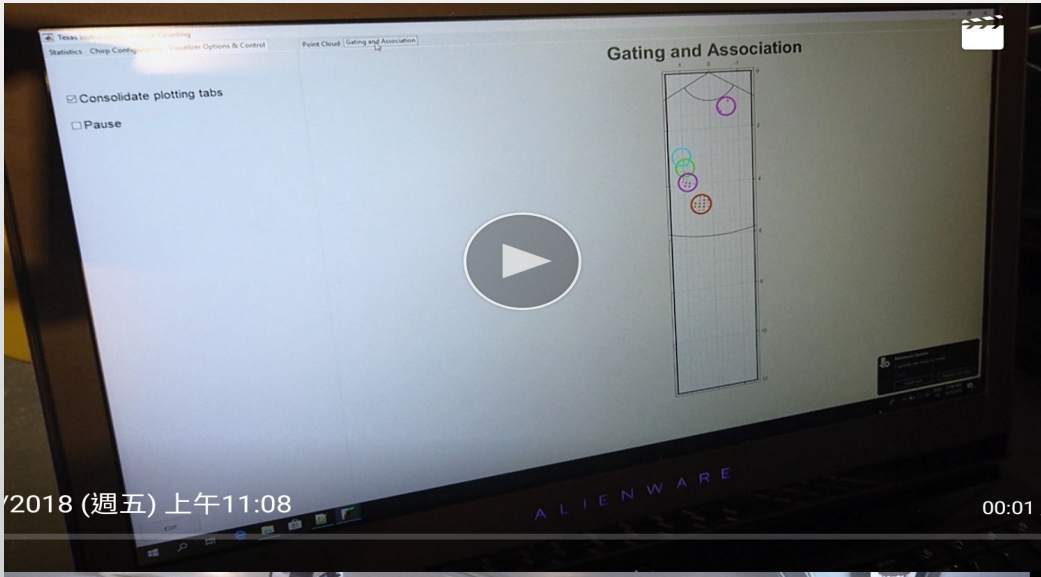
System Context

- King City people counting & tracking algorithm
- Infineon mmWave radar 24GHz
- networking 10/100 or WiFi or Sigfox or NBIoT
- DC or PoE power with 1W
- water splash proof case
- safe radar power far below FCC EIRP limits (1/10 power of WiFi router)

Test Site in HK Science Park



77 GHz People Tracking Test in Wanchai Car Park



Applications and Markets

People Tracking and Counting
in shopping malls
in exhibition malls
Help to evaluate rental fee

People In-out Counting Radar
in shops
in hotel rooms
Help to evaluate occupancy

Arm Motion Recognition Radar
in retail stores
Help to evaluate list prices

Case Study
A car park

Customer's need

crowd control under fire regulation
open border and no special entrances
using facial cameras but too low ceiling and too wide entrance/border

Solution

77GHz people tracking radar
people's staying location and time

Case Study
An art gallery

Customer's need

visitor count (discount employees)
using facial camera but many miscount with employee escape

Solution

77GHz people tracking radar
discount employee's track from the service desk
visitor's staying location and time
high privacy

Case Study
An exhibition organizer

Customer's need

visitor tracking among exhibition booths
conventional method to use RFID badges but not accurate
identify visitors and locate them in booths

Solution

77GHz people tracking radar with RFID/barcode badges
customer's track from the entrances to booths, and staying time

Case Study
A furniture store

Customer's need

study customer behaviour
customer's shopping path
which sofa customer tried
serving time by sales persons

Solution

77GHz people tracking radar
customer's track and staying time
(with a special badge) differentiate a sales person from the customer group

Case Study
A cosmetic retail chain store

Customer's need

study customer behaviour
which items picked up and looked at
customer's shopping path

Solution

24GHz gesture detection radar
human body moving in and out
human arms putting in and out
with items or not (if the item is big enough)

MIoT Limited
Contact

ming@miothk.com
whatsapp : 53897304
wechat : 13068414304

Room 519, Building 5W
Hong Kong Science Park
Shatin, Hong Kong