

Thundercomm

— AIOT ENABLER —

www.thundercomm.com

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Part **01**

Brief Introduction



Thundercomm

World Leading IoT Product and Solution Provider

A Joint Venture of *ThunderSoft* Qualcomm

Company Profile

- Founded in 2016
- 600+ Employees
- 90% Engineers
- 100+ Patents
- 10m+ Shipments Support
- 300+ Customers

Products & Solutions

- 10+ TurboX SOMs
- 20+ Turnkey Solutions
- 10+ E2E Solutions
- 10+ AI Algorithms
- IoT OS (Edge / Cloud)

Core Technologies

- OS Optimization
- Artificial Intelligent
- Multimedia
- Cloud
- Edge Computing
- Security



Origin

Found

Rapid Growth

2011

Joint Lab



2016

Joint Venture

Thundercomm



2018

Joint Innovation Center

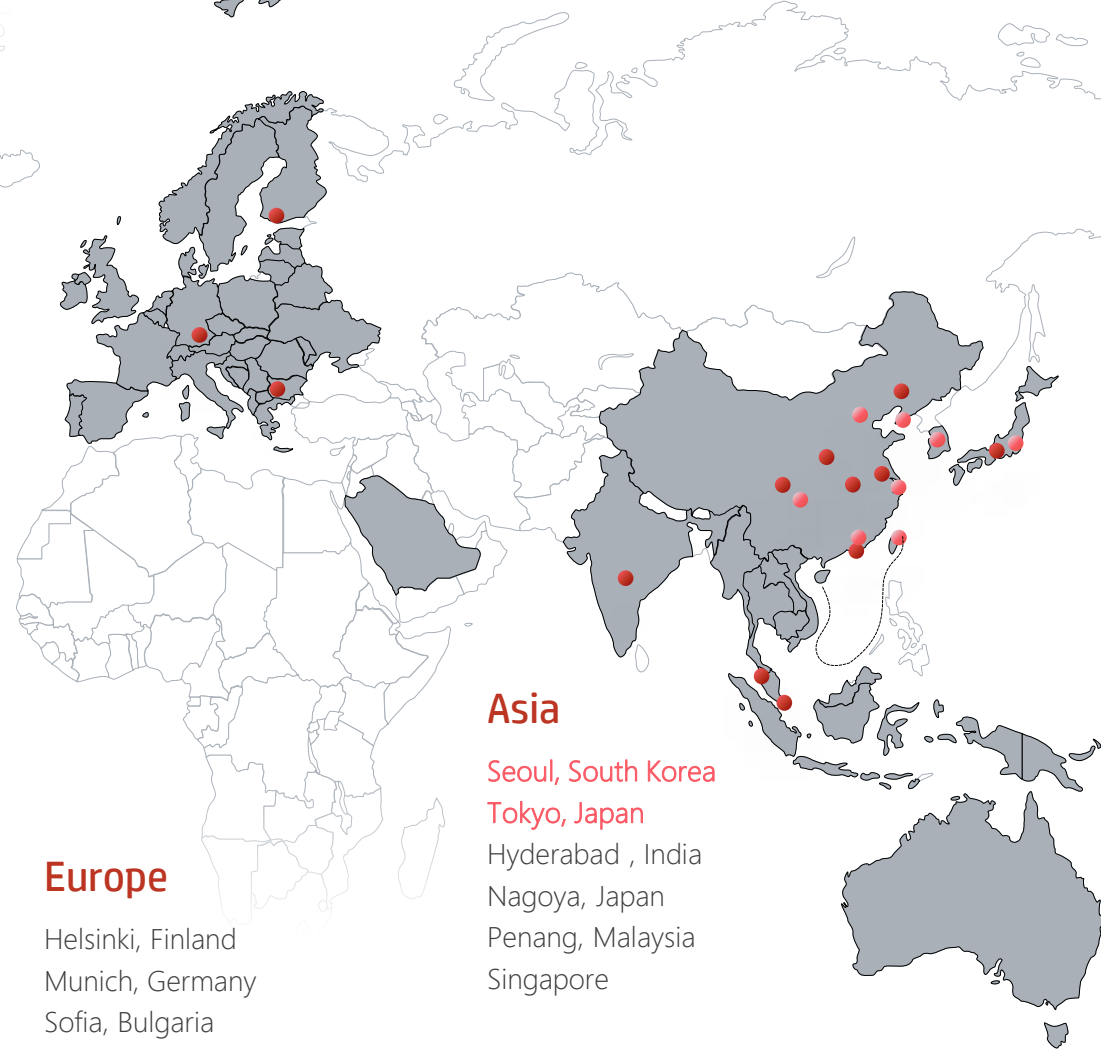


2019

Joint Venture with Ability



Footprint



10 R&D Centers

10+ Sales Offices

10+ Global Distributors

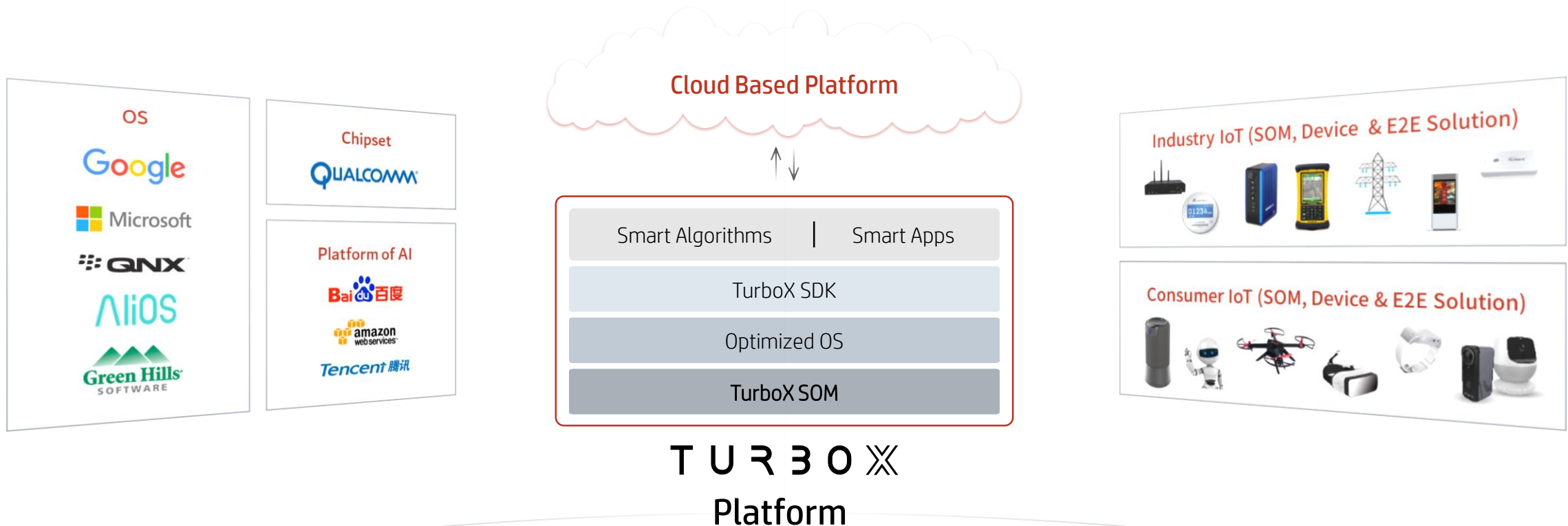
China
Beijing, Chongqing, Dalian, Shanghai, Shenzhen, Taipei, Chengdu, Hong Kong, Nanjing, Shenyang, Xi'an, Wuhan

What We Do

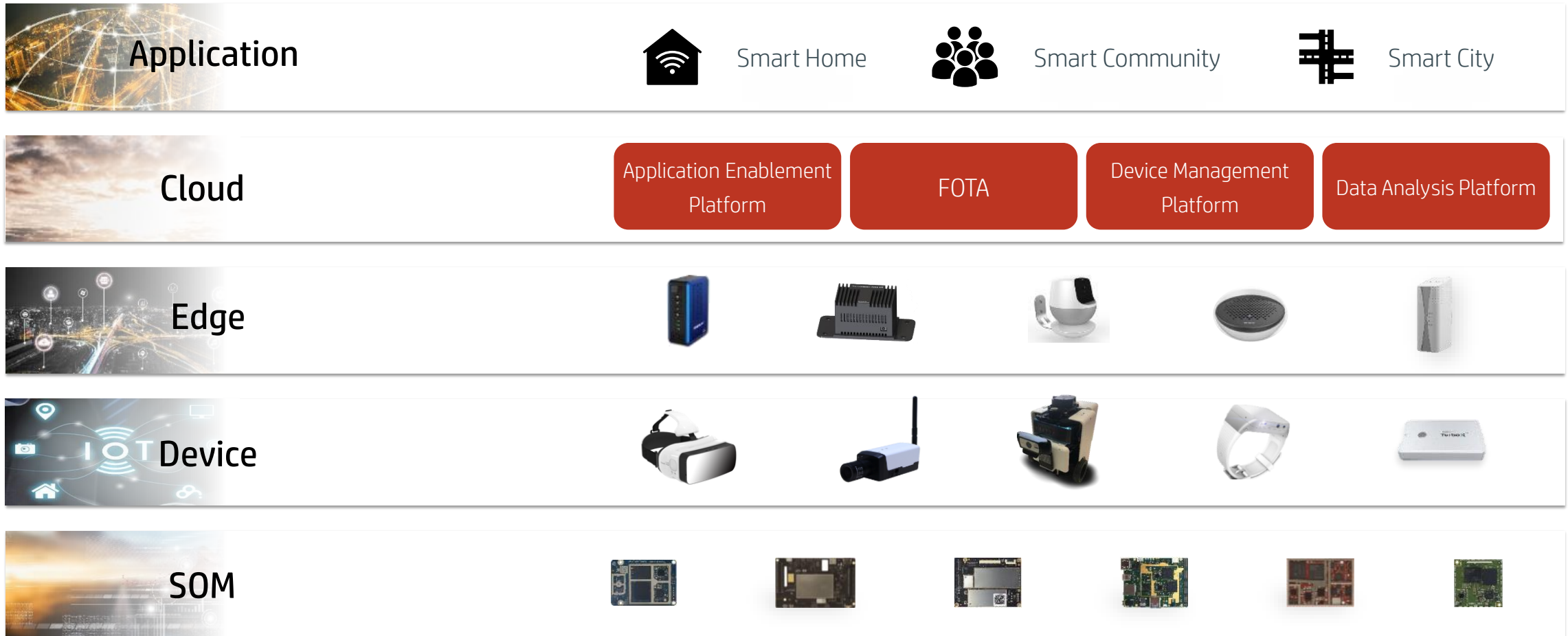


Our Value Propostion

Thundercomm Value-added Scaling Partner



Short Time to Market | Effective Cost | Better Experience | High Quality



Success Cases (Consumer IOT)



Lenovo
Thinkreality A6



HiAR Glasses



Rokid AR Glasses



Vuzix AR Glasses



Find Smart Piano



Polycom Video Conference
System



Junyao
Digital Signage



Braincorp



iRobot Roomba i7+



Linkflow FITT360
Wearable Camera



SKT Smart
Home IPC



360 Fly Fish
Eye Camera



Allie Home
720 Degree IPC



Qualcomm IPC
Reference Design



ASU Projector
Smart Watch



Confidential Brand
Sports Smart Watch



Confidential Brand
Smart Speaker



Gatebox
Smart Speaker



Baidu
Smart Speaker



Drone for
Zero Tech

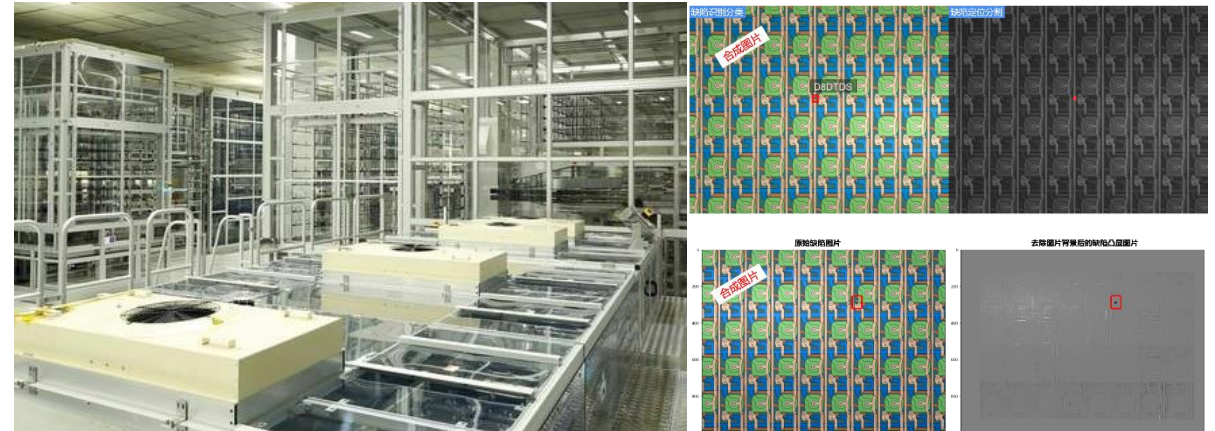


Hover
Camera

Success Cases (Industrial IoT)



Super I-shanghai (Digital Signage)



BOE OLED Defect Inspection (Visual Inspection)



T View sense (Indoor Monitoring Camera)

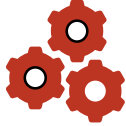


China(Nanjing) Software Valley (Smart Access)

Part 03

Core Technology & Capability





BSP

- Extensive peripheral driver development
- Boot time optimization
- DDR/eMMC chips compliance tuning
- MIPI/HDMI/PCIe/USB/SDIO driver tuning for high speed signal quality assurance
- Irregular/Multi display panels enablement for IoT products



Edge Computing

- Full stack experience in Linux, Ubuntu, Android, RTOS, ROS and etc.
- Kernel and security patch upgrade
- Dual OS support for Enterprise and Personal
- AWS Robomaker/Greengrass support



Connectivity

- Customize Wi-Fi module on Qualcomm chipset
- Bluetooth stack optimization
- Bluetooth profiles customization for IoT products
- Bluetooth SDK for IoT device management
- Support BQB/WFA/PTCRB



Tools

- Factory tools
- Fish-eye camera calibration
- AI development studio
- VR testing tool
- Tuning/Calibration Tools



Hardware

- EE system design for IoT/Automotive products
- RF design for Cellular/IoT products
- Familiar with global operator requirement and regulation
- Mechanical design with consuming/industrial products
- Antenna design for 2G/3G/4G/5G
- HW Lab(PI/SI/RF/Thermal/Power/Reliability...)



Graphics

- Work with Qualcomm to enable its ImproveTouch technology
- Work with Qualcomm Graphics team on VR SDK
- Performance tuning for graphic subsystem
- Customize SurfaceFlinger/hwcomposer
- Algorithm implementation and optimization with OpenGL/openCL/fastCV ...
- Gstreamer and it's plugins on Android/LE system



AI

- AI apps for smartphone, IoT, automotive
- AI Algorithms: Face Recognition, Object Recognition, Food Recognition, Quality Inspection, Video Analysis, Object Tracking ...
- AI Services: Data Collection, Data Labeling, AI Model Training, Algorithm Optimization, Platform Benchmarking...
- AI SDK: Algorithm Protection SDK, AI Task Scheduling SDK, AI Acceleration Library, Camera SDK
- AI Integration: Framework Integration like SNPE, TensorFlow, Caffe, ONNX, MACE



Performance & Power

- Thundercomm Power Saving Solution
- Thundercomm Thermal Optimization Solution for consuming and automotive products
- Performance balance
- Touch latency/accuracy improvement
- Boot time optimization
- Smaller memory footprint
- App launch time improvement



Camera

- Deep customization of the camera low-level system
- One ISP support two bayer cameras concurrency
- Multi camera concurrency and 2A sync
- Non-MIPI Camera support(LVDS, Long-range-SerDes, UVC...)
- External ISP/DSP/FPGA support
- HDR algorithm development and performance optimization



Cloud

- Multi-Cloud connection (Aliyun/AWS/Azure IoT Hub)
- EdgeX Software stack
- FOTA and Device Management SDK
- RANCHER K3S on AI Kit
- Micro service and Buffering design



Audio

- Familiar with Qualcomm audio+ technology
- Mic-array(8 mics and 5A+6D) and Qualcomm Fluence Pro integration
- Audio codec software implementation and DSP algorithm optimization
- Enable 192K 24bit headset & speaker playback.
- Audio detection, Voice wake up, noise suppression
- Audio standard certification (Dolby, DRA, AVS)



Security

- Dual OS
- Encrypted Communication (Call, SMS, VoLTE, IM App)
- Enterprise application
- Security certification Solution for China Market
- Finance Secure middleware for OS
- Digitalization of assets

On-device AI Technology & Service Provider

AI Technology & Services

- AI Algorithm Development, Optimization, Training
- AI Compute Modules: 404/450/603/605/626/820/835/660/845



System & Solution

- Smart Retail, Smart Manufacturing, Smart Vehicle, etc.



AI Resources

- AI Resource: 20+
- Data Annotation: 30+ (in Chongqing)
- Camera Resource: 500+ (Thundersoft resource pool)



On-device AI Algorithms



3D volume detection



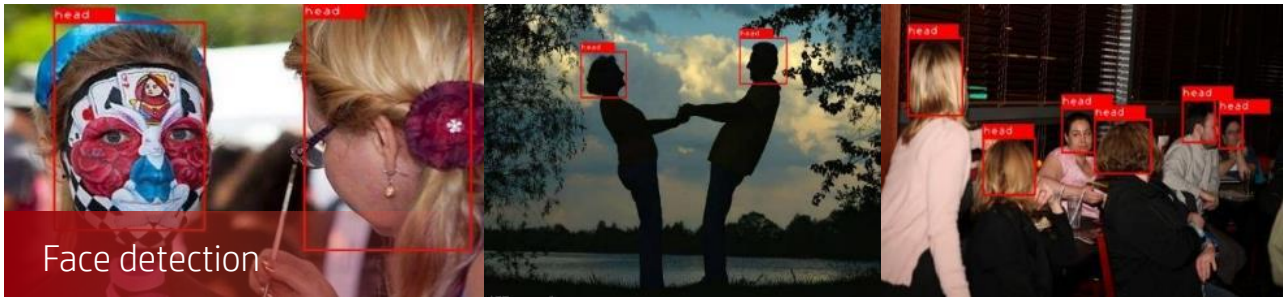
Scene detection



Object detection



Number recognition



Face detection



Face recognition



Feature detection

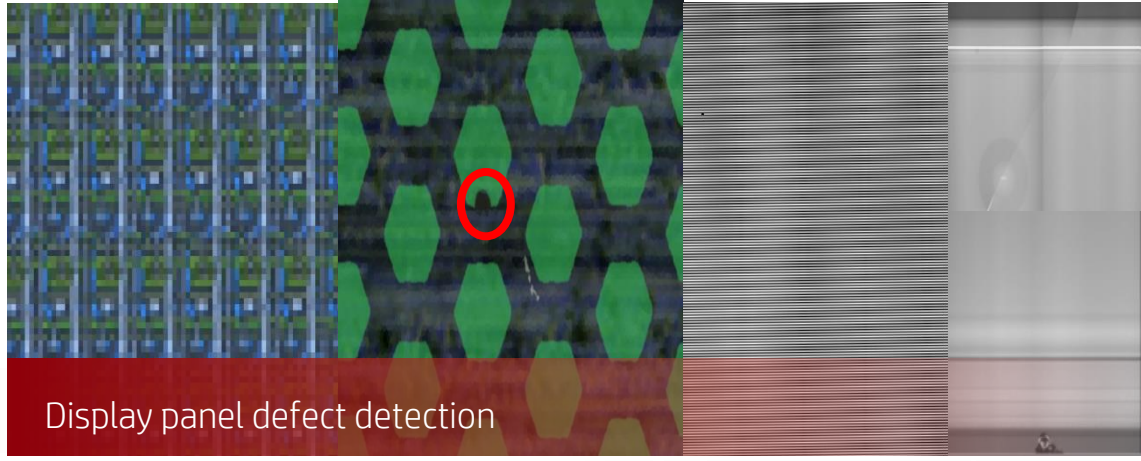


Age / gender / emotion detection

Industrial IoT AI Algorithms



Public facility defect detection



Display panel defect detection



Textile product defect detection



Components and parts defect detection

Camera Full Stack Solution

Drive

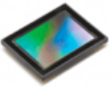
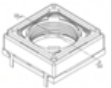


Image sensor
IR, mono, RGB



Flash
Xenon, LED, dual color



Voice Coil Motor
VCM, HVCM, EVCM



MEMS



Stereo & array camera

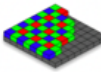


CSI switcher
HDMI to CSI, parallel to CSI

Image Processing & Algorithm



ISP
IR, mono, RGB



Bayer domain
Temporal noise filters, chroma aberrations corrections



YUV domain
Edge enhancements, spatial and temporal filtering



Algorithm
Porting, optimization



Stereo & array camera
Stereo, depth, object segmentations and tracking, fusion



3A
Auto exposure, Auto white balance, Auto & continuous focus, Flash control

Tuning & Tools



Studio



Outdoor



Benchmark & report



Calibration tools



Factory tools

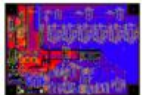


Tuning tools development

Design and Consulting



Schematic capture, review and simulation



Layout design, review and simulation



High speed interfacing
CSI, DSI, HDMI, USB , PCIE, Ethernet



Digital & Analog signal capture and conditioning



Power and thermal management



GPIO, I2C, SPI, Display , Touch, Sensors

Manufacturing



Bare PCB contracting



PCBA contracting



Prototypes production and bring-up



Product safety and compliance



Pilot run and small volume production



Production test jigs and support

Quality Management Support

ISO9001 Quality System

- Internal/External Audit
- Management Review
- KPI Management
- Document Control
- Continuous Improvement
- Corrective/Preventive Action



- All Critical Issues Collection and Review
- Root Cause Analysis and Corrective Action Report



- Company Business Plan Breakdown
- Department Goal Definition
- Personal KPI Definition Basing on Department Goal
- Monthly KPI Self Assessment and Review
- Perform Improvement for Non-Achievement



- Proposal and Rule Definition
- Propaganda
- Perform Training
- Collection and Review
- Progress Tracking and Coaching
- Final Report Collection and Review



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Empowering Every IoT Device with Our Technology

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