



Empowering Dual Transformation with Edge AI

Joe Yeh



ELAN Microelectronics Corporation

全球客戶群



義隆引領人機介面技術的未來

Touchscreen



E-Paper



Touchpad



Point Stick



Fingerprint



Mouse



Our Human Input Product Lines

Smart Card



Smart Touch



義隆解決方案橫跨多樣化應用

Innovative Interfaces for Everyday Experiences

Notebook

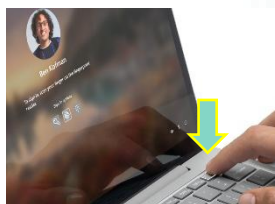
Touchscreen



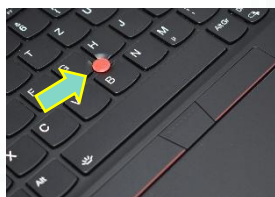
Touchpad



Fingerprint



Point Stick



Wearable



AI Glasses



Micro LED Watch



Gesture Watch

Drone



Mini-LED RC

Mouse



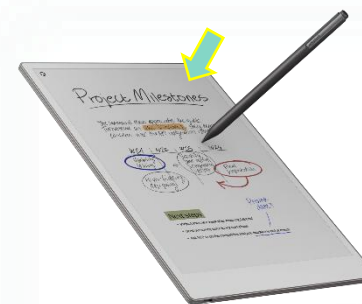
Gaming / Office Mouse

Smart Card



Cold Wallet with FP

E-Reader



E-Reader with Stylus

帶有AI功能的觸控螢幕晶片技術亮點

#1

Touch IC Market

10 – 18"

Support Size

AI Enabled

Pen Track Prediction
Palm Rejection
Gesture Recognition
Moisture Proof

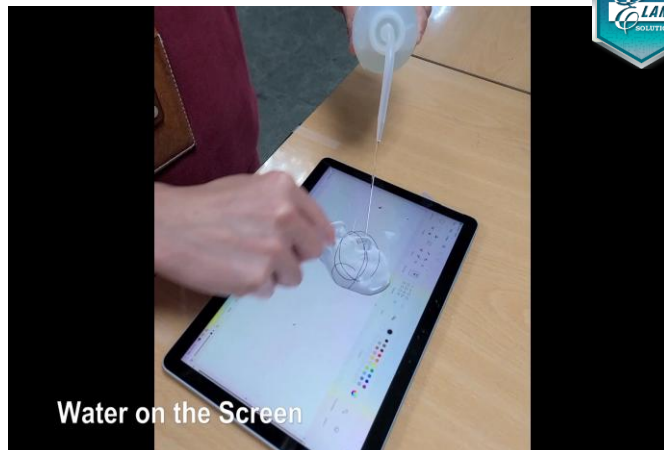
Touchscreen

50%⁺

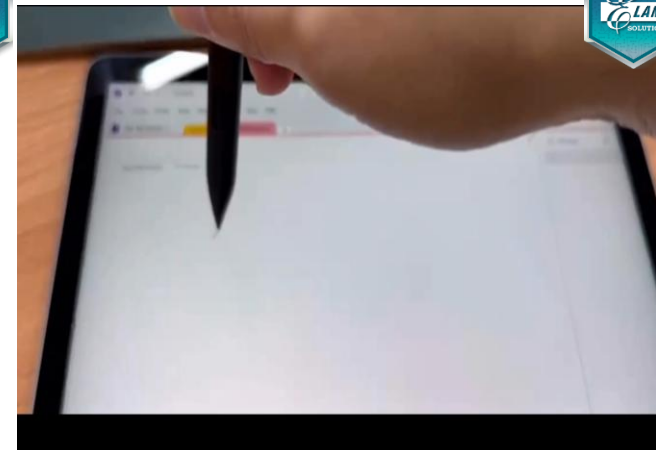
Market Share



500Hz Pen report



Waterproof & Glove Solutions



AI Prediction – Short Latency

AI賦能的觸控螢幕晶片-電子書



reMarkable

R kobo

Bigme

mooInk

ONYX
BOOX

掌阅
引领品质阅读

小猿

科大讯飞
IFLYTEK

EPD with ELAN Capacitive Active Pen Application



AI 融合觸控板模組技術亮點

#1

Touchpad Market

50%+

Market Share

Smart-UsabilityTM

Best In-Class Palm Prevention

AI Enabled

Palm Rejection
Gesture
Noise Immunity
Moisture Proof

Touchpad



Pen on Touchpad



Lighting Pad



Training with AI Tool



Handicap with AI Training

AI 加值的指紋辨識模組創新成果

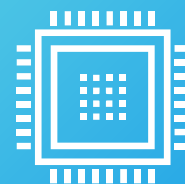
#1

Notebook Market

100%

In-House
Algorithm

Smallest MOC
Highly Brand-Compatible



AI Enabled

2.5D/3D
Anti-Spoof

Fingerprint

MOH&MOC

Single-Chip
Encryption



Fingerprint Features



Anti-spoofing Solution



Optical FP



義隆非筆電的解決方案

Mini LED Local Dimming(區域調光)技術應用於車用及無人機



>1000nits
High Brightness



>20000:1
High Contrast



>600
HDR



Power Saving
Extended Battery Life



ELAN Mini-LED Local Dimming



戶外觸控螢幕晶片解決方案可應用領域

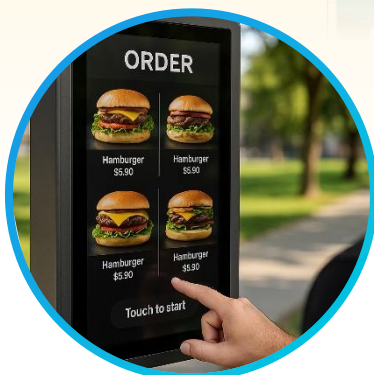


Outdoor Solution



Outdoor Devices

EV Chargers
Smart Infrastructure



Interactive Kiosks

Self-ordering
Public Terminals



Marine Use

Onboard Systems
Yacht Electronics



Military Field

Rugged Mobility
Tactical Command



Medical Use

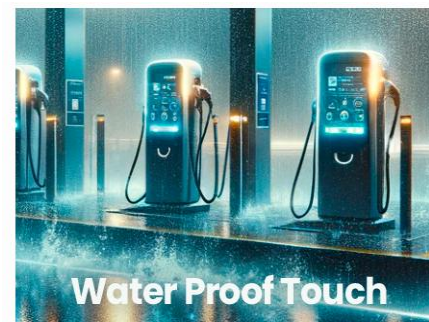
Surgical Tablets
Healthcare Devices

戶外觸控螢幕晶片解決方案獲獎肯定

New Solution for Raining Water Touch, Glove Touch and Salt-water Touch



AI Enabled Touchscreen Solution for IPC
AI賦能工控電腦觸控方案



智慧觸控解決方案



Ultra
Low Power



Support
Waterproof



Support
Glove Touch



Support
Gesture Touch

Gestures Touch

htc



Touch Screen

LEDGER



Touch Screen



OLED



Micro LED

Touch Function Row

DELL



Touch Button



Indoor
Lock



Outdoor
Lock

Touch Start Button



HTC 發表搭載義隆智慧觸控方案的 VIVE Eagle AI 智慧眼鏡



ELAN TOUCH INSIDE



Gesture Touch



Tap

Single / Double / Triple



Swipe/Slide

Single Finger

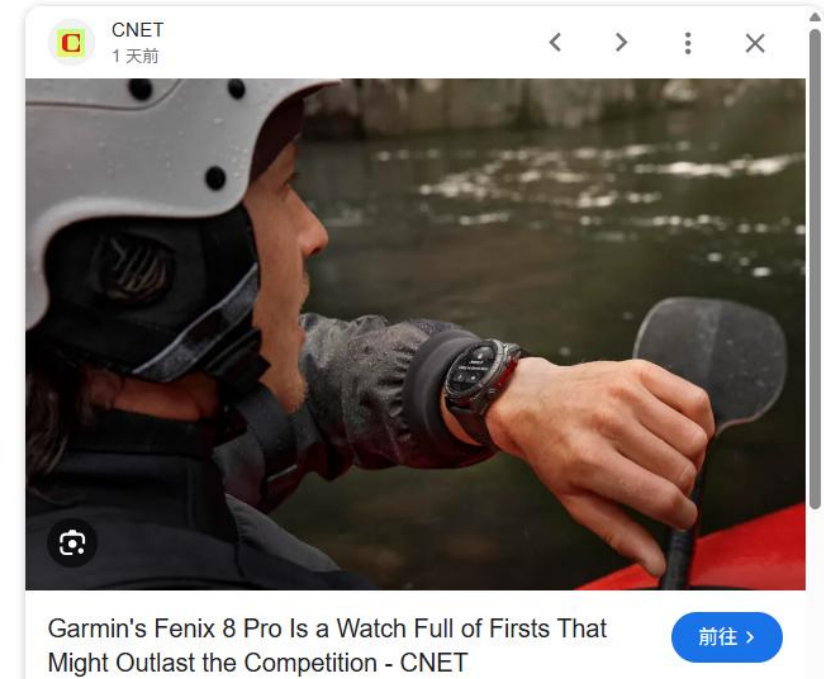


Garmin 發表搭載義隆穿戴式智慧觸控方案的 fēnix 8 Pro 微型 LED 智慧錶

GARMIN



Anti-Droplets Triggering for Extreme Sports



Built for Harsh Conditions

- ✓ Waterproof Screen
- ✓ Glove Touch
- ✓ Extreme Weather

帶有AI功能的生物辨識智慧卡



World 1st
Under PVC/PET
Exclusive Solution



Ultra-low
Power
Fingerprint Sensor

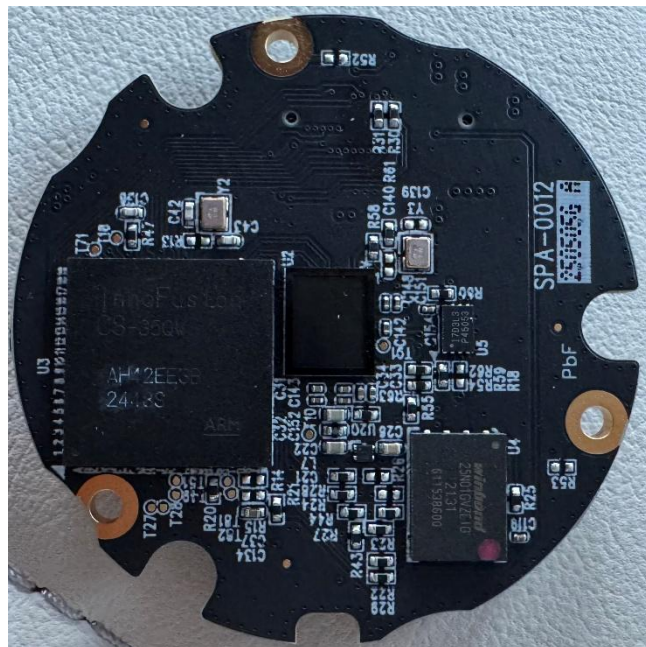


Battery-Free
with Epaper
Support



VISA





義隆終端裝置AI核心技術



中研院×義隆 世界領先的影像辨識AI模型

Server-based (open Source)

CSPNet (2019)
Google Citation: 5,311
FWCI: 334.30

YOLOv4 (2020)
Google Citation: 21,487
FWCI: 無

Scaled-YOLOv4 (2021)
Google Citation: 2,064
FWCI: 67.96

YOLOv7 (2023)
Google Citation: 811
FWCI: 8.14

YOLOv7 (2023)
Google Citation: 11,238
FWCI: 988.33

YOLOv9 (2025)
Google Citation: 2,173
FWCI: 1138.67

Edge AI

Edge Module

Jetson TX2: 1.33
TFLOPS (7.5W)

Jetson Xavier NX:
21 TOPS (15W)
ElaNetv2

AI-SOC:
- 4-TOPS (<4W)
GElanNetv2-T

Related paper has been cited more than 10,000 times!

Computer Science > Computer Vision and Pattern Recognition

[Submitted on 27 Nov 2019]

CSPNet: A New Backbone that can Enhance Learning Capability

Chien-Yao Wang, Hong-Yuan Mark Liao, I-Hau Yeh, Yueh-Hua Wu, Ping-Yang Chen, Jun-Wei Hsieh

Neural networks have enabled state-of-the-art approaches to achieve incredible results on computer vision tasks such as with cheap devices from appreciating the advanced technology. In this paper, we propose Cross Stage Partial Network architecture perspective. We attribute the problem to the duplicate gradient information within network optimization. the end of a network stage, which, in our experiments, reduces computations by 20% with equivalent or even superior the MS COCO object detection dataset. The CSPNet is easy to implement and general enough to cope with architecture

Computer Science > Computer Vision and Pattern Recognition

[Submitted on 21 Feb 2024 (v1), last revised 29 Feb 2024 (this version, v2)]

YOLOv9: Learning What You Want to Learn

Chien-Yao Wang, I-Hau Yeh, Hong-Yuan Mark Liao

Today's deep learning methods focus on how to design the most appropriate acquisition of enough information for prediction has to be designed. Existing This paper will delve into the important issues of data loss when data is transferred (PGI) to cope with the various changes required by deep networks to achieve be obtained to update network weights. In addition, a new lightweight network that PGI has gained superior results on lightweight models. We verified the paper achieve better parameter utilization than the state-of-the-art methods developed train-from-scratch models can achieve better results than state-of-the-art models



陳良基的創新筆記

2021年12月13日 · 1

台灣在科技界的新世界第一！

感謝中研院、義隆電子、台大AI中心所有研究團隊的投入，也恭喜廖所長傑出優異的帶領！這是個可以改變世界的新技術。

<https://www.ithome.com.tw/article/148305>



ITHOME.COM.TW

臺灣製造！世界第一物件偵測AI

ELAN Collaboration with
Academia Sinica

ADAS：持續進化，沒有最好，只有更好

More Than 50% Car Accidents
in Taiwan had ADAS Installed



在AI效能中，蒐集正確的資料庫至關重要

Scenes Collection Definition , Effective Annotation Tools , Efficient Datasets Algorithms.



Normal Case

Scenarios

Day_time

Weather

Driving_Scene

{ Day
Dusk/
Early morning
Night
Indoor }

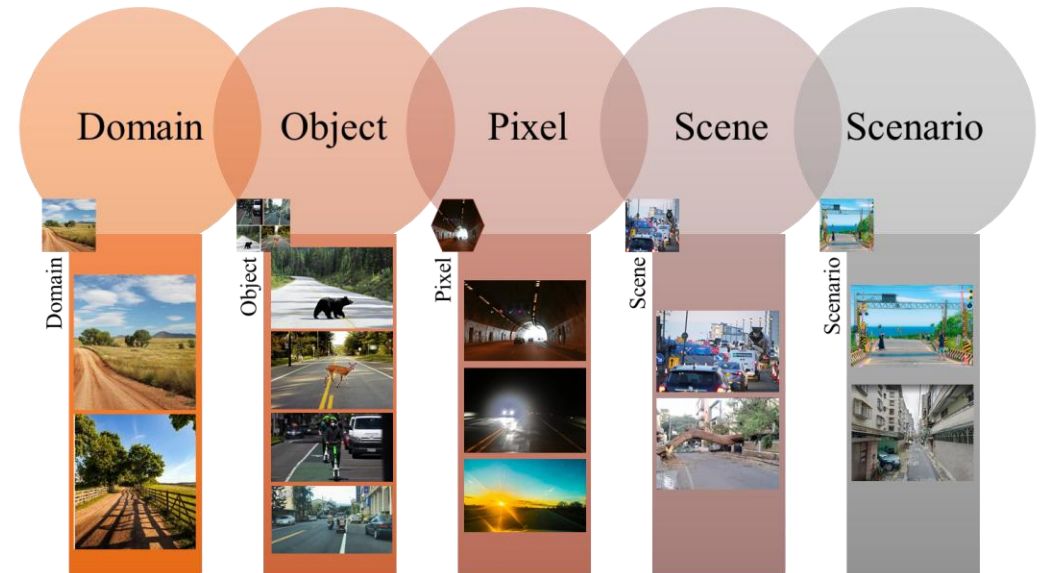
{ Sunny
Cloudy
Rainy }

{ Freeway/Expressway
Rural
Downtown
Others }

Object Definition :
Cars/Bus/Motorcycles (including riders)/ Bicycles
(including riders)/Pedestrians/Motorcycles/Bicycles

Data Balance !

Corner Case



1. Domain-level : Rural/Snowfield/Low Light Source
2. Object-level : Animal(AR)/Assistive Device
3. Pixel-level : Backlight exiting the tunnel 、 Sunset Glare 、 Oncoming Headlights at night
4. Scene-level : Rush Hour Congestion 、 Road Construction 、 Tree /Person down on the road (AR)
5. Scenario-level : Grade Crossing/Alley

AR / 生成式AI應用於智慧交通系統中的資料增強與情境生成

AR Generates Special Scenarios & Objects (Data Augmentation)



Special Vehicles
Special Events



AR Pedestrians & Bicycles

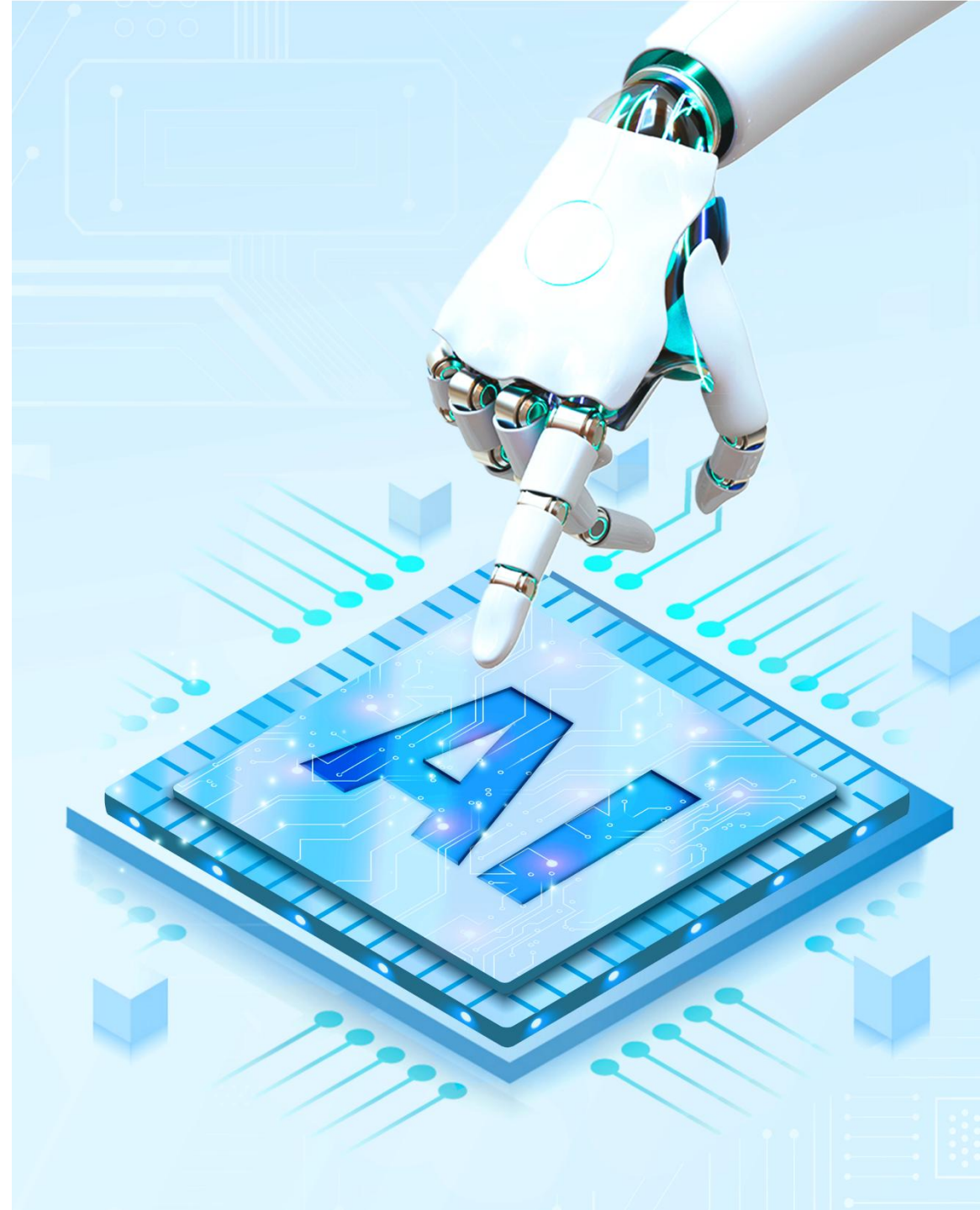


Add Special Vehicles &
Modify Weather Conditions





AI x ADAS



搭載AI功能的ADAS Level 2+ -- 適用於電動巴士與物流車輛



Lane Keeping Assistance (LKA)

Lane Following System (LFS)

Adaptive Cruise Control (ACC)

Autonomous Emergency Braking (AEB)

Emergency Steering Function (ESF)

Automatic Lane Change Assist (ALCA)

Automated Lane Keeping System (ALKS)

Blind Spot Information System (BSIS)

Camera-Monitor System (CMS)

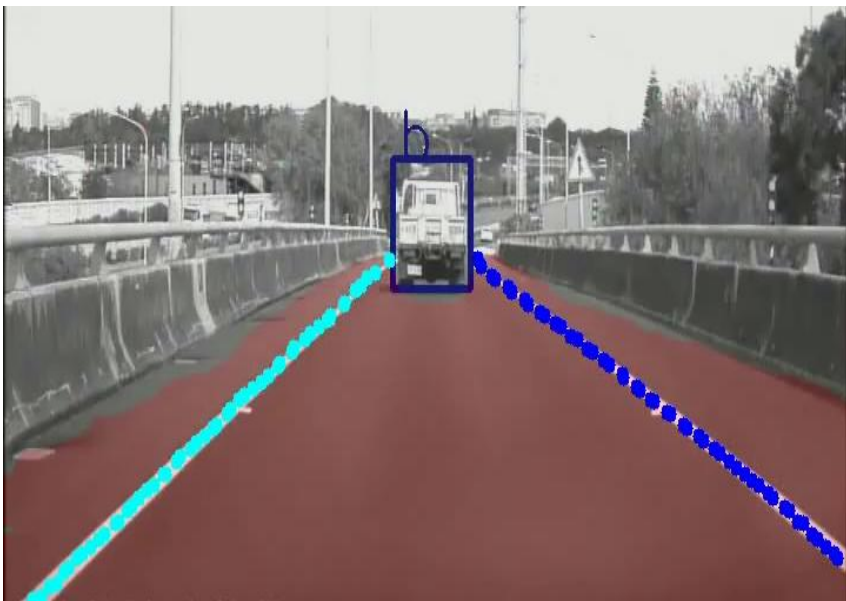


邊緣 AI 演算法 — Elan Net 用於 ADAS

Multi-tasks in Unify Model

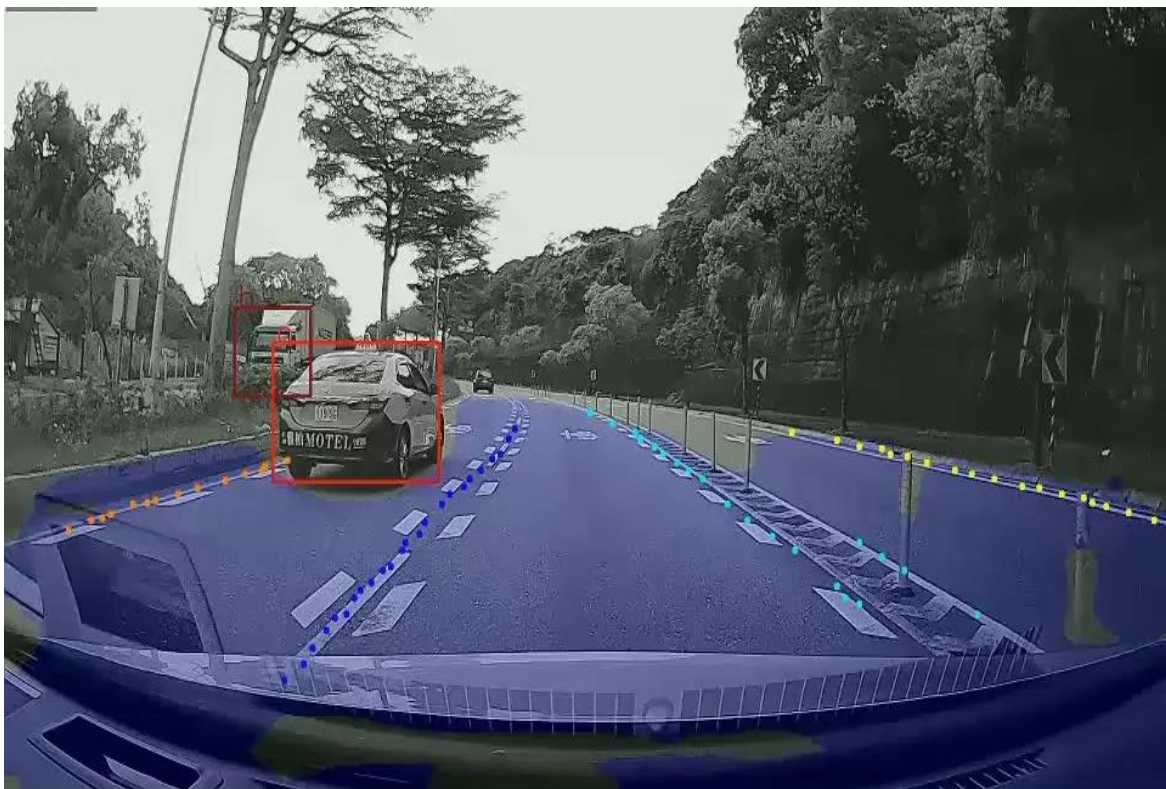
Object Detection & Classification+ Segmentation + Car-Lane Line

Special Lane Markings



ADAS : 搭載AI 運算能力 1 TOPS

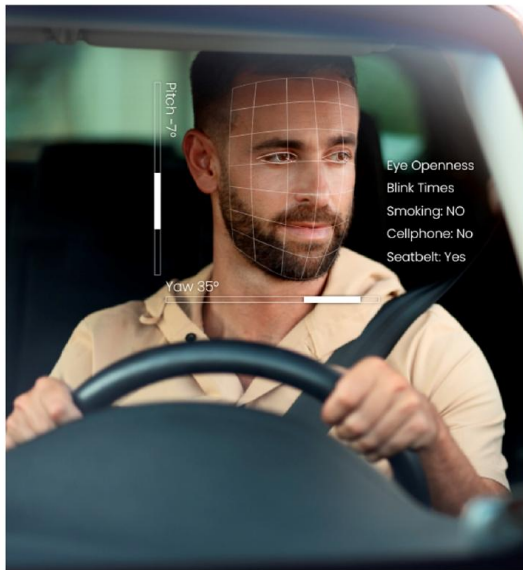
Front Camera



Rear Fisheye Camera



ADAS — 駕駛員監控系統 (DMS) 解決方案



DMS

Our Function

 Eye Closing Frequency

 Yawn Detection

 Distraction Detection

 Smoking Detection

 Using Cellphone Detection

 Head Precision Detection

 Gaze Estimation

 Attitude Abnormal Detection

 Seat Belt Detection

Multi-tasks in Unify Model

Yaw **Red**: 轉頭 / Pitch **Green**: 抬頭低頭



巴士盲區警示系統 (BSIS)

Inner Wheel off-tracking



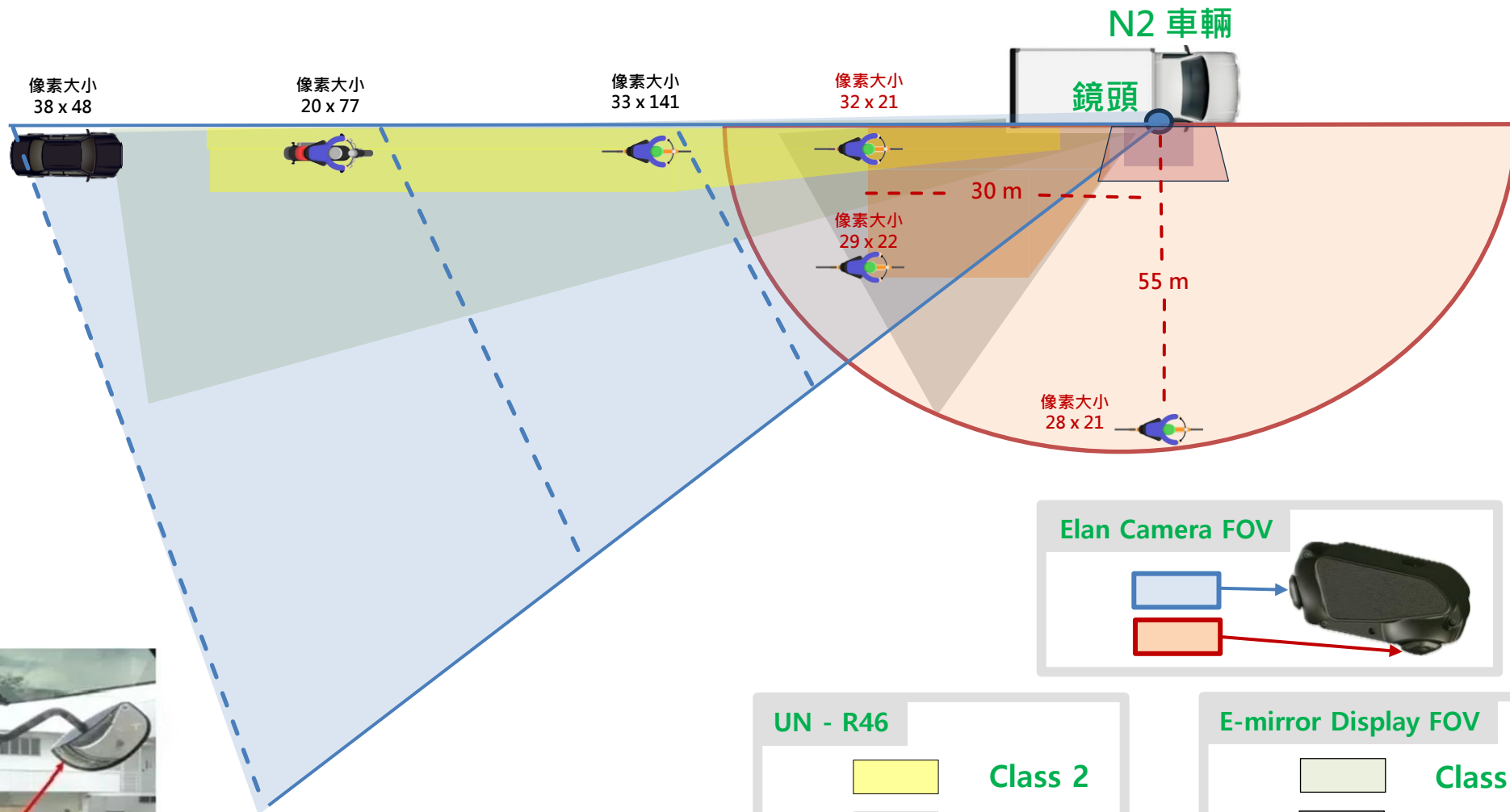
台灣精品
2022



Fisheye Camera
With AI
@ 1TOPS



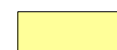
電子後視鏡可視範圍(俯視圖)



Elan Camera FOV



UN - R46



Class 2

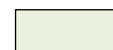


Class 4



Class 5

E-mirror Display FOV



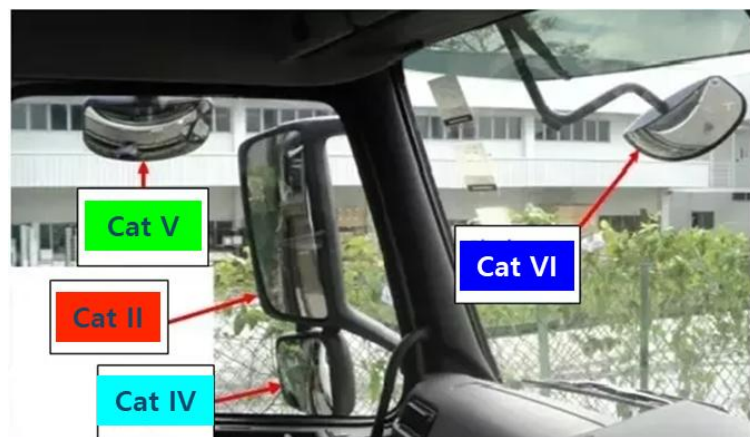
Class 2



Class 4



Class 5



攝影監控系統 (CMS) 及電子後視鏡解決方案

Wider Driving Visibility



Clearer Vision at Night



No Impact on Visibility in Rain/Fog



應用於電動巴士與物流車輛的 AI 輔助駕駛系統 (ADAS) Level 1/2+



Enhanced Lane Assistance Navigator 3.0
電動巴士AI緊急轉向防護系統

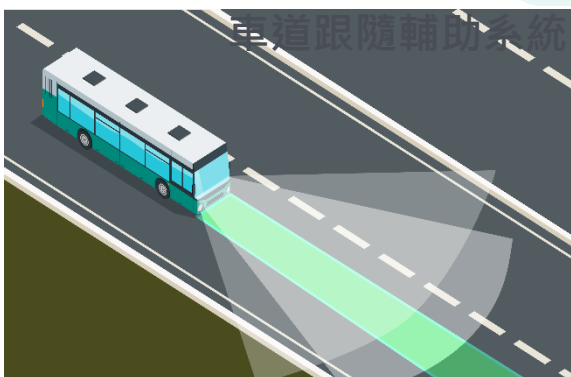
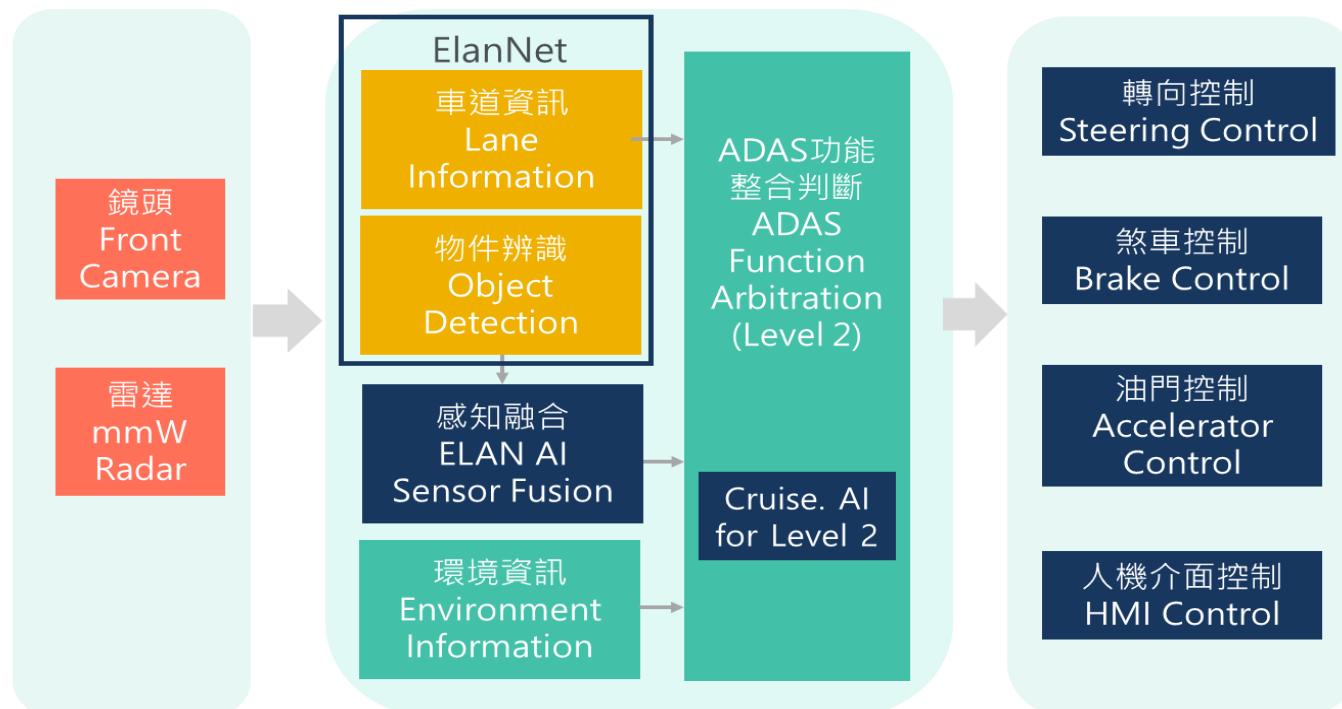


ADAS Level 2 解決方案

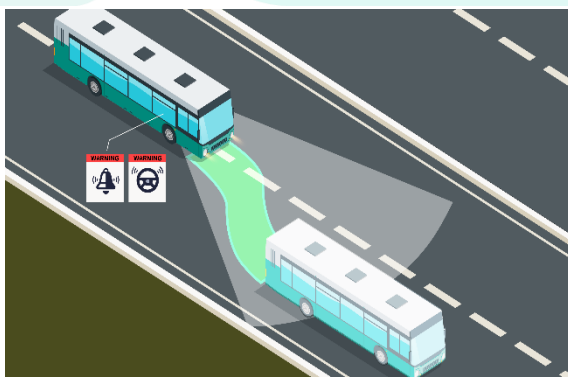
感知 Perception

決策 Decision

執行 Actuator



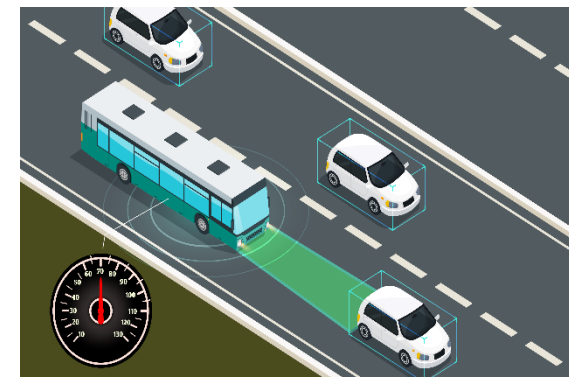
Lane Following System (LFS) 車道跟隨輔助系統



Lane Keeping Assistance (LKA) 車道維持輔助系統



Autonomous Emergency Braking (AEB) 自動緊急煞車系統

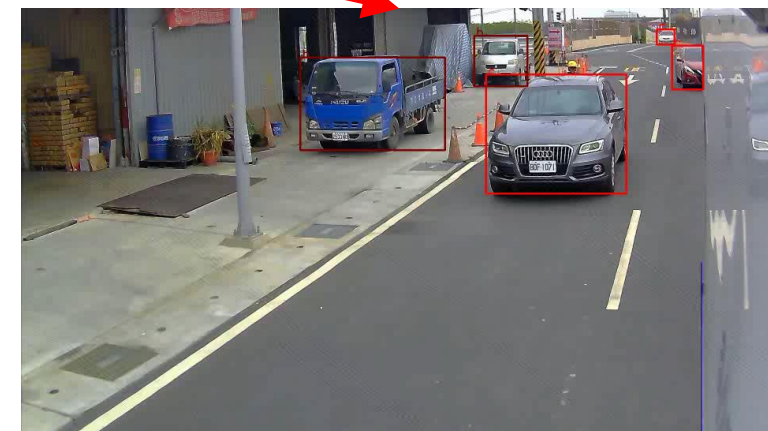
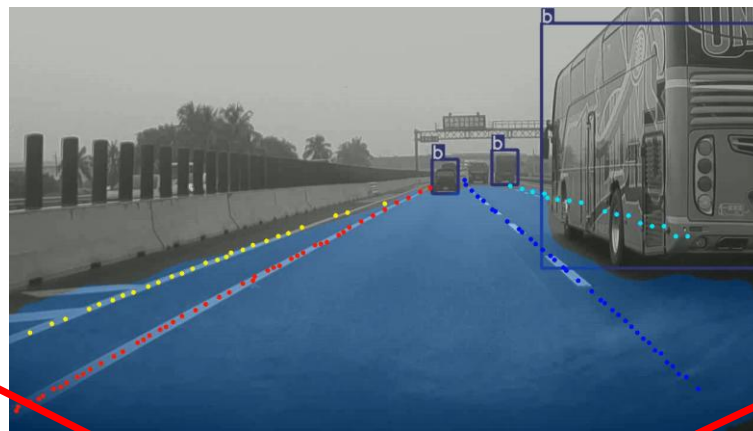


Adaptive Cruise Control (ACC) 主動式車距維持系統

自動緊急煞車 (AEB) 解決方案



ADAS Level 2+ 攝影感知系統



合併損益表 – 累計至第三季 (2025年 vs. 2024年)

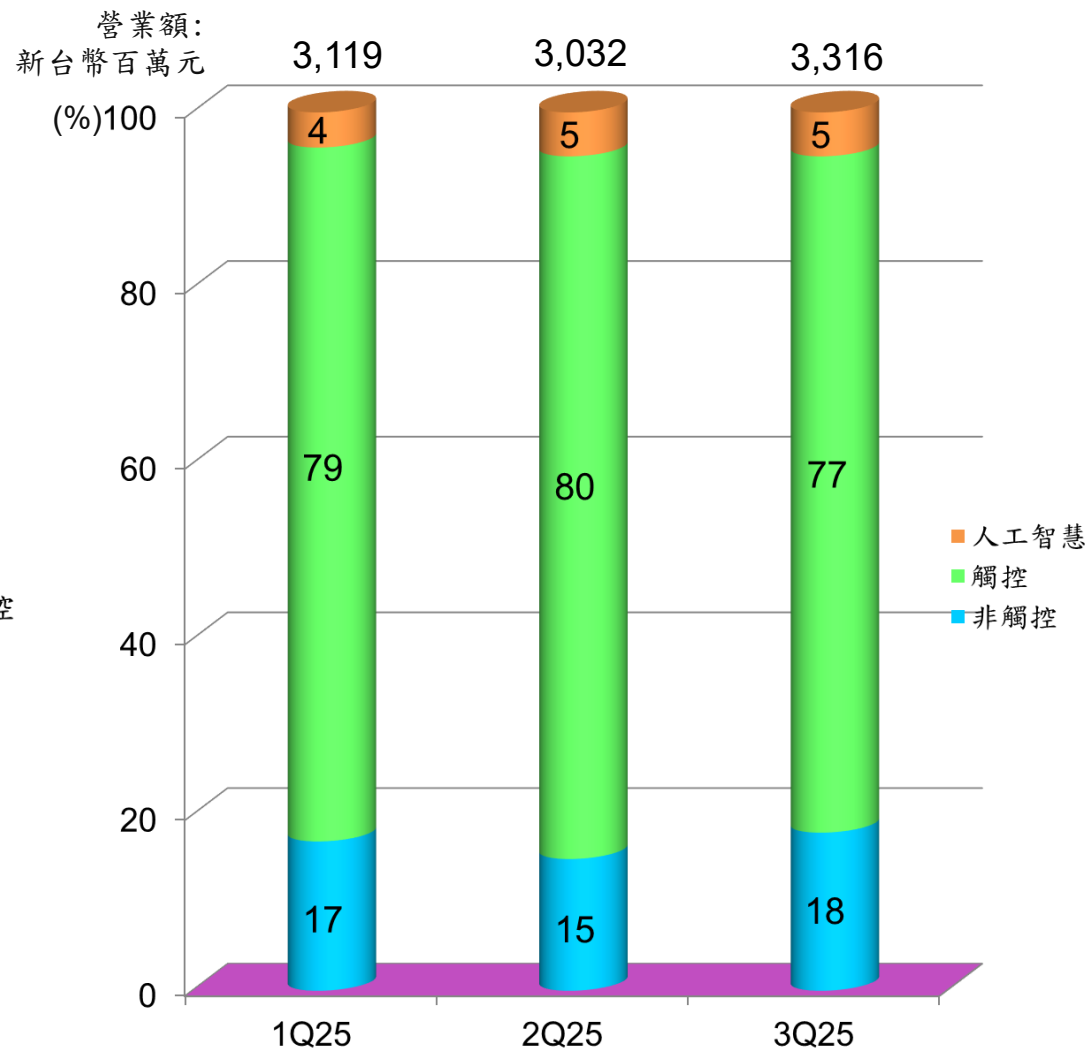
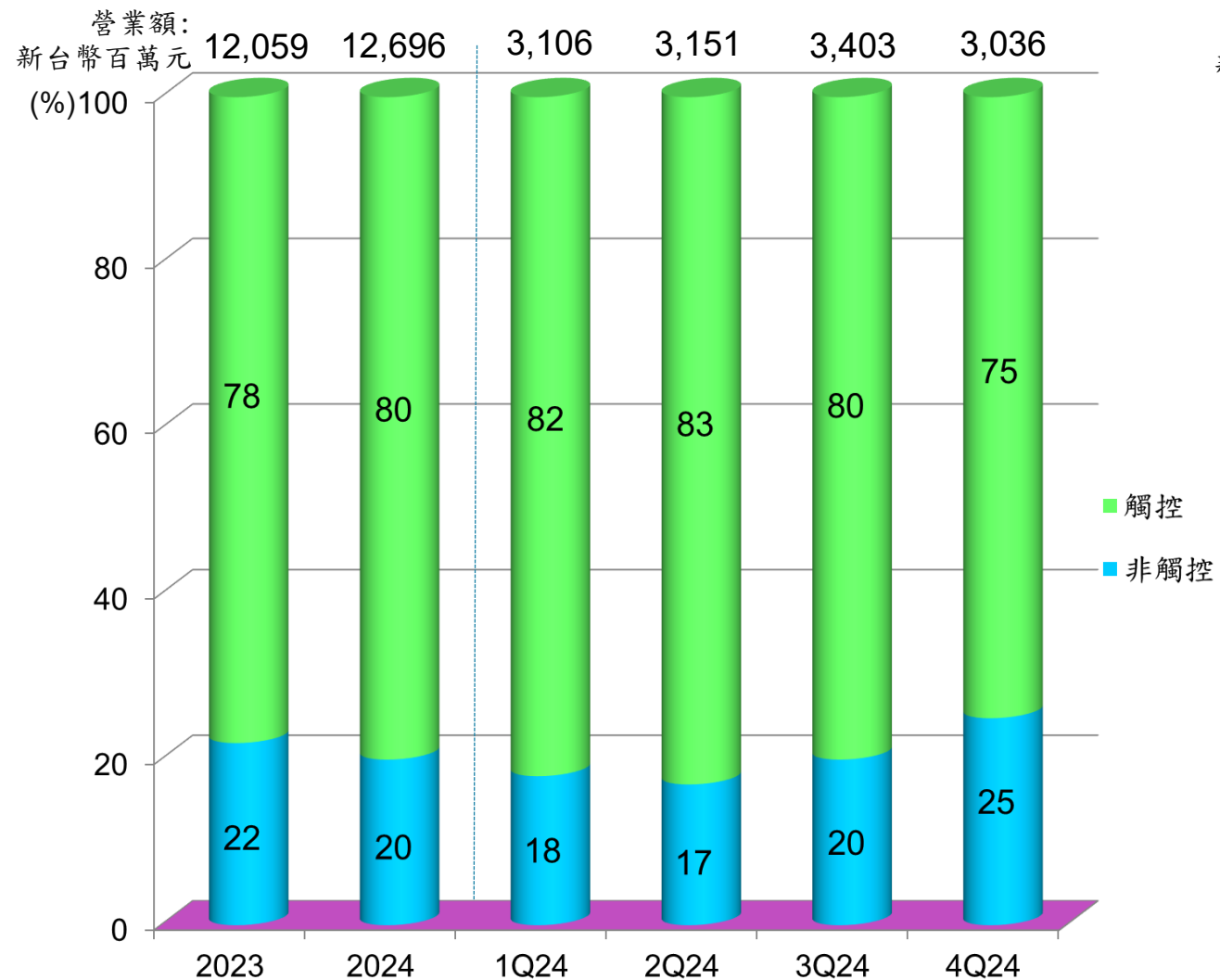
單位:新台幣佰萬元

	2025年第1~3季	%	2024年第1~3季	%	YoY(%)
營業收入淨額	9,467	100.0	9,660	100.0	(2.0)
營業毛利	4,586	48.4	4,697	48.6	(2.4)
銷售費用	260	2.7	264	2.7	
管理費用	357	3.9	382	3.9	
研發費用	1,648	17.4	1,707	17.7	
營業費用	2,265	24.0	2,353	24.3	(3.7)
營業淨利	2,321	24.4	2,344	24.3	(1.0)
業外收入及支出	(239)	(2.4)	201	2.0	
稅前淨利	2,082	22.0	2,545	26.3	(18.2)
稅後淨利	1,595	16.8	2,038	21.1	
本期淨利歸屬於					
母公司業主	1,707	18.0	2,133	22.1	(20.0)
非控制權益	(112)		(95)		
* 每股盈餘 (元)	5.96		7.47		(20.2)

* 期末發行股數: 3.04億股; 流通在外股數: 2.863億股 (2025年9月底)、2.862億股 (2024年9月底)

* 財務資料來源: 會計師核閱

產品線業績比例 (合併營收)



- 人工智慧產品：車用ADAS、智慧交通AICCTV、AI影像辨識演算法...
- 觸控產品：觸控板,觸控螢幕晶片, 生物辨識晶片
- 非觸控產品：指向裝置,微控制器&其他



THANK YOU

ELAN MICROELECTRONICS

