PRODUCTIVITY THROUGH DIGITALISATION

AI4S PROGRAM

(Artificial Intelligence for SMEs)
Proof-of-Concepts (PoC)
Projects Compilation

MIDA intel. MPC

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Proof-of-Concepts (PoCs) Projects Compilation

AI4S Executive Summary

The AI4S program (also known as Artificial Intelligence for SMEs), is an Artificial Intelligence (AI) based machine vision system. It is a three-way partnership, among Malaysia Productivity Corporation (MPC), Malaysian Investment Development Authority (MIDA) and Intel Malaysia. This booklet is a compilation of end-users' Proof-of-Concepts (PoCs) projects as a result of the experiential training provided to the participants

The first part of the booklet introduces the program objectives, collaboration partners, AI-based machine vision essentials including the hardware and software suites

The second part focuses on the details of the proof-of-concept (PoC) projects; which include the project overview, description of the 'before' and 'after' the PoC implementation, finished up with a sharing of the benefits of the final results. A Pareto analysis of all the PoC projects, based on the use-cases, is also provided

FOREWORD
Director General
Malaysia Productivity Corporation

" It gives me great pleasure to pen a few words in this AI4S Booklet. Since the launch of the Malaysia Productivity Blueprint in 2017, the Malaysia Productivity Corporation (MPC) has been working relentlessly in driving to increase productivity of the nation. "

With the advent of Industry 4.0, the task of productivity improvement has been made easier, especially with the adoption of the enabling pillars of technologies. MPC, together with our partners, has been spearheading the promotion and adoption of Industry 4.0, especially among the local companies and SMEs.

MPC is most honored to be partnering with Intel Malaysia and MIDA for this AI4S program, which features an Artificial Intelligence (AI) based Machine Vision system. As the operational partner, MPC has been managing the entire training process, including the post-training technical support. Advisory clinic sessions were also organized to assist the companies with the development of their Proof-of-Concepts (PoCs) projects.

This booklet is a compilation of end-users' Proof-of-Concepts (PoCs) projects. As can be seen from these projects, the wide-ranging adoption of Industrial 4.0 is enormous, encompassing the electronics, automotive, plastics, food and beverages sectors.

These cases have demonstrated in bringing Industry 4.0 concepts and initiatives up to reality. We hope that the other companies would be able to draw some valuable best practices from these PoC projects by end-users of our AI4S program; and serve as lessons learned in charting the transformation of their own Industry 4.0 journey.

Let us all embrace the Industry 4.0 revolution to bring about greater agility, accelerated efficiency and productivity and enhanced global competitiveness.

Thank you to all who have directly and indirectly contributed to this Booklet.

YBhg. Dato' Abdul Latif bin Hj Abu Seman
Director General
Malaysia Productivity Corporation (MPC)

FOREWORD
Chief Executive Officer
Malaysian Investment Development Authority

" **SMEs play significant roles in building the nation's industry ecosystem. With more than 1.15 million local industry players operating in the sector, these entities have contributed more than RM500 billion to Malaysia's gross domestic product (GDP). Their roles and contributions to Malaysia's economy cannot be emphasised further.** "

MIDA is a strategic partner to these businesses, constantly engaging local service providers and SMEs in business-linkage programmes with MNCs and large local companies. To serve our local companies better, we have aligned our facilitation programmes with the National Investment Aspirations (NIA).

Apart from growing existing sectors, we aim to develop new clusters, create high-value job opportunities, extend domestic linkages, and improve inclusivity. The clarion call now would be for these local players to continue to harness new opportunities in technology adoption and adaptation to increase growth.

Artificial Intelligence (AI) is a crucial enabler to achieving such an aspiration. The usage of AI can cut across functions, including operations, Customer Relationship Management (CRM) and consumer analytics, increasing their capabilities to support a global supply chain. MIDA, together with Intel and Malaysia Productivity Corporation (MPC), have been active in promoting such agenda, demonstrating the capabilities of AI and its potential returns for business growth.

The Artificial Intelligence for SMEs (AI4S) project with Intel and MPC is a synergised initiative that aims to empower 100 potential small-medium businesses. These companies have participated in the Intel-initiated pilot project and experienced using the AI4S starter kit in their business-related activities. Such ideas will help to scale up their capabilities and embrace the spirit of innovation.

MIDA is focused on supporting existing and new investors to drive a vibrant investment landscape for Malaysia that will attract sustainable investments that meet global demand and adhere to Environmental, Social and Governance (ESG) commitments made by the nation. On that note, I want to express our gratitude and heartfelt appreciation to the talents involved in creating this compilation of end-users "proof of concepts" (PoCs).

YBhg. Datuk Wira Arham Abdul Rahman
Chief Executive Officer
Malaysian Investment Development Authority
(MIDA)

FOREWORD
Managing Director
Intel Malaysia

" **Having built a career with Intel, I have seen how technological innovation has the ability to change a person's life, a company's fortune, or even a nation's trajectory. On the individual level, it takes vision, perseverance, and boldness to learn, innovate and do something different.** "

On a nationwide level, it requires more than that. To create lasting impact that can propel a nation, we need leaders who inspire and influence, and private-public partnerships to form a strong foundation for that progress and innovation to happen.

At Intel, we believe that Artificial Intelligence (AI) is and will be a key technology driver in transforming the way we live, learn and work, across all segments of society and industry. To continue to advance our nation's global competitiveness and harness the potential of Malaysian companies, we want to catalyze the adoption of AI and its related technologies, particularly among small-to-medium enterprises (SMEs).

This goal is not ours alone. Both the National Industry4WRD policy and MyDigital Blueprint contain key strategies for the Fourth Industrial Revolution (IR 4.0). Central to those strategies are technology skillsets like AI. We desire to see Malaysians leading and participating in the emergence of smart manufacturing, smart cities, smart grids, and smart services.

Intel is committed to working with the industry and the government to help drive Malaysia's growth in IR 4.0 and to realize its full economic value through technology commercialization.

We want to help the nation become a hub for innovation by increasing the capacity and capability of Malaysian firms, start-ups, universities, and institutes.

As a step towards that goal, we are grateful for the close collaboration of our longstanding partners—MIDA and MPC—in implementing the AI for SME Program. Through this combined effort, 100 SMEs have undergone a comprehensive technology enabling process to jump-start their AI endeavours by preparing them to implement their own pilot projects. It is truly encouraging to learn about all the ideas that were generated and the opportunities that AI and Intel technology can create for their businesses.

To those who participated in this program, congratulations for being courageous in learning and doing something new. I welcome you into the community of innovators and wish you every success on this journey.

Ms. AK Chong
Vice President, Manufacturing, Supply Chain and Operations, Intel Corporation
Managing Director, Intel Malaysia

AI4S INTRODUCTION

AI4S Program Overview

- The AI4S program (also known as Artificial Intelligence for SMEs), is an Artificial Intelligence (AI) based machine vision system. The AI4S starter kit consists of an Intel-based industrial PC with a Field Programmable Gate Array (FPGA) add-on card, and powered by Intel® Intel Edge Insights for Industrial and Intel® OpenVINO™ toolkit

- In the six half-day training program, participants are taught images capturing techniques, images detection and labeling systems, machine learning and model algorithms. Participants are also taught Node-RED programming and to use the Dashboard module to visualize the results of their inferencing. An additional 3 half-day training was held to coach participants on the installation and activation of the enhanced add-on FPGA card

- Upon completion of the AI4S training curriculum, participants are expected to complete a Proof-of-Concepts (PoCs) project at their workplace

The AI4S training curriculum and modules

- Introduction to AI and deep learning

- Images capturing techniques

- Images detection and labelling systems

- Machine learning and model algorithms

- Artificial Intelligence (AI) and inferencing

- Visualisation via Node-RED programming

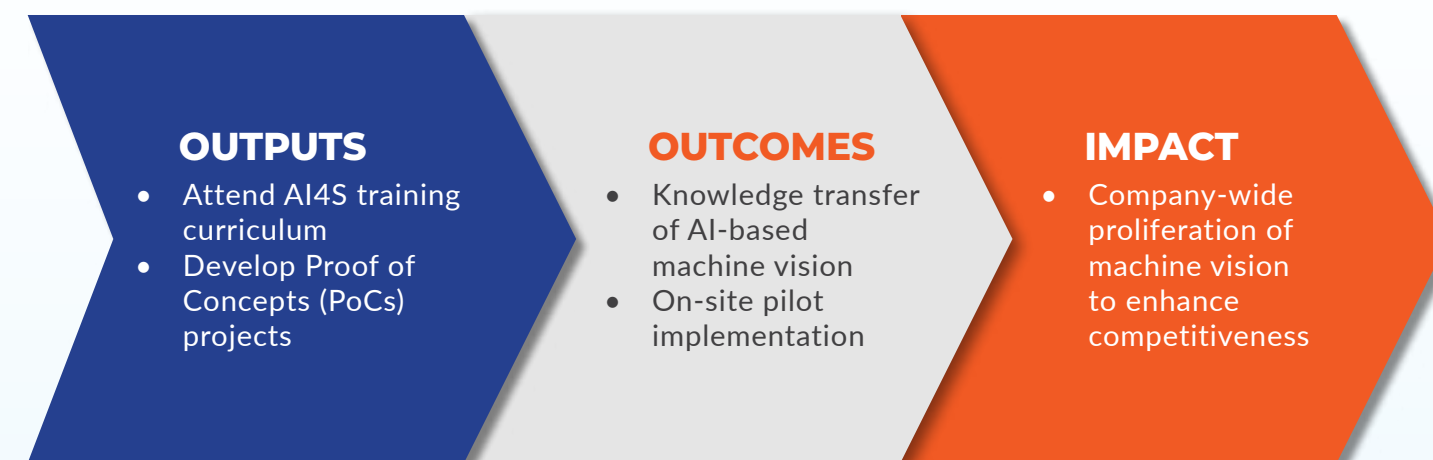- Activation of Field Programmable Gate Array (FPGA) add-on card
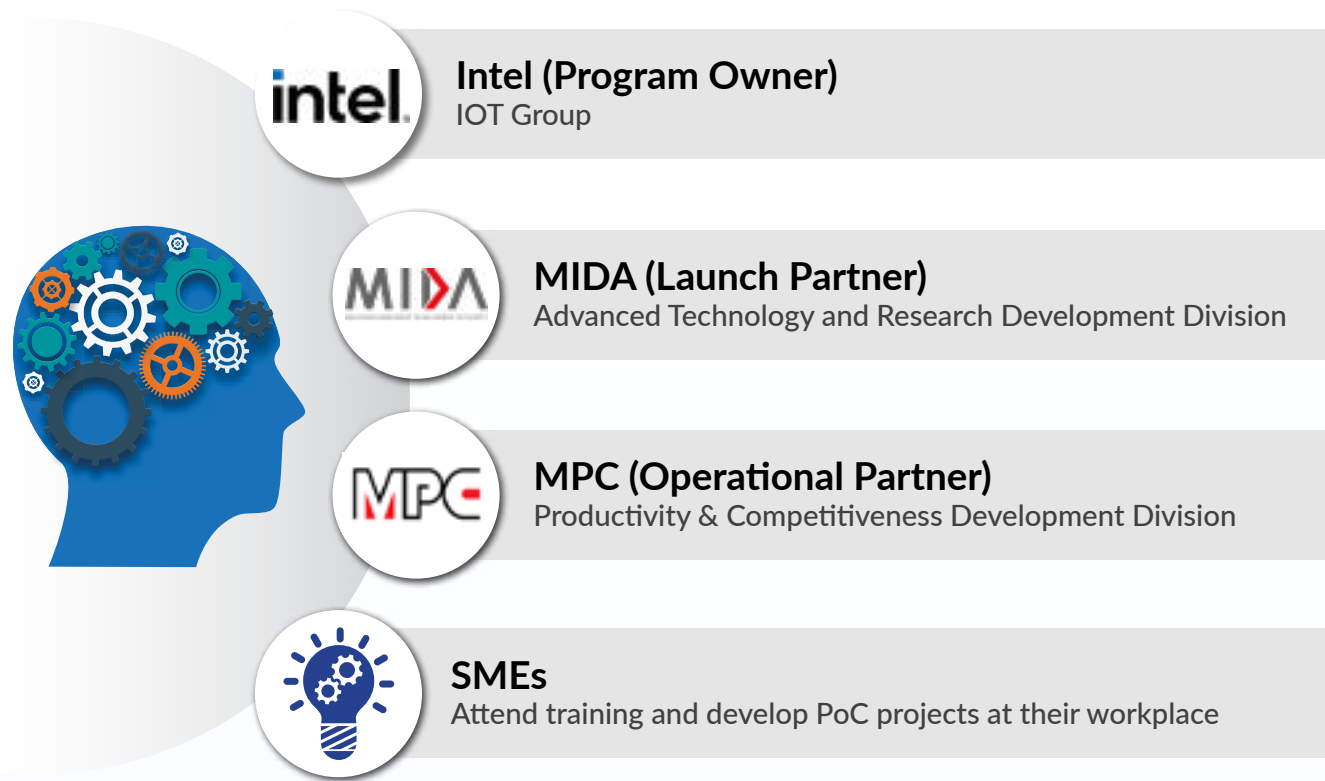
AI4S PROGRAM OBJECTIVES

Program Objective

- To transfer 'AI-based machine vision' knowledge to 100 SMEs within a 18 month period, starting from January 2021

Expected outputs

- SMEs attend a 6 'half-day' experiential training on AI-based machine vision system, for the basic starter kit
- SMEs attend a 3 'half-day' Field Programmable Gate Array (FPGA) card training, for enhanced performance
- SMEs develop Proof of Concept (PoC) projects at their workplace within 3 months
- SMEs document and to showcase their PoCs as lessons learned

OUTPUTS
- Attend AI4S training curriculum
- Develop Proof of Concepts (PoCs) projects

OUTCOMES
- Knowledge transfer of AI-based machine vision
- On-site pilot implementation

IMPACT
- Company-wide proliferation of machine vision to enhance competitiveness

COLLABORATION PARTNERS

Intel (Program Owner)
IOT Group

MIDA (Launch Partner)
Advanced Technology and Research Development Division

MPC (Operational Partner)
Productivity & Competitiveness Development Division

SMEs
Attend training and develop PoC projects at their workplace

The collaboration partners are as below:

- Intel's IOT Group, as the Program Owner, provides overall funding and technical support
- MIDA's Advanced Technology and Research Development Division, as the Launch Partner, identifies the 100 participating SMEs
- MPC's Productivity & Competitiveness Development Division, as the Operational Partner, manages the entire training process and provides secretariat support
- SMEs, as the Beneficiaries, attend the training and develop Proof-of-Concept (PoC) projects at their workplace

ROLES & RESPONSIBILITIES

MIDA

Launching Partner

1. Identify the 100 participating SMEs
2. Receive and distribute the starter kits to companies
3. Host all the launching events and public relations (PR) activities

INTEL

Technology and Fund Provider

1. Fund the purchase of the starter kits and add-on cards
2. Provide training to SMEs
3. Provide technical support during the Proof-of-Concepts (PoC) development

MPC

Operational Partner

1. Coordinate with trainers
2. Manage the training to the SMEs
3. Follow up on Proof-of-Concepts (PoC) projects
4. Provide secretariat support and status reporting

COMPANIES

Beneficiaries

1. Receive the starter kits
2. Attend all the training
3. Develop Proof-of-Concepts (PoC) projects within three months
4. Showcase their Proof-of-Concepts (PoCs) projects

AI4S LAUNCHING EVENT
(27 JANUARY 2021)

AI4S Official Kick-off

- The AI4S program journey was officially kicked-off during the launching event on the 27 January 2021
- Attended by all the 100 participating companies

Mr. Eric Chan Wai Phang
Vice President of Internet of Things Group (IOTG), Intel

" *Intel hopes to nurture and sustain an active local ecosystem to lead the AI development and deployment in Malaysia* "

Dato' Azman Mahmud
Former Chief Executive Officer, MIDA

" *MIDA wants more SMEs to step up to embrace new technologies. We know of numerous companies that are capable of AI technology adoption but are not aware of how and where to start* "

Dato' Abdul Latif bin Haji Abu Seman
Director General, MPC

" *MPC continues to support the industry and other government agencies in accelerating Industry 4.0 adoption, particularly in IOT and AI Machine Vision* "

AI4S ENHANCED LAUNCHING EVENT
(27 OCTOBER 2021)

AI4S Enhanced Program

- Given the overwhelming responses from the participating companies, Intel introduced the AI4S Enhanced Program
- The Enhanced Field Programmable Gate Array (FPGA) add-on card will improve and enhance the current performance by more than five times

Mr. Ruban K Kanagaratnam
Vice President, Intel PSG

" *I want to congratulate the companies, which have completed the Proof-of-Concept (POCs) pilot projects, for their perseverance, dedication and success in their projects* "

AI4S ENHANCED LAUNCHING EVENT
(27 OCTOBER 2021)

YBhg. Datuk Wira Arham Abdul Rahman
Chief Executive Officer, MIDA

" *MIDA encourages other MNCs to contribute back to the nation's industrial ecosystem and increase the capabilities of domestic companies; while at the same time enhancing the MNC's value proposition.* "

Tn. Hj. Zahid Ismail
Deputy Director General, MPC

" *AI4S is aligned to MPC's mission statement to assist companies in upgrading their productivity and efficiency to ensure global competitiveness* "

MIDA as the Event Host

Former Director of Advanced Technology and Research & Development Division, MIDA, Mr. Norhizam Ibrahim led the initiative of facilitating selected SMEs in the adoption of Industry 4.0 technology.
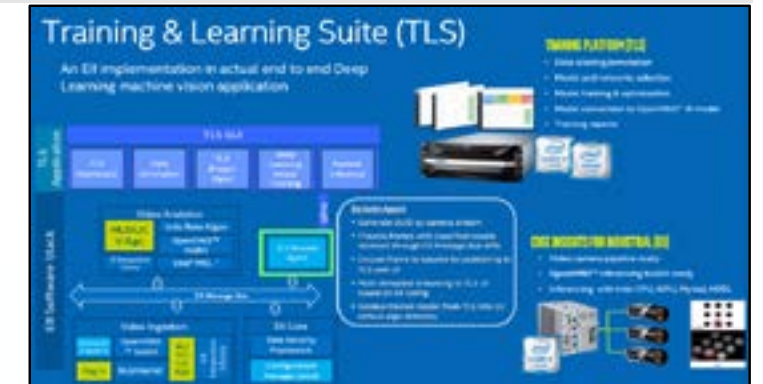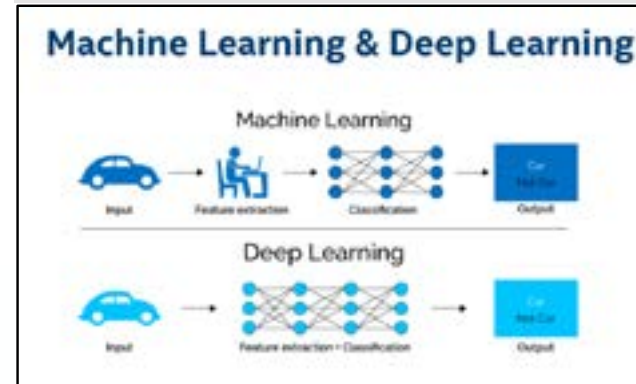
AI-BASED MACHINE VISION ESSENTIALS

AI4S Machine Vision consists of a four-step process cycle

1. The system captures the images with some machine vision system
2. System processes the captured images and to analyze these images at the edge
3. System communicates these results with the process control system
4. System takes actions in response to the results, and will make the necessary

1
Image Acquiring

Capture images with vision sensor

2
Image Processing & Analysis

Process images at the edge

Analyze images at the edge or back end

3
Communicate Result

Communicate results to the system in controlling the process

4
Decision & Action

Machine takes action in response to analyzed results
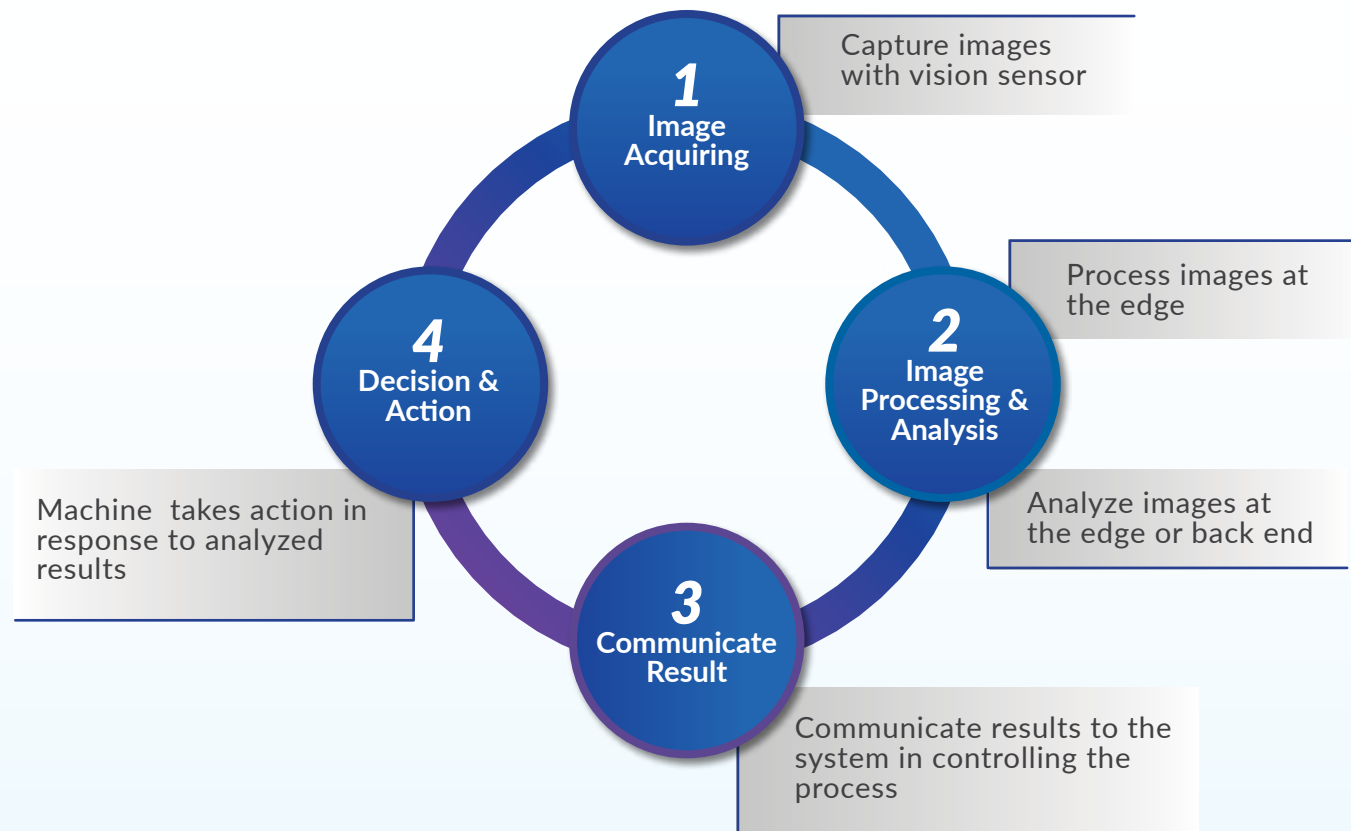
AI4S PROGRAM OBJECTIVES

Theories

Machine Learning & Deep Learning

Training & Learning Suite (TLS)

Hands-on Practical

Face Mask Detection

Color Brick Classification

Hand Glove Detection

AI4S HARDWARE

High Performance AI Edge Platform

1. AI4S Starter Kit consists of a high-performance Industrial PC, powered by Intel's Intel Core i7 processor
2. The machine vision system comes with a Logitech webcam for image capturing

IPC962-511 by Axiomtek

- Power Cord
- Logitech Webcam
- Mouse
- Keyboard
- Monitor (HDMI or D-Sub)
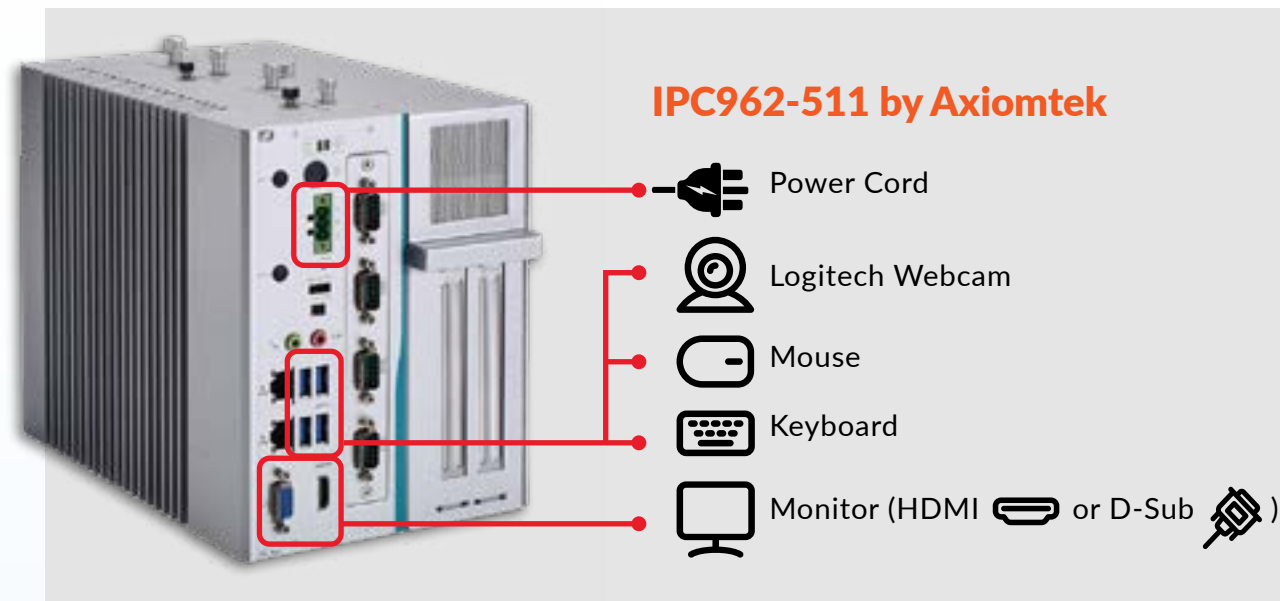
- Processor: LGA1151 Intel® Core CPU, up to 65W
- Rich I/O connectivity: 4 USB3, 2 GbE & dual views
- Wide operating temp. from -10°C to 60°C
- Built-in Artificial Intelligence Software Suite, for training and inference
- Dual half-size PCIe interface for accelerator cards
- Integrated 120W power with 24 VDC

AI4S ENHANCED HARDWARE

AI4S Enhancement Card

1. The AI4S enhanced program features the Intel HDDL-F card based on Intel Arria 10 GX1150 FPGA, as an add-on card to the AI starter kit
2. The model of the HDDL-F card is Mustang-F100-A10 by IEI Corporation
3. It is customized to support OpenVINO™ toolkit for Intel® Deep Learning Deployment Toolkit
4. Upon receiving the FPGA card, participants will get to attend a three 'half-day' virtual training program, provided by Intel Malaysia. The training modules will cover the introduction of FPGA technology and installation and activation of the FPGA Card

Mustang-F100-A10 by IEI

- The main FPGA is based on Intel®
- Arria® 10 GX1150 FPGA
- Memory is 8G on board DDR4
- Intel® Enpirion® power solutions
- Support OpenVINO™ toolkit for Intel® Deep Learning Deployment Toolkit
- Model Optimizer
- Inference Engine

All hardware is sponsored by Intel Malaysia

AI4S SOFTWARE

AI4S ENHANCED SOFTWARE

Integrated solution based on Intel® OpenVINO™ toolkit

1. AI4S Starter kit is powered by Intel's Edge Insights for Industrial (EII) platform and Intel's OpenVino toolkit
2. The Intel OpenVINO toolkit is a high performance computer vision and deep learning inference solutions that allow you to harness the full potential of AI across multiple intel architectures to enable new and enhanced use cases in industrial, retail, health and life science and more.

AI4S Enhanced Software

1. The Enhanced program is specifically developed to accelerate workload performance in current implementation with AI Starter Kit
2. Participants will see significant improvement in AI inferencing, in their experiential 'look and feel' of the current system
3. More than five times enhanced performance

5X
Improved Inference performance

⊙OpenVINO™	A toolkit to accelerate development of **high performance computer vision & deep learning inference into vision/AI applications** from edge to cloud. It enables deep learning on hardware accelerators and easy deployment across multiple types of Intel® platforms (CPU, CPU with integrated graphics, FPGA, VPU)	**Who needs it?** • Computer vision, deep learning developers • Data scientists • OEMs, ISVs, system integrators **Usages** Security surveillance, robotics, retail, healthcare, AI, office automation, transportation, non-vision use cases speech, text) & more
High performance AI at the edge	Streamlined & Optimizeddeep learning inference	Heterogeneous, cross-platform flexibility

OpenVINO™ toolkit

Video Decode — Intel® Media SDK

Image Process — OpenCV OpenVX

Inference Engine — Intel® Deep learning Development toolkit

Image Process — OpenCV OpenVX

Video Encode — Intel® Media SDK

Intel Accelerator

CPU GPU VPU FPGA

AI4S VIRTUAL TRAININGS

AI4S VIRTUAL TRAININGS

Virtual Training

1. MPC was responsible in managing the entire training process
2. All the trainers were from Intel Malaysia
3. In addition to the actuals training, advisory clinic sessions were also held to assist the companies with the development of their PoC projects
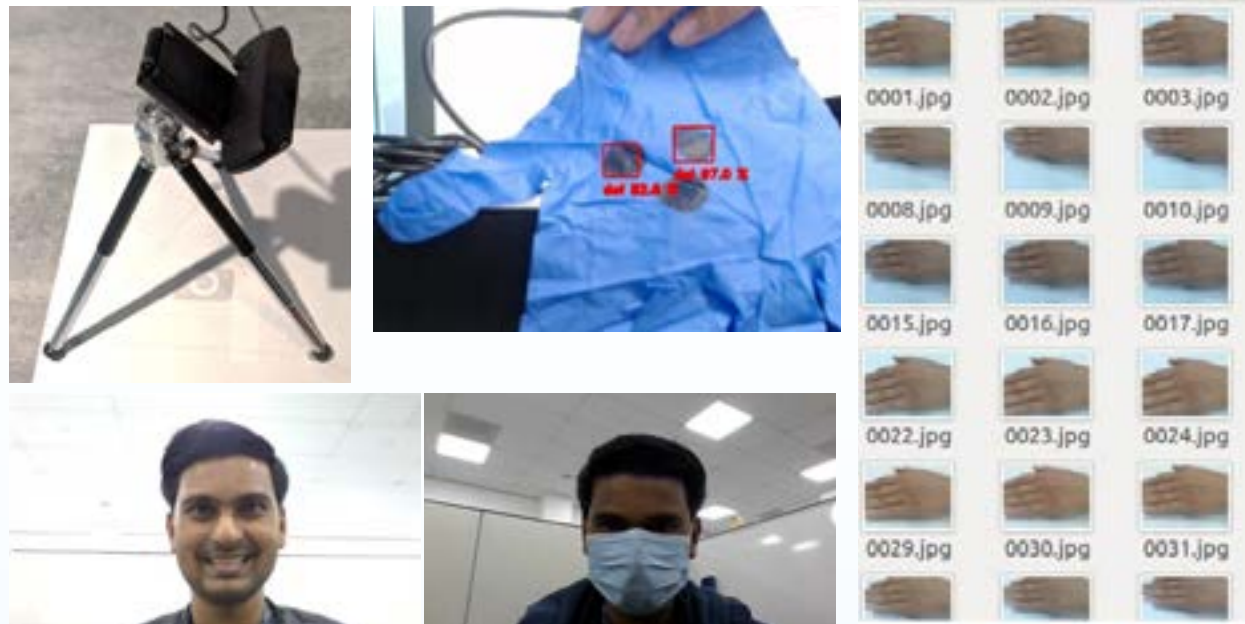
A total of 5 trainings were held

BATCH 1:   22 March - 31 March 2021

BATCH 2:   24 May - 29 May 2021

BATCH 3:   7 June - 12 June 2021

BATCH 4:   23 August - 2 September 2021

BATCH 5:   27 September - 5 October 2021

BATCH 1

BATCH 2

BATCH 3

BATCH 4
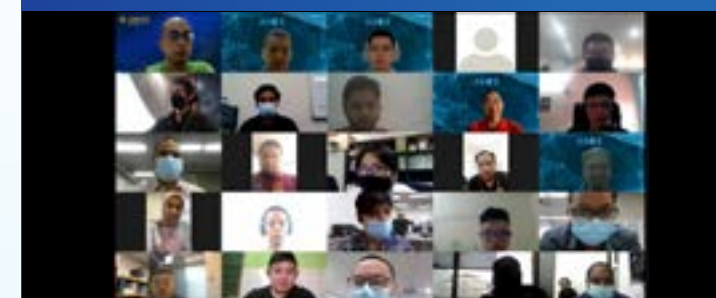
BATCH 5

TESTIMONIAL FROM PARTNERS

intel.

Ms. Nadia Jasman
Software Enabling and
Optimization Engineer,
IOTG
Intel Malaysia

" *I believe knowledge should be accessible to all and AI4S training is one great platform that helps to make sure the local SMEs got what they needed to integrate AI with their daily work* "

MIDA

En. Norhizam Ibrahim
Former Director of Advanced
Technology and Research &
Development (ATRD) Division
MIDA

" *AI4S has set the benchmark for proven and effective collaboration between government agencies and MNCs. MIDA welcomes more initiatives for nation-building collaboration projects with us!* "

MPC

Ms. Lee Wan Wei
Manager of Productivity
& Competitiveness
Development Division
MPC

" *AI4S is a hands-on experiential training program in introducing AI machine vision technologies and techniques to the businesses to promote digitalisation and IR4.0* "

TESTIMONIAL FROM COMPANIES

eMooVit

Dzafriel bin Zulkiflee
Vectorlab

" *It is so easy! I do not have to decide which framework to use* "

SULOMAS
TOWARDS A SUSTAINABLE AND GREENER PLANET
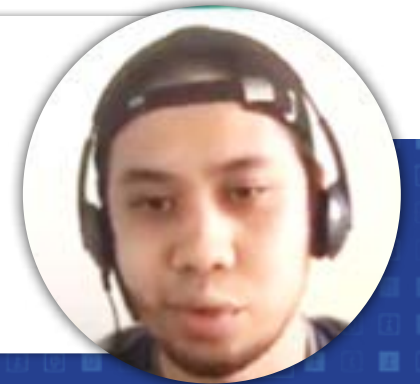
**Nurul Aidim Madiha
binti Zaharuddin**
Sulomas

" *Saya rasa saya dapat mengaplikasikannya di Bahagian Kawalan Kualiti* "

LINGKAIL

Dr. Leow
LingKail

" *We hope to be able to develop this product further* "

LIST OF POC PROJECTS

Agritix Sdn Bhd

📍 **Agritix Sdn Bhd**
37, Jalan TPP 5/17,
Taman Perindustrian Puchong 5&6,
47100 Puchong, Selangor

🏢 **Company Background:**

Agritix Sdn. Bhd. is a technology company that provides analytics solutions for the forestry and agriculture sector. Their core competencies include (1) computer vision and machine learning, research, development and deployment, (2) software services and cloud development and deployment (3) image processing and remote sensing, image processing, and (4) system integration with in-field devices

📋 **Project Overview:**

'Wood Grading Eye' application, which is a machine vision system on wood for quality and grading purposes.

<< Before:

Workers manually inspect and grade each wood piece; and mark with its respective grade

- This 'Grade Selection' process is fully manual, and accounts for more than 80% of labor work hours

>> Final Results:

- Consistent wood quality and accuracy
- Compatible with conveyor automated system
- Scalable for higher speed automation and/or untrained workers
- Improved accuracy of tracking of volume of each grade

Before:
Workers manually inspect and grade each wood pieces.
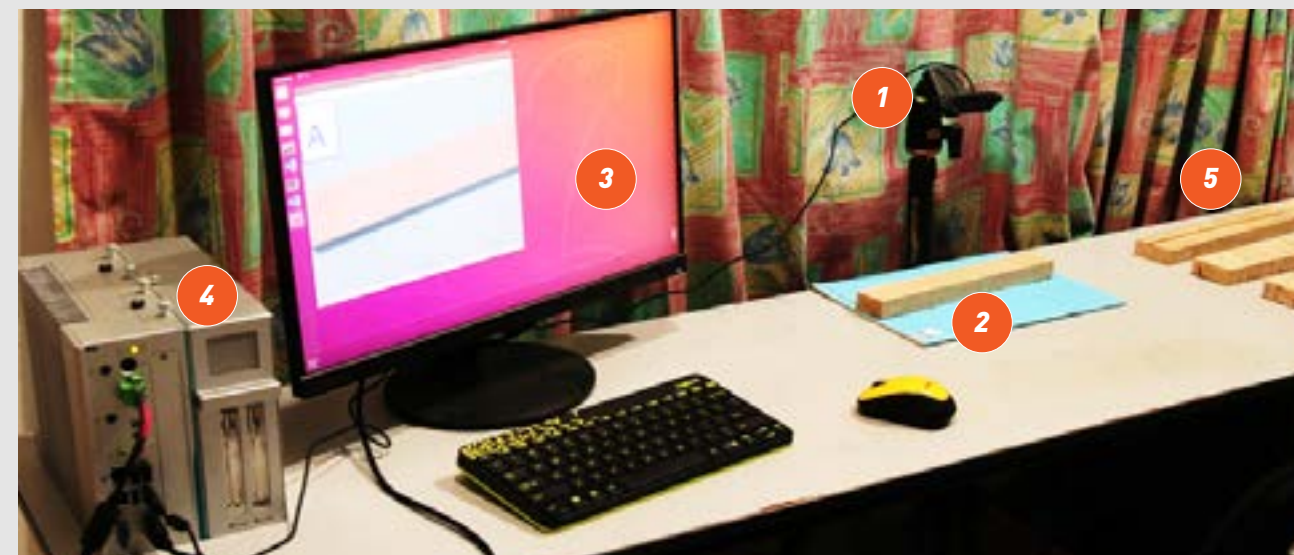
1. Camera
2. Wood under observation
3. Display of inference result
4. Ai Vision System
5. Wood samples after graded

>> After:
Complete wood grading system - all wood pieces are graded and binned. Automated recording to track volume and count of wood pieces by grades

Amity Technical Services & Consultancy (M) Sdn. Bhd.

No. 10B, Lintang Sungai Tiram 4,
11900 Bayan Lepas, Penang, Malaysia

Company Background:

Amity Technical Services & Consultancy (M) Sdn. Bhd. was established in 2004 as a one-stop technical services provider in supporting local, overseas and Multinational Companies (MNCs) for their technical development work, with integrity and confidentially. Its core business is in providing Printed Circuit Boards (PCBs) design and prototyping services.

Project Overview:

Vision system to detect the Printed Circuit Boards (PCBs) missing components

<< Before:

- Operator needs to manually check for missing component on PCBs
- However, operator may carelessly miss out the defect board which not fully mounted.

>> Final Results:

- Reduced the time taken of checking unmount components on PCBs
- Operator can focus on other tasks, and not needed to check on components
- Improved product quality due to reduced failure rates

Before:
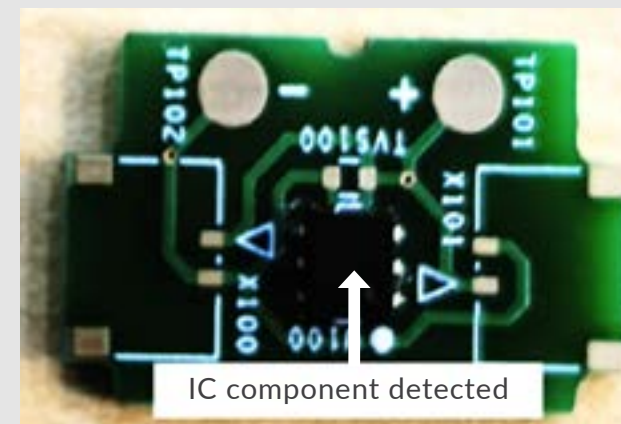Operator manually checks for missing component on PCBs

Amity Technical

1. Camera
2. Display of result
3. AI Vision System

>> After:
Vision system able to detect missing components on PCBs, with higher accuracies

IC component detected

IC component missing

Amlex Technology Sdn. Bhd.

799, Lorong Perindustrian Bukit Minyak 7
Taman Perindustrian Bukit Minyak14100,
Simpang Ampat, Penang

Company Background:

Amlex Technology Sdn. Bhd. provides electronic packaging and interconnect solutions for the global semiconductor and electronics industry. Amlex manufactures lead frames for semiconductor, optocouplers, sensors (motion control, navigational, optoelectronics), high power super bright LEDs for Automotive as well as other electronic packaging and interconnect components such as components for silicon microphones and microelectromechanical systems (MEMS)

Project Overview:

Vision inspection system to detect lead-frame defects such as lead-frame misalignment

<< Before:

- Operator manually inspects the lead-frame with bare eyes and records the number of defects
- Operator might omit and miss out some of the lead-frame defects

>> Final Results:

- Automatically identify and label the presence lead-frame defects and misalignments
- Reduced human errors during inspection of lead-frame sorting process, due to increased accuracy of defect detection

Before:
Operator manually inspects lead-frame with bare eyes and record the number of defects

Amlex Technology Sdn. Bhd.
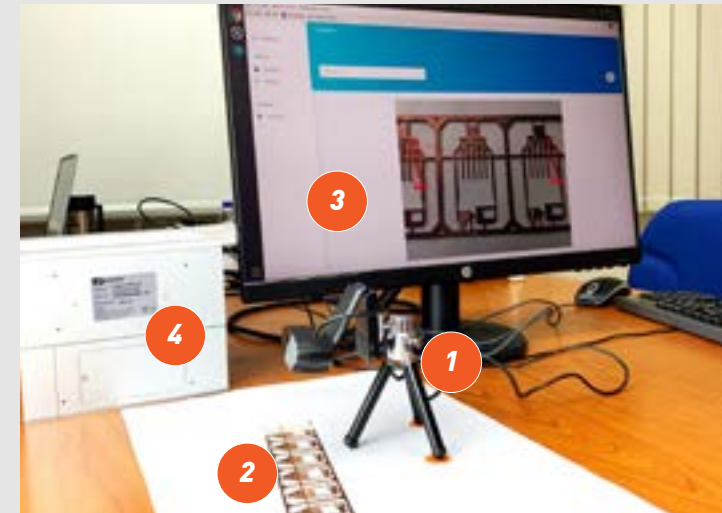
1 Camera
2 Lead-frame under observation
3 Display of inference result
4 AI Vision System

>> After:
Operator observes the lead-frame, and the screen will be labelled as **'Defect'**

Lead-frame bent fingers detected and labeled as **'Defect'**

Asia Pacific University Of Technology And Innovation (APU)

📍 **Jalan Teknologi 5, Taman Teknologi Malaysia,
57000 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur**

🏢 Company Background:

The Asia Pacific University of Technology & Innovation (APU) is amongst Malaysia's premier private universities, and is where a unique fusion of technology, innovation and creativity works effectively towards preparing graduates for significant roles in business and society globally. APU has earned an enviable reputation as an award-winning University through its achievements in winning prestigious awards at national and international levels, as well as an excellent track record in producing highly employable graduates

📋 Project Overview:

Vision system enabled online examination proctoring system

<< Before:

- Due to inexistence of online exam invigilation in place, students can take the advantage to cheat and plagiarize and leaving no evidence.
- Manual invigilation is impossible as the invigilator is unable to monitor all students simultaneously

>> Final Results:

- Maintained examination integrity, with reduced students' cheating and plagiarism
- Reduced human effort, save cost and time as manual invigilation is not required
- Flexibility in examination arrangements, without the limitation of location

Before:
No online exam invigilation system to ensure that students do not cheat during exams

Asia Pacific University (APU)
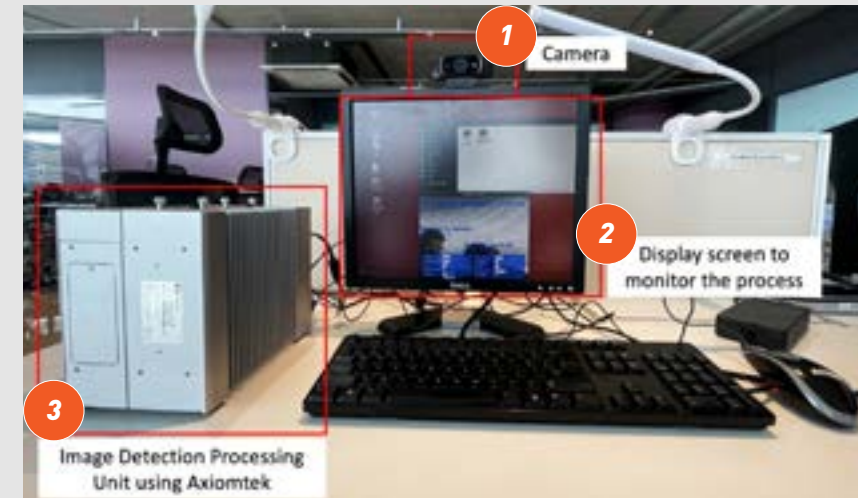
1 Camera
2 Display of result
3 AI Vision System

>> After:
During the examination, Vision System will start to monitor the status of the students during examination and detects suspicious anomalies

Anomaly Type:
Multiple Faces Detected

Anomaly Type:
Phone Detected, with 93% accuracy

Anomaly Type:
Student is Speaking

Bsmart System Solutions Sdn. Bhd.

**Unit 38-3-5, Shamelin Business Centre,
Jalan 4/91, Taman Shamelin Perkasa,
56100 Kuala Lumpur**

Company Background:

Bsmart System Solutions Sdn. Bhd. is a 100% Bumiputera company registered in Malaysia. They provide telematics services to Petronas, Celcom, City Zone Express, Schenker Logistics, SPAD, and Cyberview. They have developed a Front-End Intelligence (FEI) technol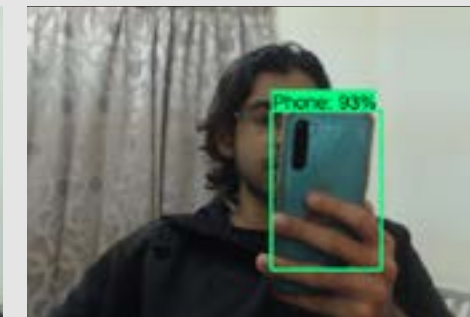ogy system, which transforms telematics solutions from a reactive standalone tracking system to an integrated system. This enables real-time interactive, intelligent, and event-driven transportation management that dynamically monitors, communicates, evaluates, and responds to events

Project Overview:

Vision system to detect and inspect solder points on Printed Circuit Boards (PCBs)

<< Before:

- Technician manually checks accuracy and quality of solder points on PCBs
- Inspection process is slow and error prone due to human error

>> Final Results:

- Cost savings because inspection process now requires less manpower
- Reduced production time because now it only takes 5 to 10 seconds to check whether the soldering is correct or notz

Before:
Technician manually checks accuracy and quality of solder points on PCBs
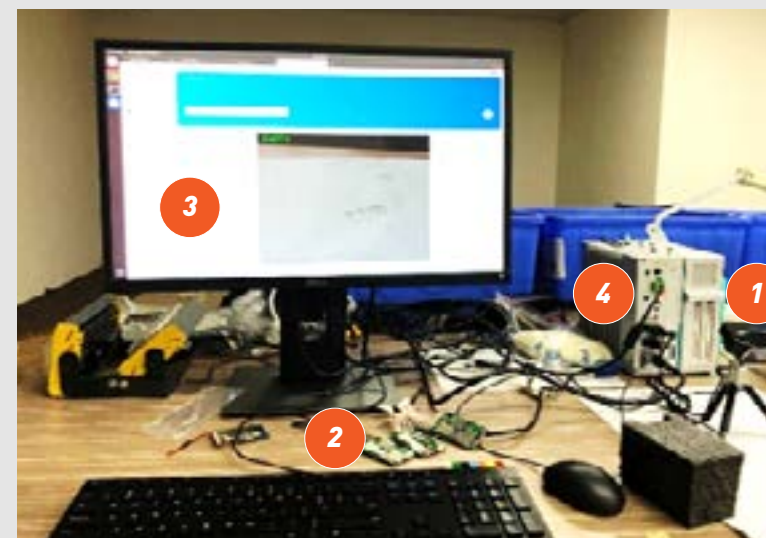
1. Camera
2. PCBs under observation
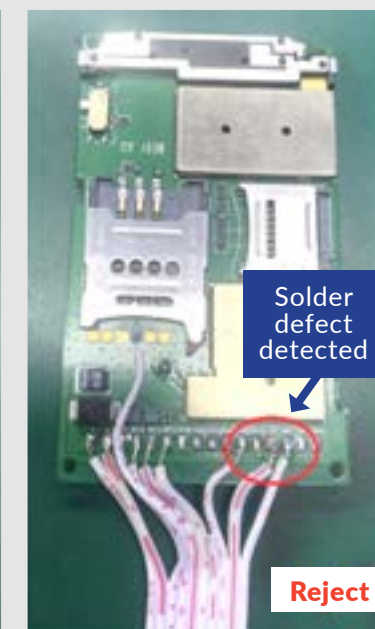3. Display of result
4. AI Vision System

>> After:
- PCB solder points detection
- Classify as 'Accept' or 'Reject'
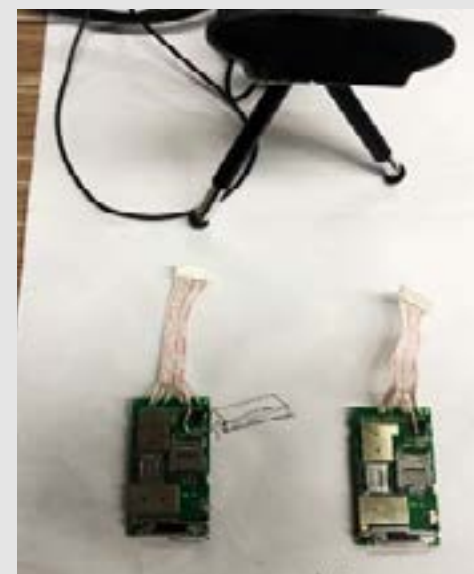
Top and Bottom side inspection

Solder defect detected

Accept

Reject

Cape Manufacturing Sdn. Bhd.

**No22, Jalan Temenggong 2,
Kawasan Perindustrian Temenggong,
81100 Johor Bahru, Johor.**

Company Background:

Cape Manufacturing (M) Sdn. Bhd., established in 2005, has a total workforce of 60 employees in a factory area of 35,000 square feet. The company has a paid up capital of RM 6.5 million, and have the ISO 9001 and ISO 14001 quality certifications. Their mission statement is to create value for their customers through innovative solutions and continuous advancement in cutting-edge technology with special focus in electronics manufacturing

Project Overview:

Vision system to prevent mixing of 'glued terminal blocks' and 'unglued terminal blocks' when running production.

<< Before:

- Operator uses human vision to check the terminal block, whether it has been glued or not
- Occasional quality issue due to human errors

>> Final Results:

- Lower manpower required; reduced to only person to check the glue.
- Increased the Overall Equipment Efficiency (OEE) due to reduced human errors
- Improve quality and consistent Internal Quality Control (IQC) process

No glue

Have glue
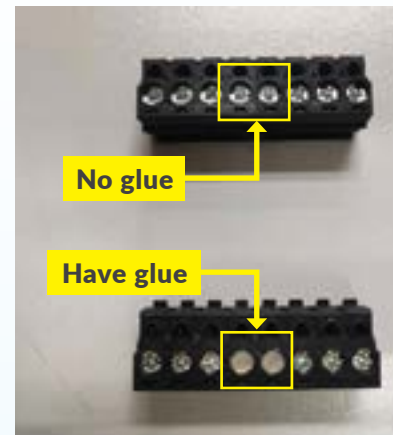
Before:
Operator manually checks the terminal blocks
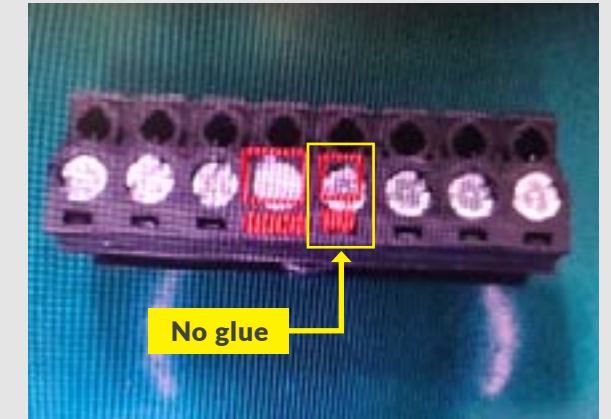
1. Camera
2. PCBs under observation
3. Display of result
4. AI Vision System

>> After:

- Vision system able to detect 'glued terminal blocks' and 'unglued terminal blocks' when running production.
- This helps in prevent mixing of parts

Have glue
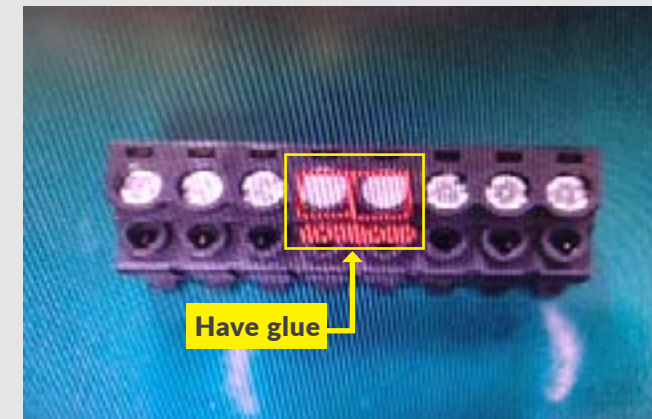
No glue

Good part.
Glue detected

Not Good part.
No Glue detected (right side)

Composites Technology Research Malaysia Sdn. Bhd. (CTRM)

**Composite Technology City,
Batu Berendam, 75350 Melaka**

Company Background:

Composite Technology Research Malaysia Sdn. Bhd. (CTRM), a member company of DRB HICOM Berhad, which specializes in the manufacturing of composites structured components for commercial and military aircraft. CTRM was incorporated on 20 November 1990 with Ministry of Finance Inc. as its principal shareholder. CTRM was entrusted with a strategic role to develop high technology based industry, namely the aerospace and composites industries. The government identified these two industries as the most crucial constituents to the future industrial growth for Malaysia. CTRM started its business operations with the assemblies and manufacturing of a two-seater composites light aircraft, Eagle 150B. Today CTRM is part of the global supply chain for composites aero structure for major commercial and military aircrafts manufacturers in the world.

Project Overview:

Automate holes detection and quantity checking using AI Machine Vision.

<< Before:

- Manual counting of holes after drilling process using Pin Gauge with hundreds of holes to be counted daily.
- Quantity of the holes are occasionally being miscounted due to operator fatigue

>> Final Results:

- The AI model's accuracy has not yet reach a sufficient level to be made ready for deployment.
- The AI4S Suite is open for unwarranted disruption that renders it unsuitable for deployment.

Before:
Manual counting of holes after drilling process

Composites Technology Research Malaysia Sdn. Bhd. (CTRM)
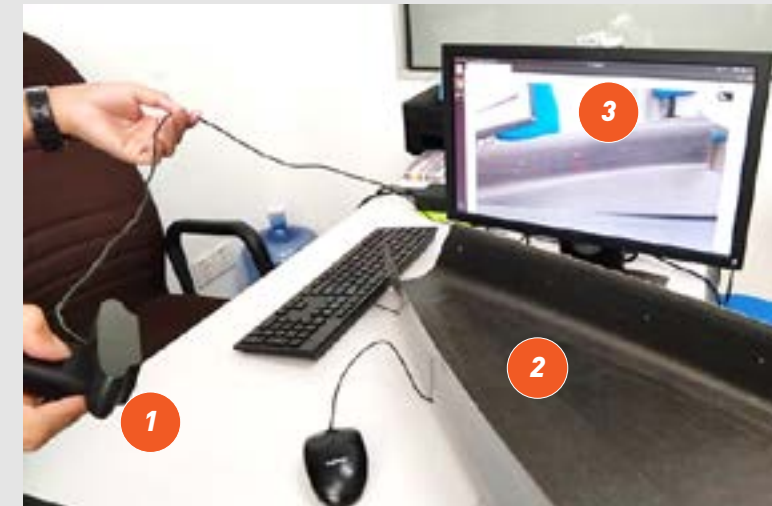
1 Camera

2 Composite panels under observation

3 Display of result

>> After:
- Automate holes detection of composite panels using AI Machine Vision
- Pins are introduced to increase contrast and improve detection

Classification of holes and pins on objects, as validation on actual shop floor environment

DelstAsia Sdn. Bhd.

Lot 161, Jalan Perigi Nanas 8/13,
Taman Perindustrian Pulau Indah,
42920 Pelabuhan Klang,
Selangor, Malaysia

Company Background:

DelstAsia Sdn. Bhd.'s core business is centered around the revolutionary food-grade grain and feed conditioner, based on a patented moisture management concept. This a patented moisture management system catalyzes safe water activity in the system (the material) to maintain freshness, and guards against microorganic spoilage

Project Overview:

Vision system to detect and identify hairline cracks on animal feed pellet surfaces

<< Before:

- Lab personnel manually inspects the animal feed pellet surfaces for hairline cracks
- This is a very tedious and demanding job

>> Final Results:

- Increased work efficiency by 50%
- Decreased work load for lab personnel during inspect process
- Improved, and more consistent, results of detection and identification

Before:
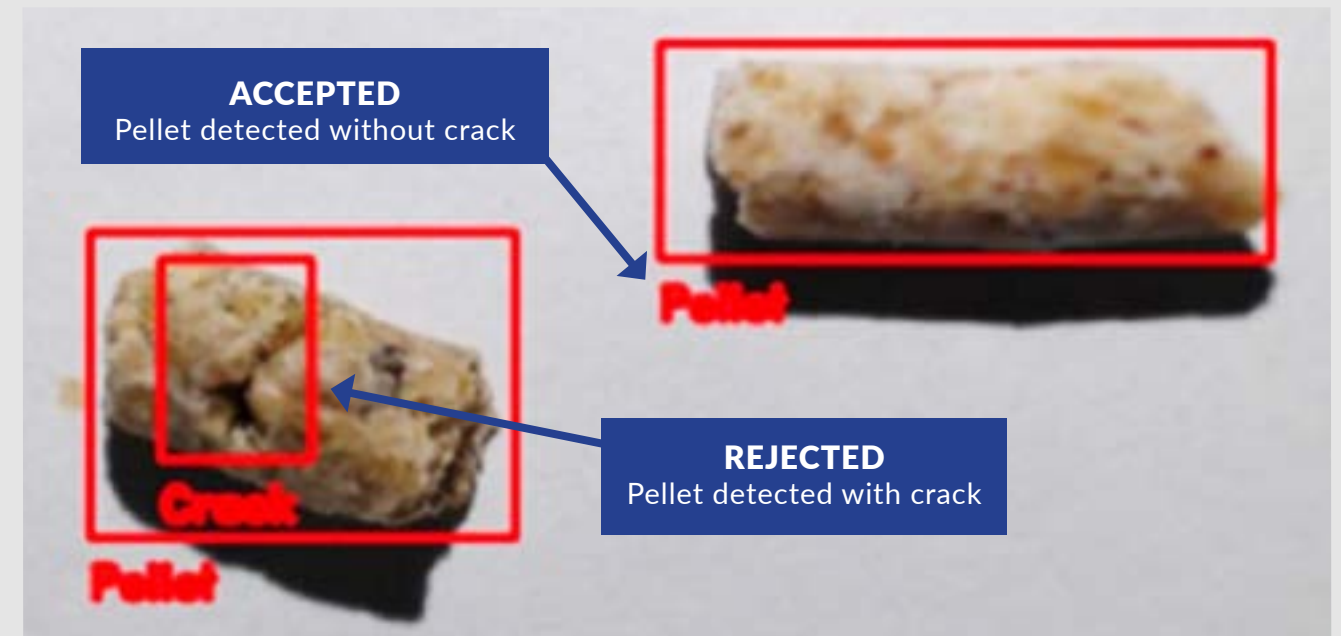Lab personnel manually inspects the animal feed pellet surfaces for hairline cracks

DelstAsia Sdn. Bhd.
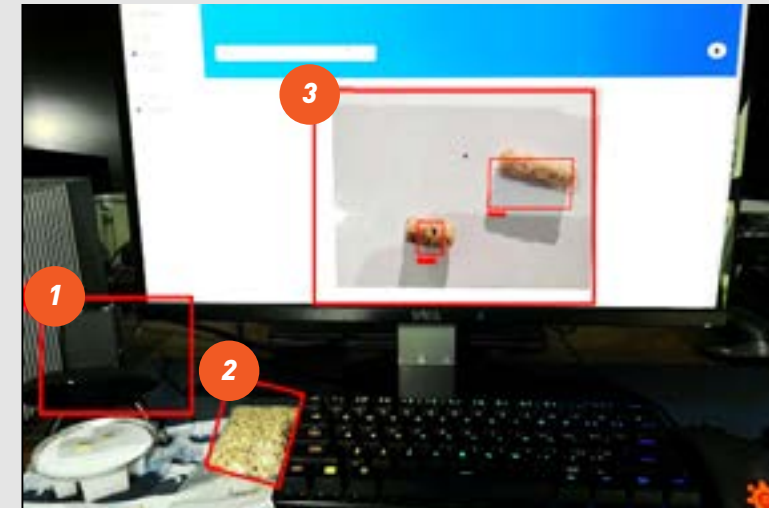
1. Camera
2. Pellets under observation
3. Display of result

>> After:
Inspect and identify the animal feed pellet surfaces for hairline cracks with higher accuracy and efficiency

ACCEPTED
Pellet detected without crack

REJECTED
Pellet detected with crack

DF Automation and Robotic Sdn. Bhd.

📍 **5 Jalan Impian Emas 18, 81300 Skudai, Johor**

🏢 **Company Background:**

DF Automation and Robotics Sdn. Bhd. is a technology company specializing in designing, manufacturing, servicing, marketing and consistently improving Automated Guided Vehicle (AGV) and Autonomous Mobile Robot (AMR) systems for various industrial and commercial use. They aspire to be a global leading Autonomous Mobile Robot Manufacturer and Automated Guided Vehicle System Provider.

📋 **Project Overview:**

Vision system to assist robot, so as to replace human for automated showroom briefing

<< Before:

- Every time when a customer or visitor comes to showroom, sales person needs to show and explain the product and showroom briefing over and over again
- Challenge is to limit human interactions in the showroom as a Covid-19 precautionary measure

>> Final Results:

- Replaced human with robot for products and showroom briefing
- Reduced human interactions during Covid1-19 outbreak in the showroom

Before:
Sales person needs to show and explain the product and showroom briefing every time

DF Automation and Robotic Sdn. Bhd.

1. Camera
2. Visitor under observation
3. AI Vision System
4. DF's Automated Mobile Robot (AMR)
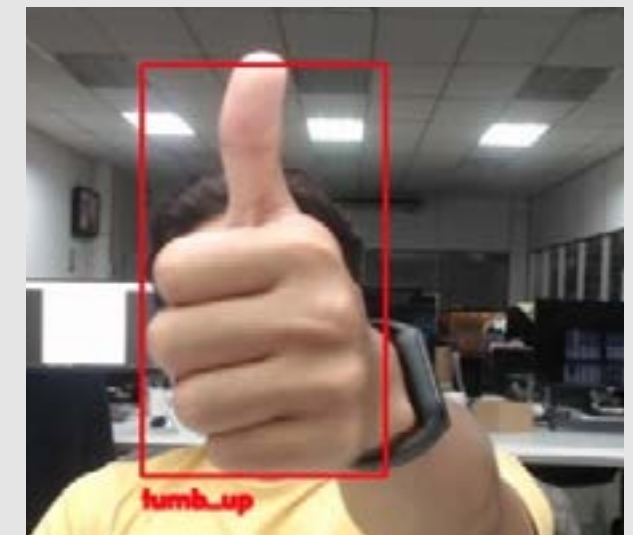
>> After:
Vision System to assist robot to detect when the door is opened and 'thumbs up' gesture signal from visitor

Robot will wait at the front of door

Robot will detect door opening and move to greet visitor

Robot will wait for the 'thumbs up' gesture signal from visitor before proceeding to the next action

Durapower Sdn. Bhd.

**PTD 18696, Batu 24 1/2,
Jalan Kulai-Air Hitam,
81000 Kulai, Johor**

Company Background:

Durapower Sdn. Bhd. was incorporated on Malaysia in 1994. This company is principally involved in the manufacturing of plastic sheet extrusion compounding based on Amorphous Polyethylene Terephthalate (APET), Polyethylene Terephthalate Glycol (PET-G), GAG, High Impact Polystyrene (HIPS) and Polypropylene (PP) technologies

Project Overview:

In-process visual defects detection of extruded plastic sheets

<< **Before:**
- Quality of extruded plastic sheets during 'Sheet Roll-Up' stage cannot being ensured, because defect may occur anytime during roll-up process
- Manual detection is difficult due to the high speed of production process

>> **Final Results:**
- Improved in-line quality control as well as out-going quality control
- Reduced manpower to visually detect the defects during production process
- Reduced production and finished product wastages since defects can now be detected at early stage

Before:
Manual inspection of product quality during 'Sheet Roll-Up' process

Durapower Sdn. Bhd.

1 Camera
2 Extruded plastic sheet under observation
3 Display of inference result
4 AI4S Vision System

>> **After:**
- AI Vision System can detect real-time roll-up sheet process
- Defects (e.g. black dots, dirt, holes etc.) can be easily detected at high speed continuous production process (up to 10 meters per minute)
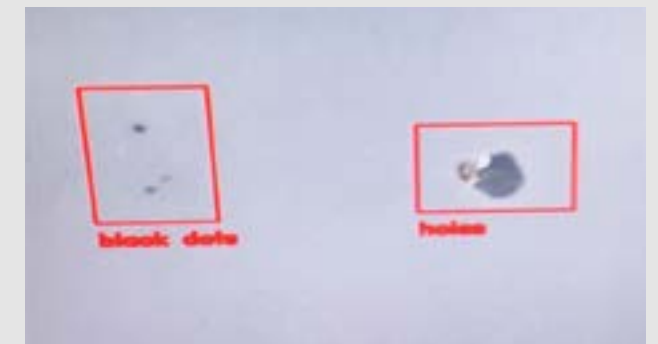
eMooVit Technology Sdn. Bhd.

**Futurise Center, Level ,
Prime Lab 3, Persiaran Apec,
Cyber 8, 63000 Cyberjaya, Selangor**

Company Background:

eMoovit Technology Sdn. Bhd. is a high-tech company specializing in autonomous and robotic technologies. Their core business focus is on developing an industry-leading component-based driverless software solutions, which converts certain vehicles into autonomy systems. These are deployed in different applications, such as first-and-last mile transportation, logistic transportation and utility solutions

Project Overview:

Enhanced pedestrian warning system to increase safety of robot movements

<< Before:

- Current robot uses only Light Detection and Ranging (LIDAR) remote sensing for pedestrian avoidance
- Need to enhance safety of the robot for pedestrians, with improved sensing

>> Final Results:

- The implementation of enhanced pedestrian warning system will increase the safety of pedestrians who are around the robot.

Before:
Current setup for the robot uses only LIDAR for pedestrian avoidance

Durapower Sdn. Bhd.

1. Camera
2. Pedestrian under observation
3. Display of result
4. AI Vision System
5. Robotic system
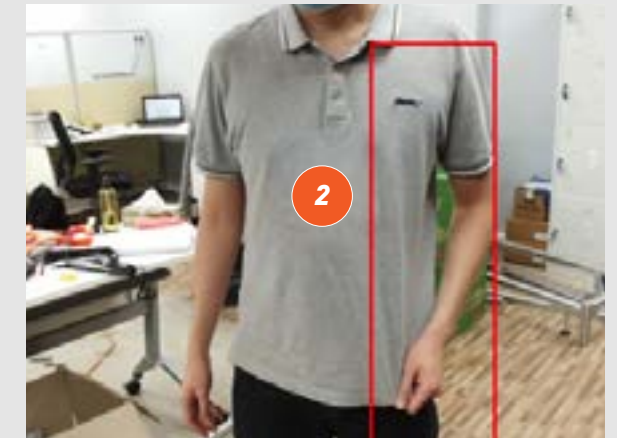
DETECTED: System successfully gave a warning whenever a pedestrian is detected in front of the robot.

>> After:
- Computer vision using cameras to complement the LIDAR sensing, for enhanced safety for near-by pedestrians

Helio Media

No. 3A & 3B, Jalan SS 26/8,
Taman Mayang Jaya
47301 Petaling Jaya, Selangor

Company Background:

Helio Media started as an out-of-home advertising agency; over the years they have been recognized as a leading Digital Signage System Integrator with proprietary solutions focusing on audience engagement, measurement and LED technologies. Today, their foundation and capabilities in media, analytics and technology have enabled them to unite physical and digital, going beyond boundaries to reimagine brand experiences. Their core competencies include Digital out-of-home (DOOH) services, Communications and Managed Services

Project Overview:

AI analysis of outdoor LED displays' health status, to check for irregular patterns and errors

<< Before:

- Photos from CCTV video stream send to WhatsApp group for site supervisors to determine issues and troubleshooting

Irregular Patterns

Before:
Manual checking of outdoor LED displays for irregular patterns and errors

>> Final Results:

- Reduced LED displays downtime as problems are detected and notified immediately
- Reduced manpower needed in mundane task to monitoring via CCTV
- Reduced workload of site supervisor
- Improved site servicing and cut down unnecessary travels

Helio Media

LCD display detected

1. Camera
2. LCD under observation
3. Display of result
4. AI Vision System

>> After:

- Vision System monitors LCD displays 24/7 for irregular patterns or errors
- Problems are analyzed and identified by AI system when errors are detected
- Notification to be sent to respective maintenance team, and reducing workload of site supervisor on manual monitoring

LCD Display OK
No defect detected

LCD defect detected

LCD Display BAD
Defect detected

i-CATS University College

**i-CATS University College,
Jalan Stampin Timur,
93350 Kuching, Sarawak**

Company Background:

At the i-CATS University College (i-CATS UC), the emphasis on career-focused learning ensures the graduates are able to excel in their chosen professions. The industry-based curricula, developed in collaboration with leading industries, ensure that the students acquire the relevant technical and soft skills to gain the competitive edge in today's increasingly globalized environment. i-CATS UC is a subsidiary company of Sarawak Skills Development Centre (SSDC).

Project Overview:

Car detection system to count available parking spaces

<< Before:

- Double parking is common practice due to limited car parking spaces
- Causing issues such as time, safety etc.

>> Final Results:

- Reduced the possibility of accidents happening
- Time saving for drivers to find a parking space.

Before:
Double parking is common practice due to limited car parking spaces
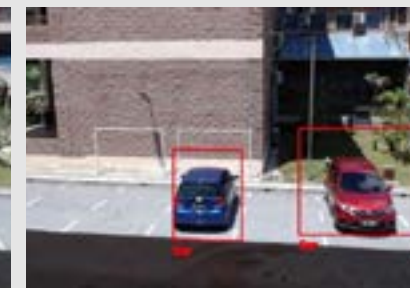
1	Camera
2	Cars under observation
3	Display of result
4	AI Vision System

>> After:

- Realtime tracking the number of cars in the parking lot.
- Display the number of parking spaces left and whether parking lot is full or not.

No cars detected
Car Park Empty

2 cars detected
Car Park Not Full

4 cars detected
Car Park Full

Intralink Techno Sdn. Bhd.

Lot 7447 & 7980, Jalan P4/1,
Bandar Teknologi Kajang, Batu 18, Jalan Semenyih,
43500 Semenyih, Selangor, Malaysia.

Company Background:

Established in April 1999, Intralink Techno Sdn. Bhd. is a leading manufacturer of Fiber Glass Reinforced Plastics (FRP) for the energy (oil, gas and power) sector, focusing on cooling towers, Floating Production Storage and Offloading (FPSO), petrochemical and special application for the industrial markets and infrastructure facilities. Intralink has over 20 years experience in the manufacturing of FRP composite using Isophathalic Polyester (ISO) and Vinylester (VE) resin systems. Their products are exported worldwide

Project Overview:

Visual defects detection of Fiber Glass Reinforced Plastic (FRP) components

<< Before:

- Quality Control (QC) inspector manually checks condition of profile for any defects
- Defect types are resin rich area, intrusion and mat splice

>> Final Results:

- Reduced time for product defects detection
- Reduced wastage and rejects
- Reduced number of QC inspector headcounts
- Real time product quality and condition monitoring system

Before:
QC inspector manually checks condition of profile for any defects.

Intralink Techno Sdn. Bhd.

1. Camera
2. FRP component under observation
3. Display of result
4. AI Vision System

Detection of 'Mat Splice' defect on profile
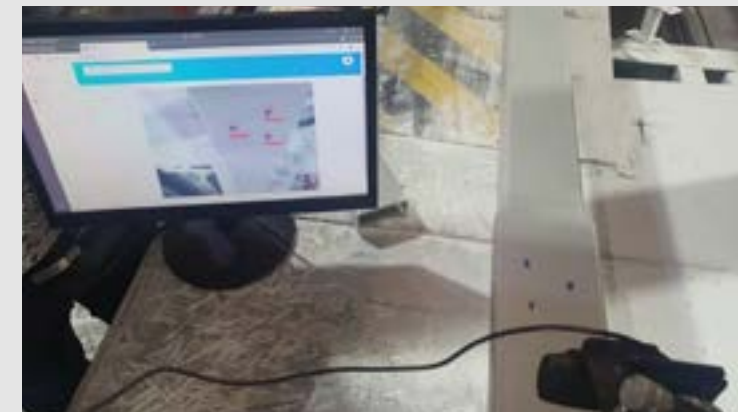
>> After:
- AI Vision System shows and categories defect on screen
- Sends alert to QC operator for intervention

Leader Range Technology Sdn. Bhd.

1A, Lintang Kampung Jawa,
NFTZ Bayan Lepas, 11900 Bayan Lepas,
Penang, Malaysia.

Company Background:

Leader Range Technology Sdn. Bhd. is an established functional test solution provider. They provide precision CNC machining services, covers sheet metal work processes, powder coating services, as well as total assembly, test, final integration and validation services on capital equipment and industrial manufacturing equipment. Their products include Printed Circuit Board Assembly (PCBA) functional testers, Radio Frequency (RF) shielded boxes, auto test handlers and various industrial automation equipment

Project Overview:

Vision System to detect presence of facemasks, and that facemasks are correctly worn

<< Before:

- Employees forgetful and not wearing their facemasks properly which exposes the nose
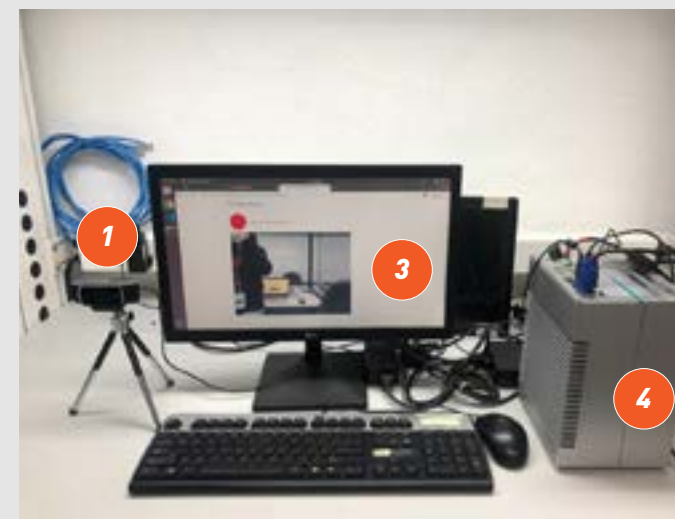
>> Final Results:

- Auto alerts to employees to wear their facemasks correctly
- Reduced manpower to check that employees are wearing facemasks
- Improved and safer working conditions for the employees

Before:
Employee not wearing facemask properly, exposing the nose

Leader Range Technology Sdn.Bhd.
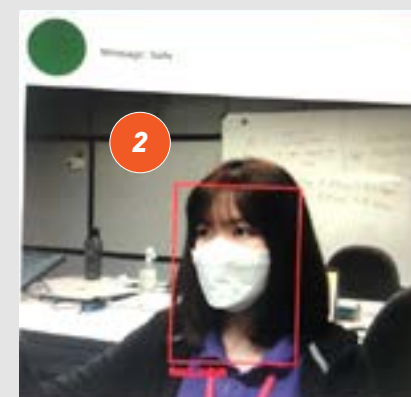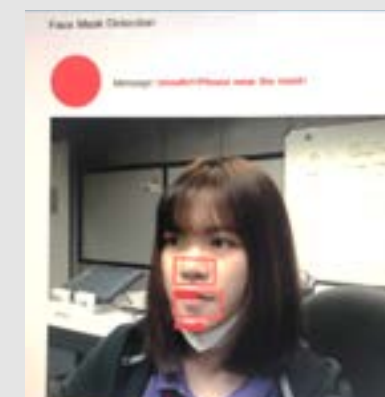

1. Camera
2. Person under observation
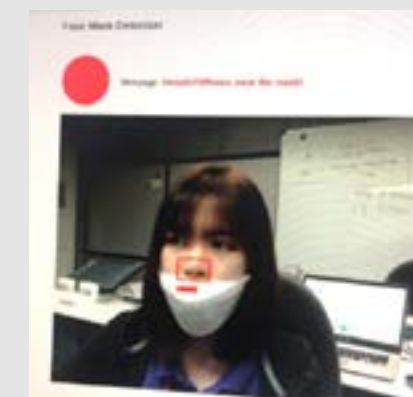3. Display of result
4. AI Vision System

>> After:

- Vision System to detect presence of facemask, and that facemask is correctly worn
- Facemask detection implemented for employees building entry access

SAFE: Facemask detected and mask is fully covering nose and chin

UNSAFE: No facemask detected

UNSAFE: Facemask is not covering nose

LiGNO Biotech Sdn. Bhd.

**No. 1 Jalan Perindustrian Balakong Jaya 2/2,
Taman PerindustrianBalakong Jaya 2,
43300 Balakong Jaya, Selangor**

Company Background:

LiGNO Biotech Sdn. Bhd., founded in 2008, is a research-based biotechnology company. LiGNO is responsible to promote, cultivate and commercialize the Tiger Milk Mushrooms and other functional mushrooms like cordyceps Sinensis, Chaga mushroom, Antrodia Camphorata etc. LiGNO also has production facilities that serve as OEM/ODM services providers. Their services range from providing specialty ingredients, creating products concepts and development, assisting product registration, manufacturing products and marketing support

Project Overview:

Visual inspection for packaging process to detect miscounted sachet quantity and faulty sachet placement

<< Before:

- Operator required to count sachets and place it properly at each column manually
- Human error due to mis-count and wrong placement of sachets in packaging

Before: Miscounted sachet quantity Extra, and less one, sachet in left and right columns, respectively.

>> Final Results:

- Improved quality due to reduced human errors.
- Increased work efficiency, due to zero rework in packaging process

LiGNO Biotech Sdn. Bhd.
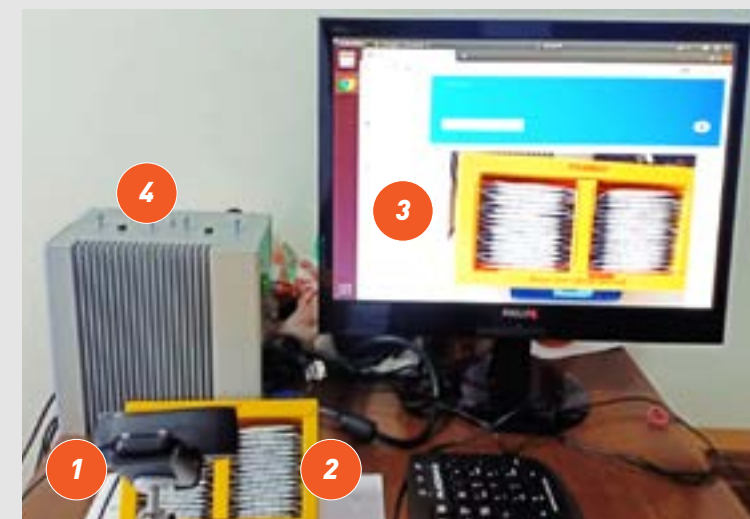
1. Camera
2. Packaging under observation
3. Display of inference result
4. AI Vision System

>> After:
AI Vision system is able to identify miscounted sachets quantity and faulty placements

ACCEPTED: Both two columns have 15 complete sachets being detected.

REJECTED: Left column is complete, but Right column has incomplete sachets quantity being detected.

LingKail Sdn. Bhd.

18, Lorong Hill Park 2,
Hill Park Residensi, Alma,
14000 Bukit Mertajam, Penang

Company Background:

LingKail Sdn. Bhd. is a solution provider. Their three core competencies are (1) software development i.e. IOT, cloud, smart cities, enterprise, Android and IOS, (2) Embedded system prototype development i.e. medical electronics, mechatronics, consumer electronics, mission critical control system, test and measurement) and (3) e-commerce i.e. technology product sourcing and trading. They are also working on an AI project focusing on traffic management system in KL

Project Overview:

Smart AI traffic monitoring system to provide real-time visualizations

<< Before:

- Operator manually monitors all roads and streets and handle traffic lights based on visual estimations without proper data
- Lots of operators are needed to make fast and reliable decisions

>> Final Results:

- Operators can monitor multiple junctions to provide real-time visualization of junction condition, including data of speed and queue-length for every junction
- Improved work efficiency and consistency in traffic management especially during peak hours

Before:
Operator manually monitors traffic and handle traffic lights based on visual estimations

LingKail Sdn. Bhd.
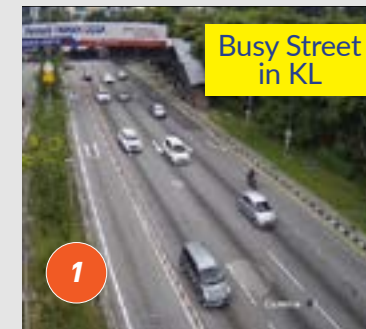
Busy Street in KL

Street CCTV

1. Real-time traffic under observation
2. Camera, replaced by street CCTV
3. AI Vision System unit
4. Display of traffic inference result

Inference to measure queue length, number of cars and speed
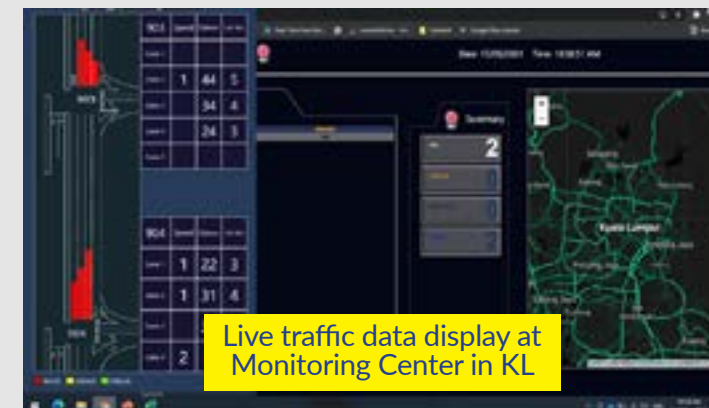
Live traffic data display at Monitoring Center in KL
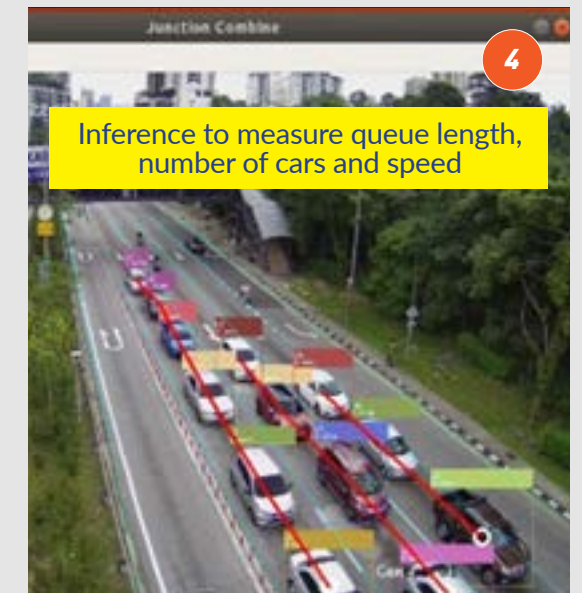
>> After:
- Machine Vision System gets video feed from street CCTV, via an optical cable
- System provides inference to measure queue length, number of cars and speed

NationGate System Sdn. Bhd.

**Lot 10563, Jalan Perusahaan 3,
Kamunting Industrial Estate,
34600 Kamunting, Perak, Malaysia**

Company Background:

NationGate System Sdn. Bhd. is a subsidiary of the NationGate Group. They provide manufacturing services and technical support to networking and communications, instrumentation, consumer products, medical devices and the automotive sectors.

Project Overview:

Auto visual inspection of semiconductor wafer fabricated dies; with detection and data gathering

<< Before:

- Semicon wafer dies are manually inspected to determine their condition
- Rejected dies are manually checked and marked without auto data gathering
- This can cause inaccuracies due to human errors

>> Final Results:

- Rejected die will automatically detected
- Increased the Overall Equipment Efficiency (OEE)
- Reduced human errors
- Real time/live monitoring system

Before:
Semicon wafer dies are manually inspected to determine their condition

NationGate System Sdn. Bhd.
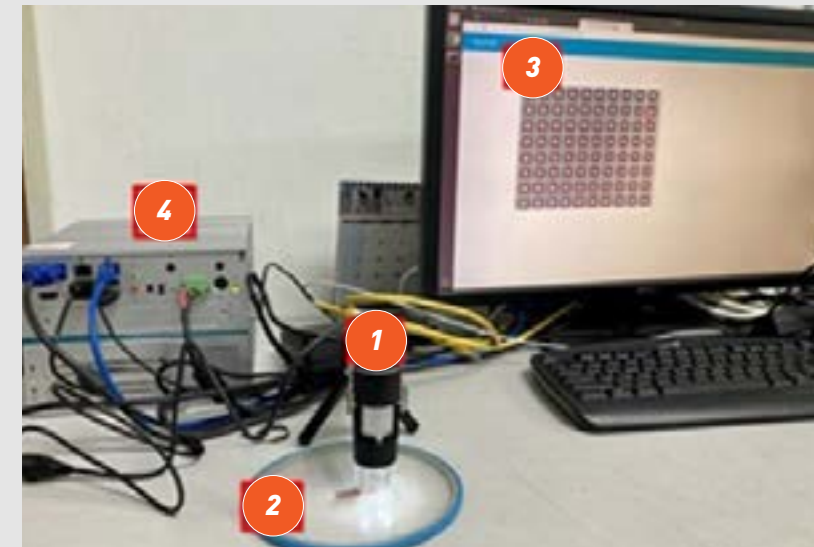
1. Camera
2. Wafer Die under observation
3. Display of result
4. AI Vision System

>> After:
- Vision system can detect defects on Semicon wafer fab dies
- Rejected dies are detected, labeled and date/time data are placements

ACCEPTED DIE
No defect detected

REJECTED DIE
Defects detected and damaged dies are labeled as 'FAIL'

PDKM

PD Kawamura Kako Manufacturing Sdn. Bhd.

Lot 29139, Locked Bag 222,
Sungai Choh, 48200 Rawang, Selangor

Company Background:

PD Kawamura Kako Manufacturing Sdn. Bhd. is a diversified plastic manufacturer, suppling a variety of precision resin (mechanic interior and exterior) parts for the automotive industry. Their technical and production integrated system covers product development, molding, painting, assembling and versatile manufacturing equipment

Project Overview:

Visual inspection of automotive Garnish Roof Side; need to detect presence of 5 clips of Garnish Roof Side parts during production

<< Before:

- Production operator uses naked eye to inspect Garnish Roof Side parts appearance and presence of clips

>> Final Results:

- Reduced human error because manual visual inspection is a repetitive task
- Increased speed and accuracy of inspection for clips installation

Before:

Production operator uses naked eye to inspect Garnish Roof Side appearance and presence of clips
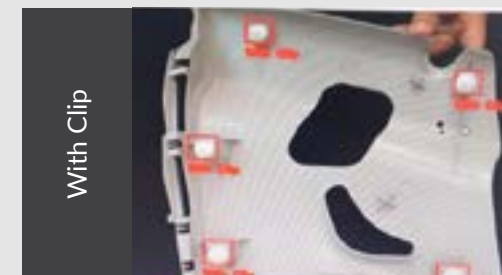
PD Kawamura Kako

1 Camera

2 Garnish Roof Side under observation

3 Display of inference result

>> After:

- AI Visual System able to detect Garnish Roof Side parts with clips and without clips
- And label them as 'Accept' or 'Not Good (NG)' parts

Clip Detection	Node-RED Result
No Clip	Not Complete (NG)
With Clip	Complete (OK)

Recogine Technology Sdn. Bhd.

29-2, Jalan Putra Mahkota 7/8B,
Putra Heights,
47650 Subang Jaya, Selangor

Company Background:

Recogine Technology Sdn. Bhd. is an innovative company, focusing on delivering smart and secure living for individuals, businesses and governments. They seek to create and promote smart and secure living for all by offering state-of-art city infrastructure designs such as Intelligent Transportation System (ITS), Real Time Intelligent Video Analyzer, Unified Security System and Integration of Clinical System to enable businesses to run smoother and better

Project Overview:

Vision system to detect and identify vehicles and people for smart traffic analysis

<< Before:

- Engineers need to define new algorithm to correctly identify new vehicle types
- System then detects vehicles and pedestrians to obtain object information.
- System collects these statistics to perform traffic congestion analysisThis can cause inaccuracies due to human errors
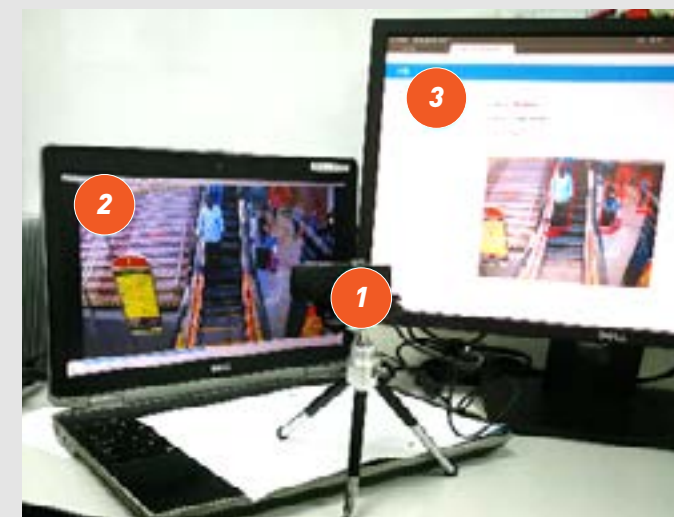
>> Final Results:

- Ease of maintenance, because system and model can improves its ability over time with more training data
- Improved accuracy of detection and classification
- Realtime processing of traffic monitoring and management system

Before:
Engineers need to define new algorithm to correctly identify and count vehicles

Recogine Technology Sdn. Bhd.

1. Camera
2. Pedestrian under observation
3. Display of inference result

>> After:

- AI traffic system accurately detects vehicles from the images
- The model improves its ability over time easily with more training data

Traffic Analysis
Message: **Vehicle detected!**
Message: **People detected!**
Vehicle Count: **2**
People Count: **2**

Vehicle Count: 2
People Count: 2
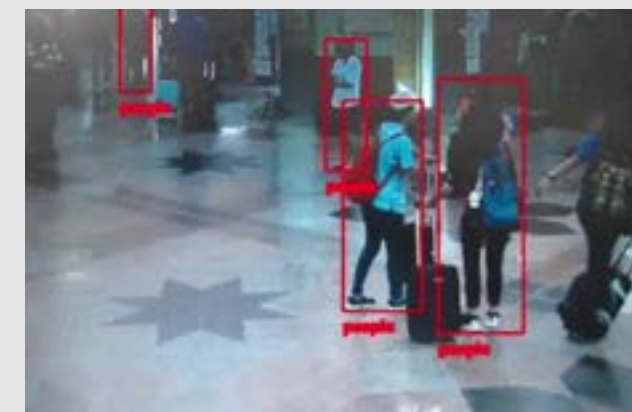
Traffic Analysis
Message: **No vehicle**
Message: **People detected!**
Vehicle Count: **0**
People Count: **4**

Vehicle Count: 0
People Count: 4

Robomy Sdn. Bhd.

E-06-01, Starparc Point,
Jalan Genting Klang,
53300 Kuala Lumpur

Company Background:

Robomy Sdn. Bhd. is an ICT company specializing in product development and system integration with AI and cognitive technologies. Their capabilities include hardware and software development, radio frequency system development, custom Internet of Things (IoT) development and IoT integration. Their core principle is to provide affordable technology solutions for multiple market segments. Robomy aspires to help local companies to excel in IR4.0 deployment, including embedded hardware and AI edge deployments

Project Overview:

Visual defects detection of Printed Circuit Board Assemblies (PCB-A)

<< Before:

- Operator manually checks for electronic components orientation
- Operator can carelessly bypass a PCB with wrong capacitor placement, which can cause the capacitor to explodeSystem collects these statistics to perform traffic congestion analysisThis can cause inaccuracies due to human errors

>> Final Results:

- Increased the Overall Equipment Efficiency (OEE) Reduced human errors
- Cost saving on manual paper recorder
- Real time/live monitoring system

Before:
Operator manually checks for component orientation

Robomy Sdn. Bhd.
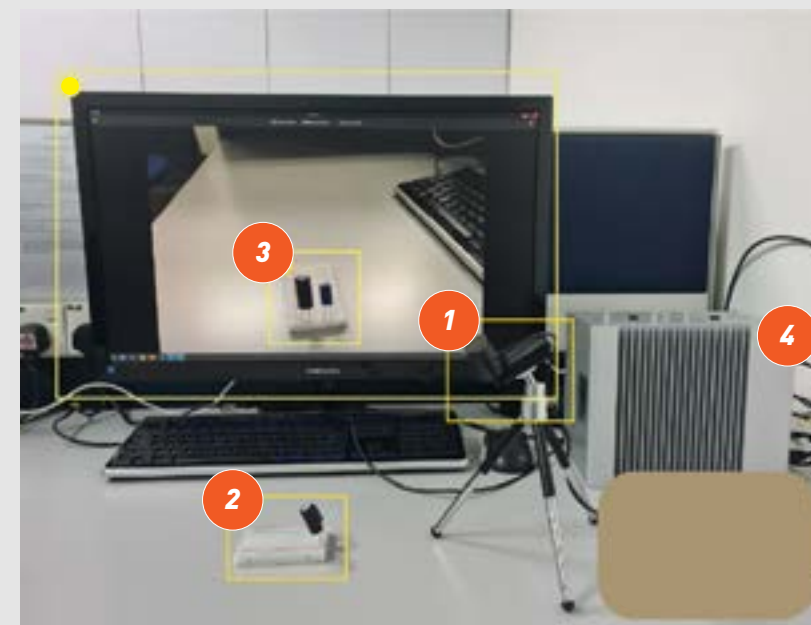
1. Camera
2. Capacitors on PCB
3. Display of result
4. AI Vision System

>> After:
Vision system automatically detects electrolytic capacitor; including detection for wrong orientation of capacitors and their voltage rating

ACCEPTED: 99.9% correct for orientation of capacitor

REJECTED: 95.1% inverted for orientation of capacitor

Selangor Human Resource Development Center (SHRDC)

No. 1, Ground Floor, Block 2,
Pusat Perniagaan Worldwide, Jalan Tinju 13/50,
40100, Shah Alam, Selangor

Company Background:

The Selangor Human Resource Development Centre (SHRDC) is a training and development center which specializes in technology-based training in the areas of Smart Factory, Artificial Intelligence (AI), Data Science, Electrical and Electronics, Solar, and ICT. The Malaysian Smart Factory (MSF) 4.0 initiative at SHRDC offers smart factory competency training through hands-on and/or online/ remote online training approaches, which is ideal for relevant skillset and talent development towards application of Industry 4.0 in Malaysia.

Project Overview:

Machine vision and image processing to check quality of engraved images

<< Before:

- No early checking mechanism to confirm the engraving process is OK before proceeding to next station
- Raw material wastage in downstream processes on bad engraved partscollects these statistics to perform traffic congestion analysisThis can cause inaccuracies due to human errors

>> Final Results:

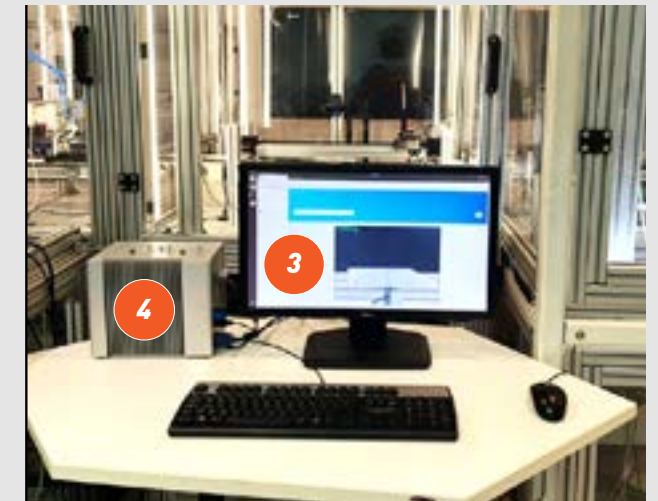- Reduced machine cycle time due to early reject detection, at engraving station.
- Reduced raw material wastage, only needed for good engraved parts only

Before:
No early checking mechanism to confirm the engraved quality

Selangor Human Resource Development Center (SHRDC)
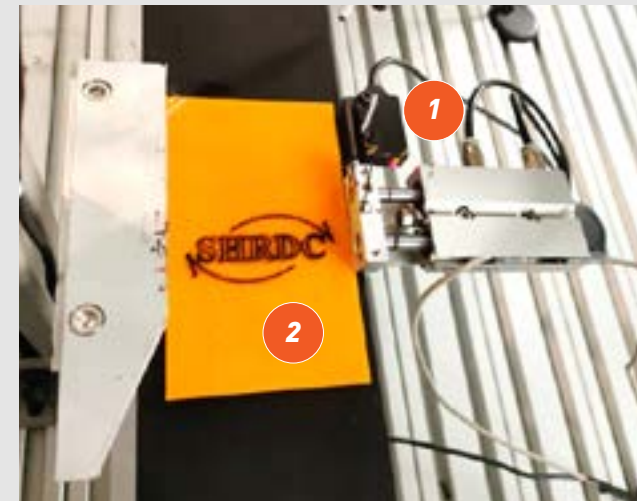
>> After:
- Machine vision and image processing can real-time check the quality of engraved images, before proceeding to next work station

1	Camera
2	Engraved image under observation
3	Display of result
4	AI Vision System

System will display '**good engrave**' if the image quality is accepted

Sky-Tag Robotics Sdn. Bhd.
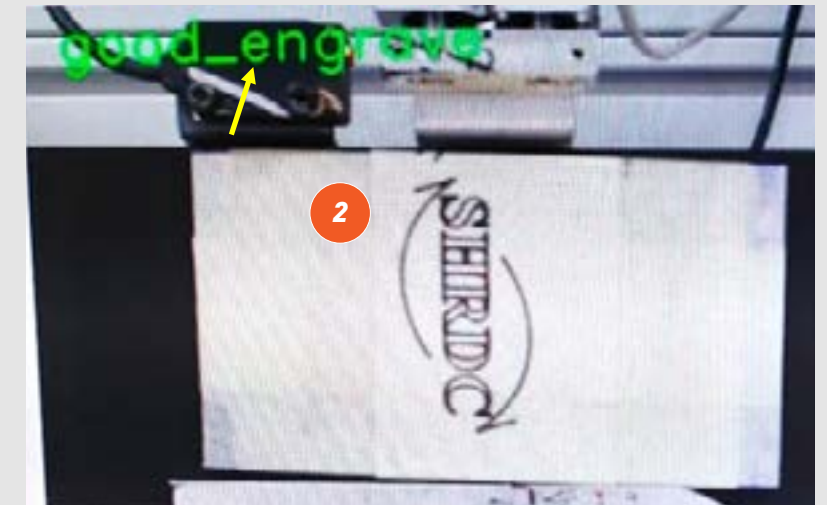
No 5, Jalan Cassia Selatan 3/2,
Lebuhraya Bandar Cassia,
Taman Perindustrian Batu Kawan,
14100, Pulau Pinang.

Company Background:

Sky-Tag Robotics Sdn. Bhd. specializes in providing high-end automated manufacturing machinery, focusing on functionality precision, quality services, cost-effectiveness and timely delivery. Since their incorporation in 2005, they have partnered with various multinational companies (MNCs) in engineering high-tech infrastructure and market-leading solutions. Sky-Tag Robotics is globally recognized for their quality control and reliability in manufacturing automation.

Project Overview:

Classification of rubber gloves based on color types

<< Before:

- Operators use naked eye to identify and differentiate the different rubber gloves based on color groups
- Some of the gloves are misclassified due to the minimal color differences
- collects these statistics to perform traffic congestion analysisThis can cause inaccuracies due to human errors

>> Final Results:

- Reduced production manpower for gloves color categorization
- Improved the UPH while minimizing the misclassification rate
- Improved quality control, work efficiency and productivity

Before:
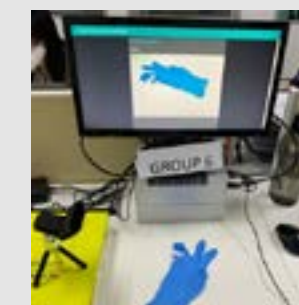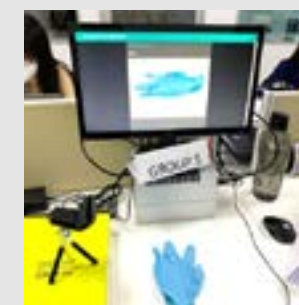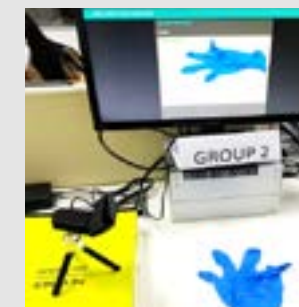Operators manually differentiate the gloves based on color groups

Sky-Tag Robotics Sdn. Bhd

1. Camera
2. Glove under observation
3. Display of classification result
4. AI Vision System
5. Gloves after classification

>> After:
Machine Vision System able to recognize and classify the rubber gloves color groups with higher accuracies and consistencies

Sonyu Plastic Industries Sdn. Bhd.

**Lot 2 & 4, Solok Selat Selatan 21B,
Sobena Jaya Industrial Area, Pandamaran,
42000 Pelabuhan Klang, Selangor, Malaysia**

Company Background:

Sonyu Plastic Industries Sdn. Bhd. has been in the plastic manufacturing industry since 1980. They started as an outsource for production of patented packaging products, and have since expanded their range of plastic products and extended their services throughout Malaysia, Singapore, China, Australia and South Africa. SonyuPlast has also achieved both the ISO 9001:2015 in Quality Management System and the ISO 22000:2018 in Food Management System, which recognizes the quality of their products and services at international standards

Project Overview:

Machine vision inspection of labels on plastic bottles

<< Before:

- Operators do visual check of labels, by picking up the bottles one by one
- Need to perform two tasks at a time, manual checking and arranging bottles into trays
- Occasion human error
- collects these statistics to perform traffic congestion analysisThis can cause inaccuracies due to human errors

>> Final Results:

- Reduction of manual headcount, production and supervisory control level
- Improvement in quality controls, with reduced human errors
- Productivity improvement, able to arrange the bottles faster

Before:
Operators visual check labels, by picking up the bottles one by one

Sonyu Plastic Industries Sdn. Bhd.

1. Camera
2. Plastic bottle on conveyor belt
3. Accept bin (labeled bottles)
4. Reject bin (unlabeled bottles)

>> After:

- Labels inspection plastic bottles on conveyor belt
- Defective bottles dropped into 'Reject' collection bin

ACCEPTED	REJECTED	REJECTED	ACCEPTED
Labelled bottle	Un-labelled bottle	Un-labelled bottle	Labelled bottle

Sulomas Sdn. Bhd.

**Lot 39, Jalan Permata 1,
Arab Malaysian Industrail Park,
71800 Nilai, Negeri Sembilan**

Company Background:

Sulomas is a 100% Malaysian owned company, inaugurated in 2014 and started as a trading house of waste bins. In 2016, they started their own manufacturing facilities specializing in steel and stainless-steel products for the waste and agricultural industries. Their manufacturing hub is well equipped and facilitated with more than 50 units of computer numerical control (CNC) machines, injection machines, die-cutting machines, embossing machines, digital printing and designing system and equipment.

Project Overview:

Visual inspection and quality control of stainless-steel products e.g. waste bins, recycle bins, benches etc

<< Before:

- Operators manually inspects with naked eyes to detect dents, scratches and welding marks on products
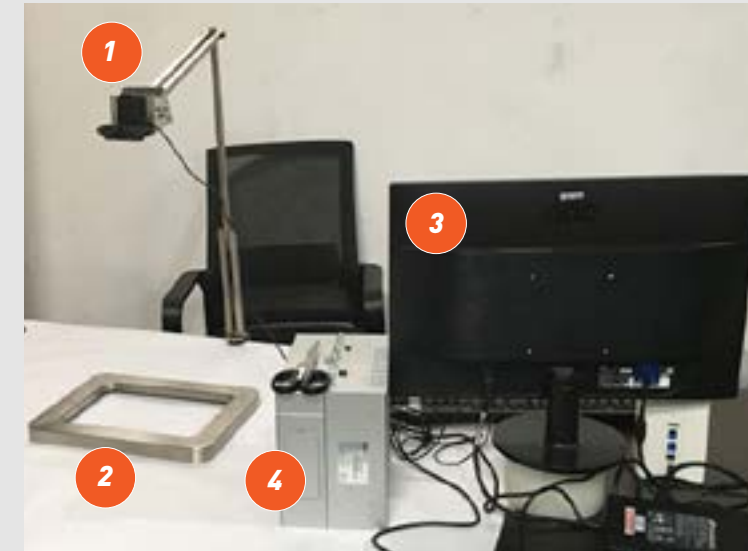- Occasion human error

>> Final Results:

- Increased production volume due to less time taken to inspect the goods.
- Improved the quality of internal inspection of Quality Control.
- Avoided over-look of the defect without rework at the production floor.

Before:
Manual inspection with naked eyes to detect dents, scratches and welding marks on products
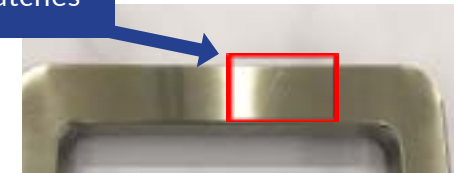
Sulomas Sdn. Bhd.

1 Camera

2 Metal frame under observation

3 Display of inference result

4 AI Vision System

>> After:
AI Vision System can easily detect the "welding marks" defects on metal covers.
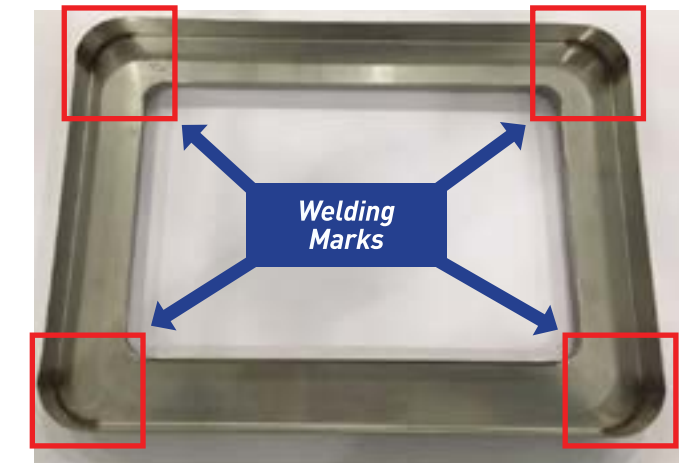
Scratches

Dented

Welding Marks

Sydney Cake House Sdn. Bhd.

13-17, Jalan Warden U1/76,
Seksyen U1, Taman Perindustrian Batu 3,
40150 Shah Alam, Selangor

Company Background:

Sydney Cake House, incorporated in 1982, started as a cake and bread manufacturer but has since grown to be a leading manufacturer for quality bakery products, with HALAL, HACCP and ISO22000 certifications. Sydney Cake House has expanded its manufacturing capability to a wide variety of products ranging from frozen, thaw-and-serve, to ready-to-eat products, from authentic local Malaysian traditional foods to Western pastries

Project Overview:

AI-enabled secure and contactless entry system into office buildings through facial recognition

<< Before:

- Employees require to physically key in PIN number or use fingerprint to unlock the door
- Not efficient when employees are wearing gloves or employees are carrying heavy loads or cargo analysis
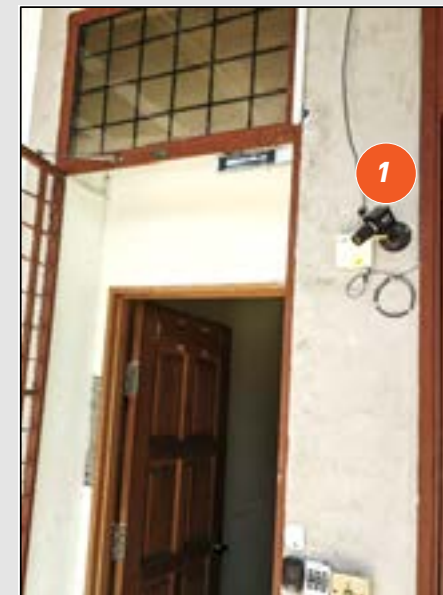- This can cause inaccuracies due to human errors

>> Final Results:

- Enable contactless entry into office buildings
- With enhanced security, only authorized employees are able to enter premises
- Better efficiency and with better hygiene to avoid food contamination (as proven in microbial assessment with swab tests)

Before:
Employees require to key in PIN number or use fingerprint to unlock door

1 Camera

2 Raspberry Pi with Intel Neural Compute Stick, connected to AI Machine Vision

>> After:
- Fully contactless and secure access into office building
- Face Recognition Entry System to detect and classify employees based on facial features and grant access into office buildings more securely and quickly

Face detection and classification to enable door entry access

Teksoft (SEA) Sdn. Bhd.

TEKSOFT

C-3A-3A, Block C, Oasis Square,
No.2, Jalan PJU 1A/7A, Ara Damansara,
47301 Petaling Jaya, Selangor

Company Background:

Teksoft (SEA) Sdn. Bhd. is a business and shared services outsourcing company. They specialize in providing engineering, designing, consulting and project management services for backend manufacturing shop floor, machinery and production and supply chain management. In addition to that, Teksoft also provides training, certification and product development services, which is a niche market in the manufacturing sector.

Project Overview:

Automated vision inspection for fabricated and machined metal parts

<< Before:
- Quality Control (QC) inspector manually checks the parts per quality specifications and drawings
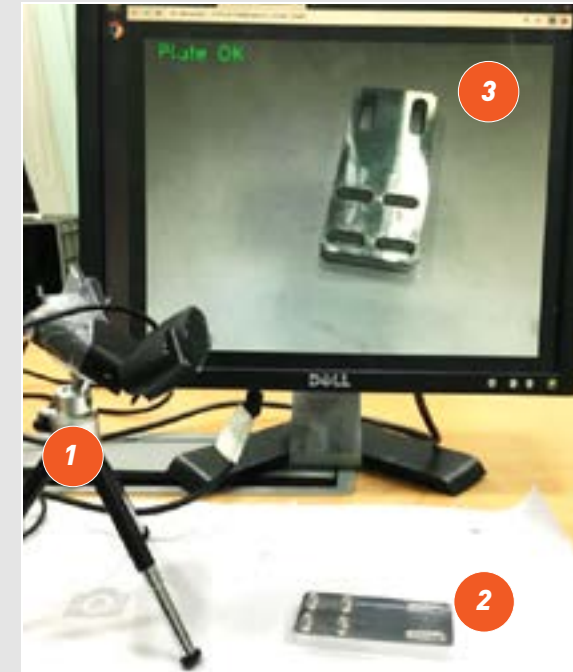- Will look for plate scratches and other surface defects

>> Final Results:
- Reduced number of manhour (~ 2 manhours/day)
- Reduced inspection time
- Reduced human error due to wrong judgement.
- Any operator can identify part, without referring to supervisor or engineer

Before:
QC inspector manually checks the parts per quality specifications

Teksoft (SEA) Sdn. Bhd.

1 Camera

2 Metal part under observation

3 Display of inference result

>> After:
- Operator can just place the part and get the inspection result and part number
- Anyone can perform the inspection, doesn't require skilled operator

Monitor will display *'Plate OK'* if part does not have any scratches and/or surface defects

Monitor will display *'Plate Scratches'* if part has scratches and/or surface defects

Teleme Technologies Sdn. Bhd.

C-7-1, Sunway Giza Mall,
Jalan PJU 5/14, Dataran Sunway,
Kota Damansara, 47810 Petaling Jaya,
Selangor.

Company Background:

Teleme Technologies Sdn. Bhd., founded in 2015, is one of the pioneers in telehealth platforms They provide an integrated healthcare ecosystem to complement services offered by offline healthcare providers. They mission is to connect healthcare practitioners with end-users, via accessibility, communications and education.

Project Overview:

Machine Vision system to detect and classify eyecare products in Malaysia

<< **Before:**

- A lot of similar eye care products in the market with very similar designs, sizes and names
- Pharmacist needs to check eyedrop type and stock based on product info provided by patient
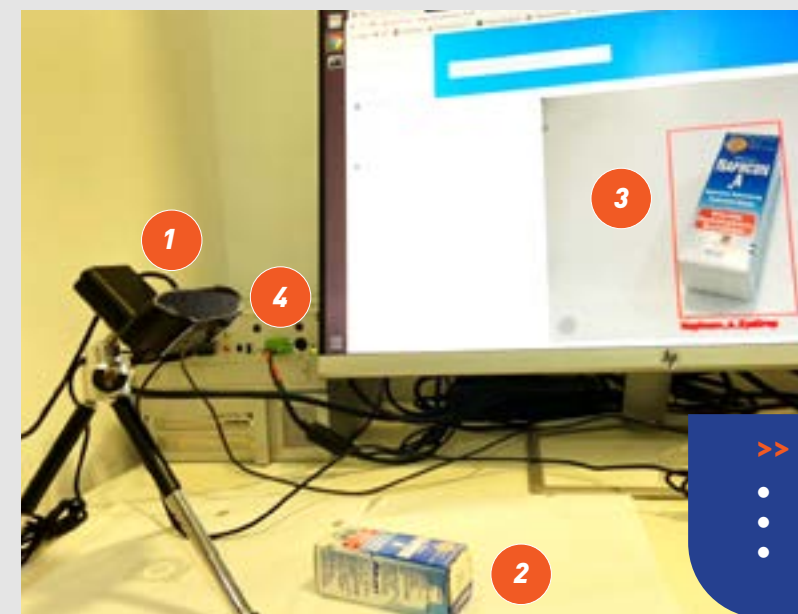
>> **Final Results:**

- Increased efficiency in the healthcare industry, especially for pharmacies
- Reduced the size of workforce and improve the workflow process of ordering any medication

Before:
Pharmacist needs to check eyedrop type and stock based on product information

1. Camera
2. Eyecare product under observation
3. Display of inference result
4. AI Vision System

>> **After:**

- Simplified process
- Patient just scans product
- Pharmacist takes eyedrop to patient, based in information provided marks

Object classification of eyecare products, by brand names

Detection without Boxes

UBCT Industrial Solution Sdn. Bhd.

**No.20, Jalan Cassia Selatan 3/1,
Taman Perindutrian Batu Kawan,
14100 Pulau Pinang**

Company Background:

UBCT Industrial Solution Sdn. Bhd. is a company with the mission to do everything possible to expand Industry 4.0 automation solution to different industries. Creating groundbreaking technology innovations for overall factory automation function with less human intervention and making the products more sustainable. Today, UBCT has proved that the visions of Industry 4.0 can be implemented into reality and offer a new horizon in production.

Project Overview:

Vision system to detect and classify of blue-capped tubes on a tray

<< Before:

- The current robot-embedded vision is not fast enough, and accurate enough, to detect tubes and do classification
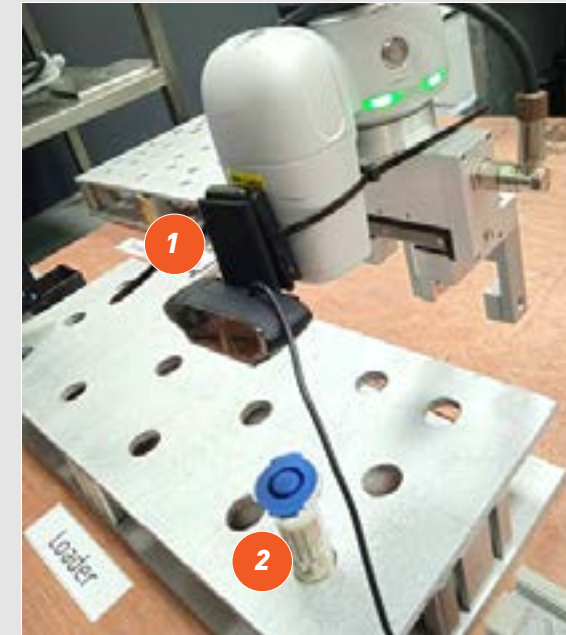
>> Final Results:

- Faster detection of blue-capped tubes than current vision system and improved cycle time.
- Reduced 'fail' detection of tubes. Hence, increased productivity

Before:
Current vision system is not fast enough, and accurate enough, to do classification

UBCT Industrial Solution Sdn. Bhd.

Once detected a tube, Node-RED will notify label as 'tube'

1. Camera
2. Blue-capped tube under detection
3. Display of result
4. Empty tray without tubes

>> After:

Vision System able to detect blue-capped tubes faster than current vision system and this improves cycle time.

Victorious Step Sdn. Bhd.

VStep

📍 **No. 5, Jalan Utarid U5/16,**
Seksyen U5,
40150 Shah Alam, Selangor

🏢 **Company Background:**

Victorious Step Sdn. Bhd. is a company focusing on injection molding for plastic parts. Their products are primarily for the automotive industry, specifically air inlets components. Their customers include Proton, Perodua, Zenig etc

📋 **Project Overview:**

The Digitalization of Human Capital Management

<< Before:

- Employees need to thumbprint everyday at guard post
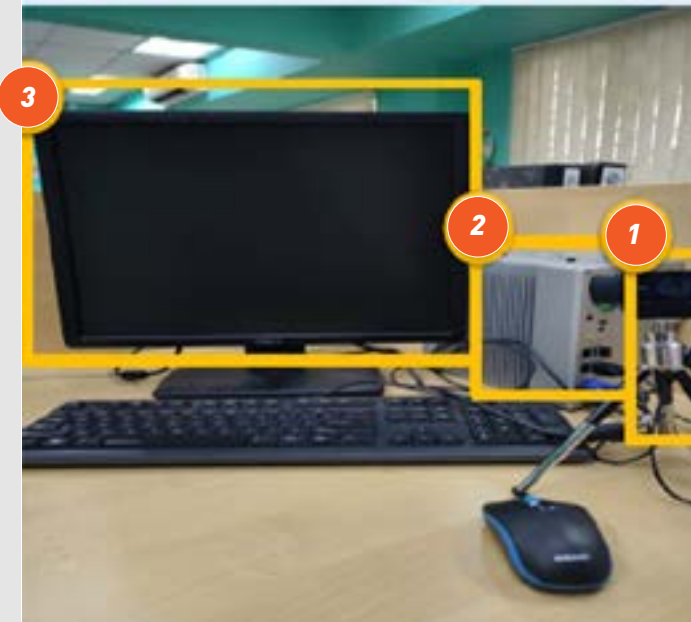- Accounting department will manually calculate employee attendance and salary

>> Final Results:

- Human capital management processes made easier
- Reduced unnecessary printing of employees time cards
- Automatically calculation of employee overtime pay

Before:
Employees need to thumbprint everyday at guard pos

1 Camera

2 AI Vision System

3 Display of result

>> After:

- Auto Attendance Tracking.
- Attendance of employee are recorded once their faces are detected and identified, and appeared on the screen

Izzah_248

Amirul_141
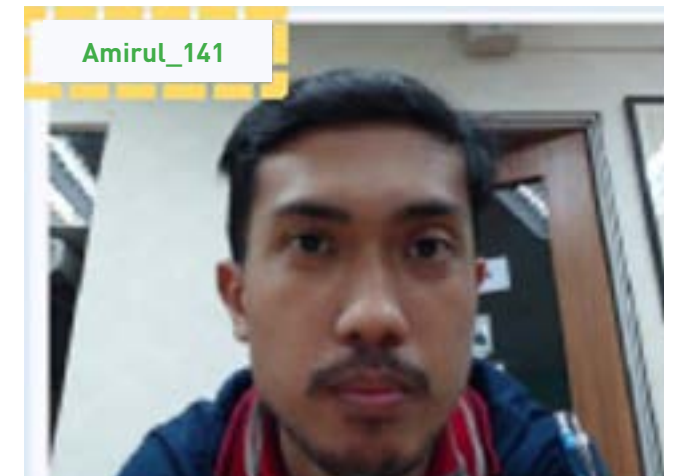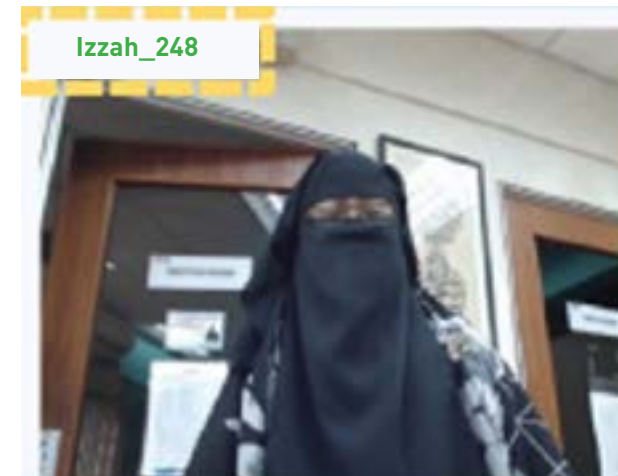
Watertec (Malaysia) Sdn. Bhd.

Lot 3 & Lot 4, Jalan Halba Satu 16/16A,
Section 16, 40200 Shah Alam,
Selangor Darul Ehsan, Malaysia.

Company Background:

Watertec (Malaysia) Sdn. Bhd., incorporated in 1983, launched its first revolutionary range of products in 1986 after an initial planning, research and development stage of three years. To date, Watertec manufactures approximately 4 million fittings per year and export to ten different countries, such as India, Sri Lanka, Philippines, Australia, Middle East, Europe and the ASEAN region

Project Overview:

Defect detection for hand bidet products

<< Before:

- QC officer manually checks every hand bidet for any product defects.
- This inspection process is slow, tedious and requires a lot of manpower hours.
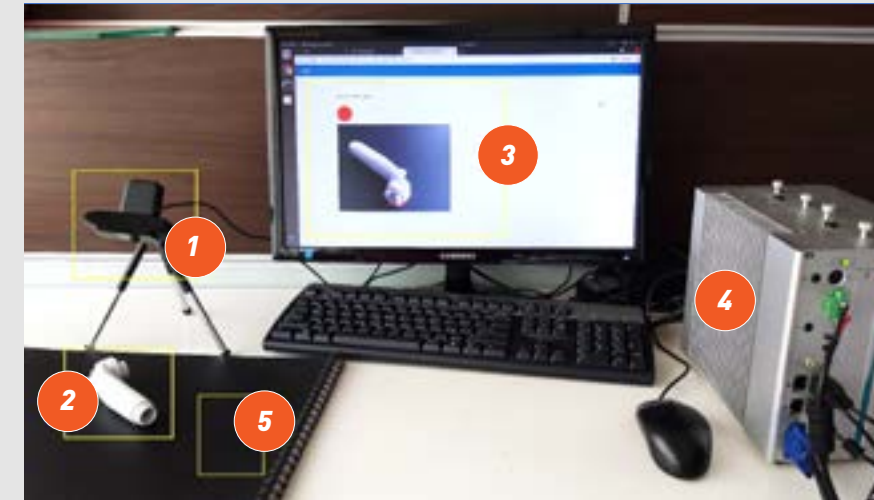
>> Final Results:

- Improved product quality due to reduced human errors
- Reduced number of headcount due to productivity gain

Before:
QC officer manually checks every hand bidet for defects

1 Camera
2 Bidet under observation
3 Display of result
4 AI Vision System
5 Acting as conveyor belt

>> After:

- Vision System detects defective Hand Bidets
- Mechanism to push defective components into 'Rejected' collection bin

short_moulding   sink_mark   flashing   hole_blockage

AI4S Advisory Clinics

A total of 13 advisory clinics were organized to assist companies with the development of their Proof-Of-Concept (PoC) projects

Advisory Clinics Session	Company	Issues and Technical Support Rendered
Advisory Clinic 1 (27 May 2021)	• Ex Change Industries • Teleme	• Node-RED issue. Tech Support suggested to run diagslave process, before running Node-RED. Status is solved. • Sync Issue. Tech Support suggested providing more images for training of AI System. Next step is for company to share status.
Advisory Clinic 2 (2 June 2021)	• Cuatro	• mqtt-broker issue. Tech Support suggested re-building broker container images. Status is solved.
Advisory Clinic 3 (9 June 2021)	• Robomy • Nga Foo Ting	• Clonezilla issue. Tech Support suggested to restore AIS 2.0 operating image. Status is solved. • Sync Issue. Tech Support suggested to sync images one-at-a-time. Status is solved.
Advisory Clinic 4 (16 June 2021)	• Teleme	• Sync Issue, carry forward from first session. Tech Support provided correct procedure for training algorithm and database and inference steps. Status is solved.
Advisory Clinic 5 (23 June 2021)	• Technerve	• Error Operation System (OS) hand and freeze up. Restart system does not help. Tech Support suggested splitting files into smaller sizes and re-run. Status is solved.
Advisory Clinic 6 (30 June 2021)	• Sonyu	• Modbustcp Socket Error. Tech Support suggested to run diagslave process, before running Node-RED. Status is solved.
Advisory Clinic 7 (4 August 2021)	• Rovski	• Camera disconnected Error. Tech Support suggested to use application as object classification instead of object detection (for defects). Status is solved.
Advisory Clinic 8 (18 August 2021)	• eMoovit • Sulomas	• Node-RED issue. Tech Support suggested to run diagslave process, before running Node-RED. Status is solved. • Training image Sync Issue. Tech Support suggest better methods of capturing images for training (more focus, and better zoom in defect). Status is solved.
Advisory Clinic 9 (8 September 2021)	• Durapower • Mawea	• Failed to get data Error. Tech Support reconfigure data acquiring process, and documented in Frequently Asked Questions (FAQs). Status is solved. • Trouble accessing the AIS server due to Clonezilla issue. Tech Support suggested to restore AIS 2.0 operating image. Status is solved.
Advisory Clinic 10 (15 September 2021)	• eMoovit • Sulomas	• Camera disconnected Error. Tech Support suggested to use application as object classification instead of object detection (for defects). Status is solved.
Advisory Clinic 11 (22 September 2021)	• Rovski • Cosmo	• Node-RED issue. Tech Support suggested to run diagslave process, before running Node-RED. Status is solved. • Detection accuracy issue. Tech Support suggested to use application as object classification instead of object detection (for defects). Status is solved.
Advisory Clinic 12 (20 October 2021)	• Bsmart • SHRDC • Cape	• Classification model cannot work with Node-RED. Tech Support suggested to edit classifier.py file for object classification. Status is solved. • 502 Bad Gateway Error. Tech Support suggested to restore AIS 2.0 operating image. Status is solved. • HDD issue due to re-flashing Clonezilla OS . Tech Support suggested to restore AIS 2.0 operating image. Status is solved.
Advisory Clinic 1 (23 May 2022)	• Hexa Food	• Node-RED issue. Tech Support suggested to run diagslave process, before running Node-RED. Status is solved. • Inference doesn't run and Results Error. Tech Support reconfigure data acquiring process, and documented in Frequently Asked Questions (FAQs). Status is solved.

AI4S Advisory Clinics

Selective screen shots of AI4S Advisory Clinics sessions

Advisory Clinic April 2021

Advisory Clinic June 2021

Advisory Clinic August 2021

Advisory Clinic November 2021
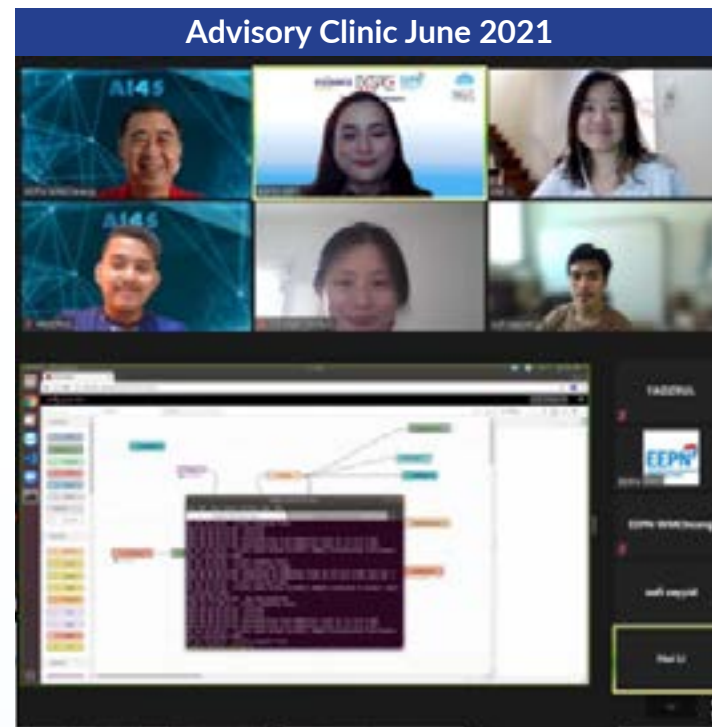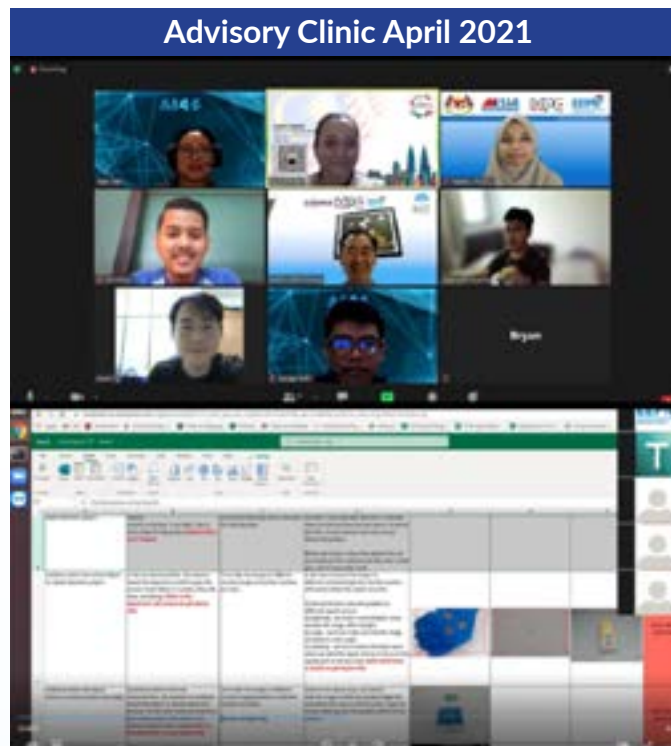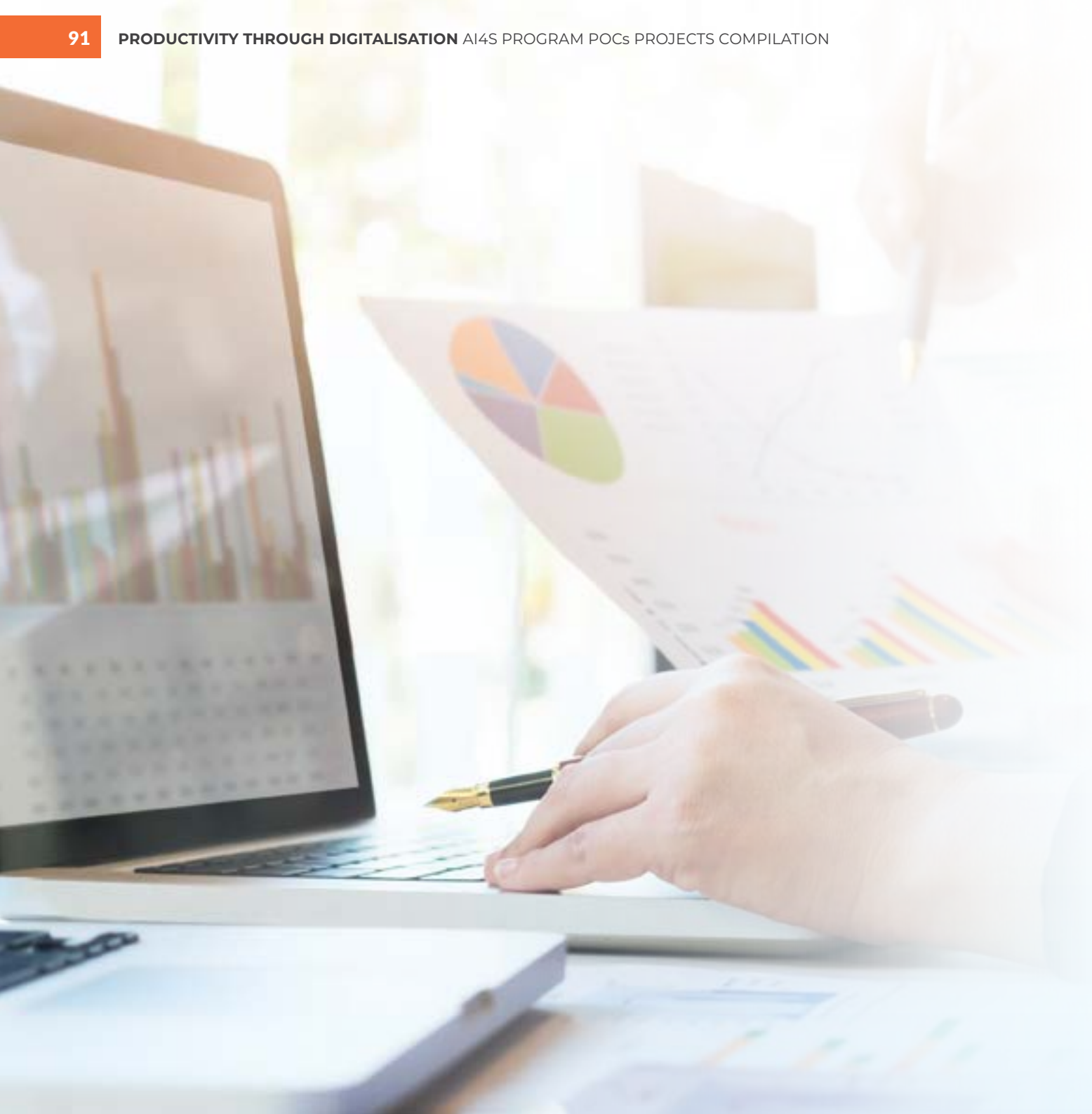
PARETO ANALYSIS OF POC PROJECTS

The Pareto breakdown of the Proof-of-Concept (PoC) projects is as below:
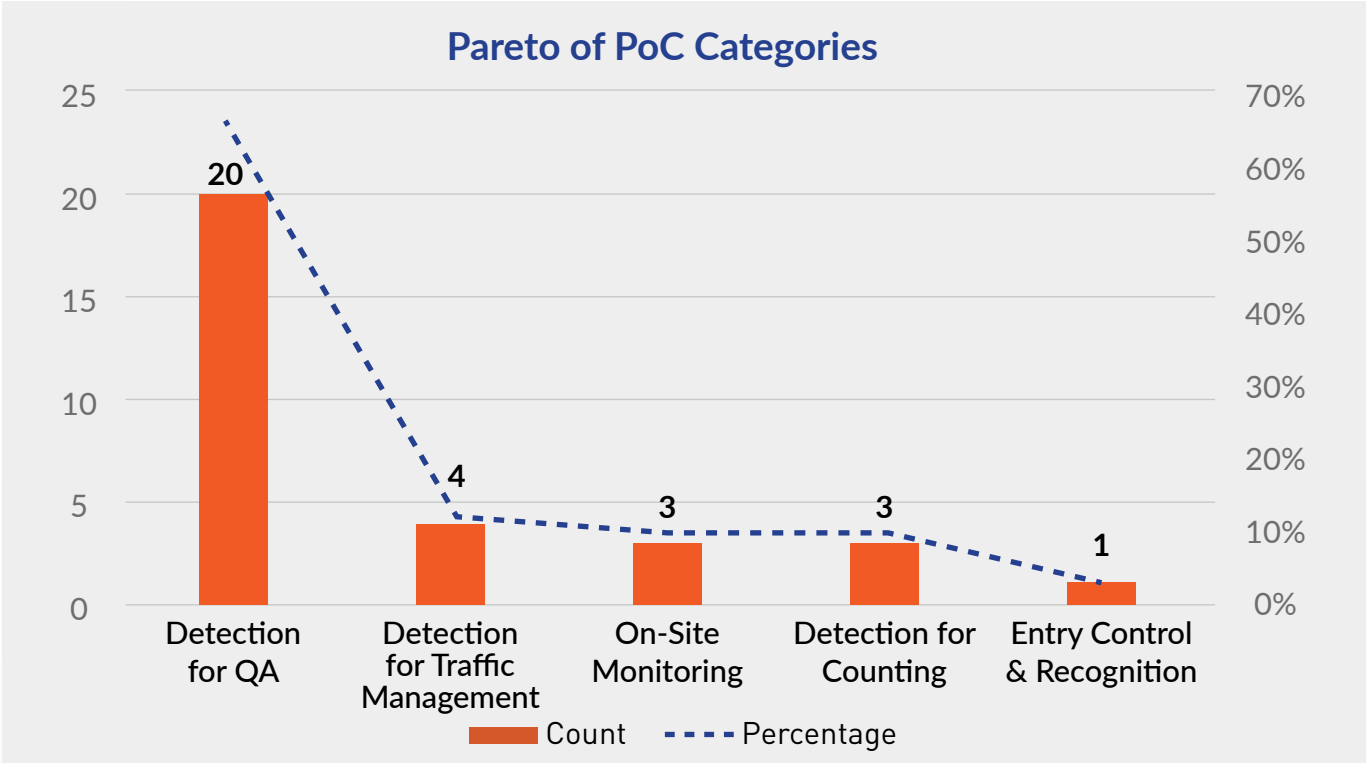
Proof-of-Concept (PoC) Category	Count	Percentage
Detection for Quality Assurance (QA)	20	63%
Detection for Traffic Management	4	13%
On-Site Monitoring	3	10%
Detection for Counting	3	10%
Entry Control and Recognition	1	4%
TOTAL	31	100%

The AI4S project spans a total of 18 months. Key milestones are as below

Q1
- AI4S Official Launch
- Distribution of AI4S Starter Kits
- AI4S Training (Batch 1)
- Develop Proof-of-Concept (PoCs) Projects

Q2
- AI4S Training (Batch 2)
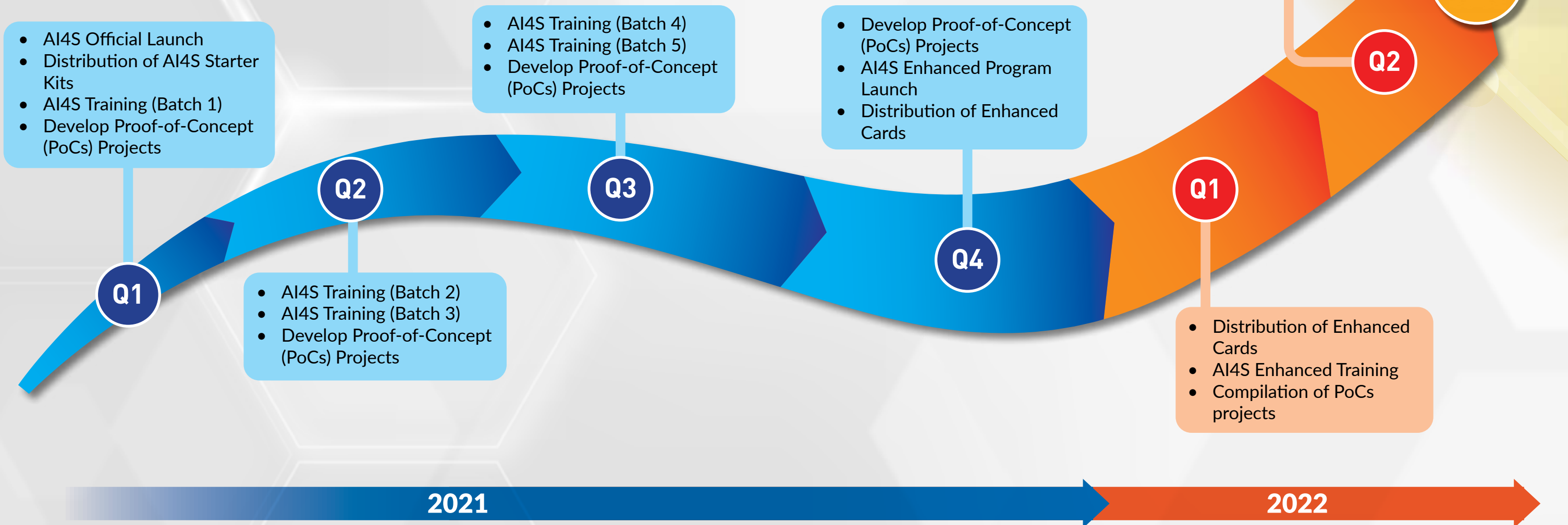- AI4S Training (Batch 3)
- Develop Proof-of-Concept (PoCs) Projects

Q3
- AI4S Training (Batch 4)
- AI4S Training (Batch 5)
- Develop Proof-of-Concept (PoCs) Projects

Q4
- Develop Proof-of-Concept (PoCs) Projects
- AI4S Enhanced Program Launch
- Distribution of Enhanced Cards

Q1
- Distribution of Enhanced Cards
- AI4S Enhanced Training
- Compilation of PoCs projects

Q2
- AI4S Enhanced Training
- Compilation of PoCs projects
- AI4S Booklet Launch and Program Closure

2021

2022

Acknowledgement

The compilation of this AI4S Proof-of-Concepts (PoCs) projects booklet is made possible through the collaboration with multiple partners. The Malaysia Productivity Corporation (MPC), together with the Malaysian Investment Development Authority (MIDA) and Intel would like to express our appreciation to our partners for their invaluable contributions in terms of providing insight, materials preparation, conducting trainings and facilitating the completion of the Proof-of-Concepts (PoCs) projects.

Last but not least, we would like to thank the Ministry of International Trade and Industry (MITI) and Economic Planning Unit (EPU) for their support rendered to our AI4S program.

For further information or clarification, please do not hesitate to contact us
Ms. Lee Wan Wei (MPC)

✉ wanwei@mpc.gov.my

Participating Companies

Finally, our appreciation to our participating companies, for their consent and willingness to share their Proof-of-Concepts (PoCs) projects in this compilation