Appendix

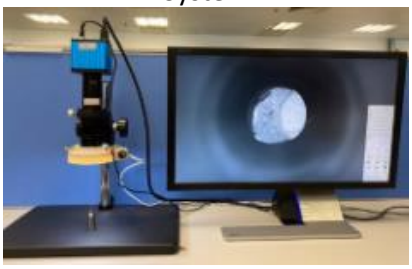
HKPC's winning projects and details of "2022 Geneva International Exhibition of Inventions"

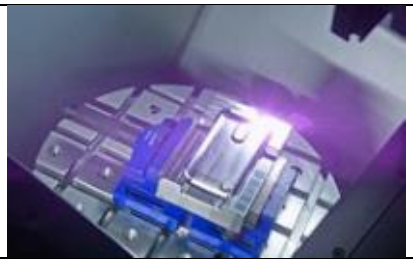
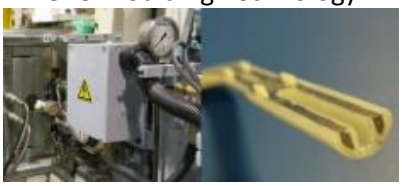
Award	Project	Description	In Collaboration With
Gold Medal with Congratulations of Jury	SMART PATCH	SMART PATCH, a virtual worker which can actively acquire jobs and report status, is a universal Industrial Internet of Things device compatible with 5G communication, used for collecting and visualising real-time production machine data. It aims at providing intelligence to machines with minimal effort to achieve machine-to-machine capabilities and arrange and execute production orders autonomously, which can reduce the risk of production stoppage due to system malfunctioning.	/
Gold Medal	Novel Chemical Treatment Process for Landfill Leachate	A simple and low cost chemical treatment process for removing coloured and non-biodegradable organics from landfill leachate, minimising the negative impact to the environment.	/
Gold Medal	Roadbot 2	Roadbot 2 is the first fully automatic robotic system installed on the road maintenance vehicle, fitted with cameras, Light Detection And Ranging (LiDAR) sensors, robot arms, system monitoring sensors and robotic storage management system. With full cognitive abilities to understand its surroundings, it is able to place and collect over 200 traffic cones and 100 warning lanterns at high speed roads, with a view to lowering the risk exposed by road workers. It equips with "Artificial Intelligence Sensors Fusion Algorithm" to identify cones and lanterns and real-time information processing.	Highways Department of the HKSAR Government
Gold Medal	Side Seam Topstitching Machine	In traditional topstitching, operator is required to align and move the side seam of garment through the sewing machine, which is hard, time-consuming and inconsistent. This Side Seam Topstitching Machine allows the seam topstitching of sleeve and body to take place simultaneously, simplifying the traditional process and enhancing	Ngai Shing Development Ltd

		productivity. With the help of gravity and fluid mechanics, the sewing head is canting 90° which enables the needle to move parallel to the horizontal direction. Overall production output is increased by 80% and yield rate is raised from 90% to 99%.	
Gold Medal	Multi-Metallic Sheet Accumulative Roll Bonding and Stamping Technologies	This brand-new stamping sheet production technology fabricates multi-layer composite metallic sheet of aluminum, copper, steel and other metallic materials as one finished product. Such sheets can be produced for stamping of products with different enhanced functional requirements. This technology also offers higher flexibility in bonding of different metallic materials and cost-effectiveness for in-house batch production of composite alloy sheets.	/
Gold Medal	Multi-stage Plasma Polishing of Metallic Object	This polishing process reduces the surface roughness of metallic objects with small features and high dimensional tolerance, which can meet different polishing requirements of metallic objects from across industries. Compared with traditional methods, this invention is more efficient and achieves better results. The polishing process will not lead to dust explosion nor generate highly concentrated wastewater.	/
Gold Medal	Super Lightweight Magnesium-Lithium Alloy	This invention is for non-stop fabrication of magnesium-lithium (Mg-Li) alloy ingot in smelting furnace inside a glove box under stable inert gas environment, effectively avoiding element loss and pollution. The super-lightweight Mg-Li alloy has high strength, stiffness and seismic performances that exceeds conventional alloys, potentially transforming aerospace, automobile, medical and 3C industries.	/
Silver Medal	AI Master	With AI algorithm and deep learning abilities, AI Master can learn the working procedures from experienced mechanics in automotive workshops, and guide the	/

		apprentices' work through identifying whether the fetched parts or assembled modules are correct in each processing step automatically. AI Master is useful for quality control and training new apprentices in various production or assembly procedures without the need of human monitoring.	
Silver Medal	Smart Taxi Metering System 	This is a one-stop system that integrates smart taxi meter and cloud system for taxi hailing, real-time route map, fleet management, electronic payment and receipts via an Internet of Things (IoT) platform. Compared with the existing taxi metre that only calculates and records taxi fare, this Smart Taxi Metering System can improve the quality of taxi service.	Mobile Shop Group Limited
Silver Medal	Smoke Remover for Chinese Incense and Candle Burning 	This cost-effective smoke removal device eliminates 40% of suspended dust particles generated from incense and candle burning. It helps reduce environmental pollution, improve the air quality inside temples, and at the same time, maintain the traditional Chinese ritual activities. Consuming little power, the device is compact in size, easy to install, and no bulky equipment is required, making it suitable for Chinese temples which lack space for installation.	/
Silver Medal	Smokeless Joss Paper 	This new type of joss paper, consisting of recycled inorganic filler and burning aids, burns 40% faster, releases much less smoke and 20% less heat energy. It is a more environmental-friendly solution for sustaining traditional Chinese Festival activities, amid causing less deterioration to burning furnaces. It can be applied to all paper products that are intended to be incinerated, reducing carbon emission.	/
Silver Medal	Novel Distributed System for Local Recycling of Food Waste 	This invention revolutionises the current labour-intensive and costly food waste collection to facilitate recycling. All kinds of food waste can be sorted and pretreated at source into slurry for easy transportation to distributed compact unmanned systems, thus generating renewable energy and animal feeds.	AEL International Holdings Ltd

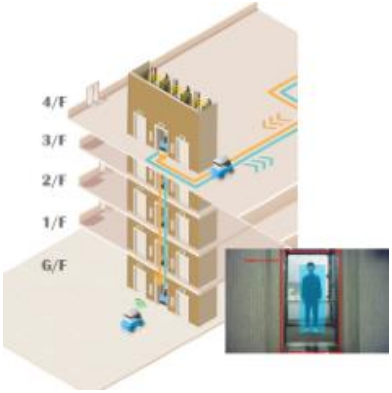
Silver Medal	Cold Plasma Disinfection System for Extending Shelf Life of Fresh Food 	A non-destructive physical treatment process to kill bacteria and spore on food surface, which can effectively extend shelf life of food by 100-300% in three minutes without adding any preservatives.	/
Silver Medal	3S Tunnel Defect Inspector 	"3S Tunnel Defect Inspector" is the first tunnel inspection system based on drone and on-board AI processing technologies. Bringing digital upgrade to tunnel inspection, it enables engineers to conduct defect inspections on tunnel linings in a safe and intelligent manner. "3S" refers to "Safe", "Smart" and "on-Site". The system eliminates the need to set up extensive working platforms required by conventional visual inspections, leading to significant savings in time and space requirement, in addition to substantial enhancement in safety, precision, efficiency and operation flexibility. Furthermore, the system automatically generates digital defect reports for digitalisation of the entire inspection process, facilitating future asset management. The "3S Tunnel Defect Inspector" was developed and has been successfully applied in the Trunk Road T2 and Cha Kwo Ling Tunnel project managed by the Civil Engineering and Development Department of the Hong Kong SAR.	Civil Engineering and Development Department of the HKSAR Government and Hyder-Meinhardt Joint Venture
Silver Medal	MY-O-Analyzer (My-Optical-Analyzer) 	This invention is a tailor-made smart eyewear for children to monitor their viewing habits and myopia risk factors, thus slowing down children's myopia progression. Through this smart eyewear, data such as reading distance, lightness and darkness, and head angle status can be collected and stored in a cloud database for future analysis. This invention also adopts special hinge design, making it flexible and easy to merge with any children's glasses.	The Chinese University of Hong Kong
Silver Medal	Automatic Multifunctional Road Maintenance Robot	This invention is a fully automated, highly efficient and multipurpose Artificial Intelligence (AI) robot, for handling road maintenance work. Supporting both	Wah For Development Ltd

		automatic and 5G teleoperation modes, this Robot can perform intensive road cleaning, obstacles removing, asphalt paving, pavement striping and painting. It is equipped with object sensors for identifying damaged pavement and obstacles, as well as striping pavement properly.	
Silver Medal	Smart Wireless Nurse-call System	The portable and compact-sized Smart Wireless Nurse-call System has unique advantages with long-lasting battery and minimum delay times to ensure steady and long range signal transmission in hospital environment. It fulfils the stringent electromagnetic compatibility standard and the test requirements as stipulated by the Office of the Communications Authority.	Electrical and Mechanical Services Department of the HKSAR Government and Weltek Technologies Co. Ltd.
Silver Medal	KetoMetrics - High Performance Fat Loss Management Solution	KetoMetrics is a handheld high-performance breath ketone analyser providing precise ketone measures to monitor rate of fat loss and assist over-weight people in planning healthy diets, as an effort to support the control of global obesity epidemic. Powered by patented photonic sensing technology, it provides quick measurement with only one breath in a convenient and effective process. Its pairing App generates tailor-made reports for getting optimal insights on how the users' diet and lifestyle affect ketone levels.	AusMed Global Limited
Silver Medal	AI for Metal Fracture Analysis System 	This is an AI metal fracture analysis system which provides an effective and fast way for preliminary analysis of metal fracture parts. This solution analyses a metal fracture image through a complete AI image analysis technology, which can reduce human errors caused by long working hours or fatigue. This invention can quickly determine the type of metal fracture failure by AI in 15 seconds or less, reducing the time and cost of metal fracture failure analysis by 50% while achieving a quality, reliable and standardised fatigue fracture analysis result.	/
Silver Medal	Advanced Dual Laser Polishing	Advanced Dual Laser Polishing is the eco-friendly, cost-effective and rapid polishing process that can reach various roughness requirements. This technology is capable of polishing complex geometry, micro-feature and	/

		textured surface with high accuracy and repeatability.	
Silver Medal	Low Temperature Metal-Plastic Overmoulding Technology 	This technology is a one-step production process to produce plastic parts with complicated conductive metal path in a single cycle, which can effectively reduce production and hardware setup costs. It also offers higher flexibility and functionality in product design with more complicated 3D conductive path.	/
Silver Medal	Refill Friction Stir Spot Welding Technologies for Dissimilar Materials 	Refill friction stir spot welding technologies are a cost-effective, high quality and reliable in-house vehicle, airplane, construction, and other industrial components welding technology for joining dissimilar lightweight materials sheets of carbon-fibre-reinforced polymers, aluminium, steel and plastics. The joining of dissimilar materials can enhance the reliability and quality of the joint, make vehicle components lighter with much higher strength, fatigue resistance, anti-corrosion properties, longer service life, and contribute to fuel-saving and environmental protection.	/
Silver Medal	Robolift – a platform for robots for working in multi-storey buildings 	Jointly developed with Robocore Technology Limited, Robolift is a universal platform that enables Automated Guided Vehicles (AGVs), service robots or moving equipment to operate lifts of different brands or models simultaneously and autonomously with minimal modifications on the control system. Using wireless technology and barometric pressure sensor, it offers a cost-effective solution for the movement of AGVs in multi-storey buildings without the need for significant retrofitting of existing lifts.	Robocore Technology Limited
Silver Medal	FitEasy - AI Assisted Virtual Fitting Mobile App for People with Reduced Mobility	FitEasy is an AI-assisted virtual clothes fitting mobile app designed specifically for people with reduced mobility to find their favourite adaptive clothes and wearing styles anytime, anywhere. Using AI face swap technology together with data analysis, it enables people with	/

		reduced mobility to enjoy greater access to adaptive clothing and fitting without space limitation and raises the profile of the related industry and public awareness of the issues of the group.	
Silver Medal	Fast Heat Dissipation and Low Thermal Expansion Aluminum-Silicon-Graphite Composite	This invention is for preparing Aluminum-Silicon-Graphite flake composite with high thermal conductivity and low thermal expansion, by vacuum hot-press sintering in argon atmosphere. The invention can be widely used in thermal management systems of automobile, electronic packaging devices, high power microelectronic equipment, and 5G communications products.	/
Silver Medal	Intelligent Foam Removal Robot	This innovation is the first of its kind for resolving a widespread and decades long issue of biological foaming in the wastewater treatment industry worldwide. The robot has been featured with an AI video analytic system for foam classification and tracing. With a series of smart control for fully autonomous operation and tailor made defoaming mechanism, this invention performs effectively in foam removal which can minimize water consumption and manpower resource.	Drainage Services Department of the HKSAR Government
Bronze Medal	5G Remote Driving Control	This is the first 5G tele-driving application in Hong Kong for an autonomous vehicle. Utilising the advantages of 5G technology, including low latency and ultra-high bandwidth, it enables tele-driving by real-time high-resolution video transmission from the vehicle. Compatible with various 5G bandwidths (3.5GHz / 4.9GHz / 26-28GHz), the driver can control the vehicle in a faraway simulator, while enjoying a reliable and realistic remote driving experience.	/

Bronze Medal	Drowsiness-Fighter 	Drowsiness-Fighter is a novel drowsiness detection embedded system based on dedicated AI deep-learning algorithm and sensor fusion technology for real-time detection of the driver's drowsiness behaviours (such as eye close, yawning, nodding). Audio alerts will be issued to drowsy drivers to avoid potential accidents. It is a low-cost, low-power and easy-to-install solution which can be applied to any vehicles.	/
Bronze Medal	Radar Vision 	This is the first AI-enhanced robotic vision system in Hong Kong based on advanced 79GHz radar signal and AI imaging algorithm. It provides real-time complete information (speed, distance, type, location and size) of multiple detected objects in front of a vehicle. Timely and precise warning can be issued prior to a possible collision for improving road safety. This low-cost solution can work under bad weather conditions and can be easily installed in different types of vehicles.	/
Bronze Medal	Red Light Violation Prediction System using Image Processing 	It is a roadside collision warning system utilising edge computing, imaging AI and Vehicle-to-Everything (V2X) technologies to detect red light violation cases at a signalised intersection. Low-cost and easy to set up, the system needs only an edge AI enabled camera to precisely recognise different types of vehicles near the crossroad and compute the vehicles' distance- and time-to-stopline, as well as broadcasting the alerts via the roadside unit and on-board unit.	/
Bronze Medal	An Intelligent System for Complicated Packaging of Traditional Chinese Medicinal Oil in Compliance with GMP 	This pioneer automated packaging system with intelligent control software for Chinese medicine products adopts visualised system and high-speed packaging modules. It performs as a novel wrapping method to imitate the cumbersome handcraft packaging technique precisely, suit diverse kinds of packaging requirements in terms of materials and sizing, and comply with strict GMP regulatory requirements. This system helps maintain the business image of over a century history with its well-recognised package design. It also lifts productivity while reducing the use of labour by 63%, alleviating the shortage of skilful labour.	Po Sum On Medicine Factory Limited

Bronze Medal	Highly Efficient High Pressure Extraction System for Food and Healthy Food 	This high pressure extraction process enables the extraction of bioactive compounds with high yield, from a range of health food, including the Chinese medicinal mushroom Lingzhi spore breaking. This novel methodology enhances the extraction rate of bioactive compound by up to 200% compared to solvent extraction, and achieves Lingzhi spore breaking rate of up to 95%.	/
Bronze Medal	An Intelligent Fine Chinese Tea Practitioner Robot 	This robot replicates tea steeping techniques and tea determination skills of tea practitioners as well as different steeping recipes with the application of perception sensors and Artificial Intelligence (AI).	Fook Ming Tong
Bronze Medal	3D Cap Logo Printer 	This invention is designed to meet the instant demand for small-scale customised logo cap production via direct 3D cap logo printing system, thus saving cost and minimising waste. This new system utilises cap positioning technology to identify the exact position and flatten the cap surface for printing. It also has triple extruder configuration for producing multi-colour and 3-layer prints with the use of highly-adhesive PCL 3D filament.	Mainland Headwear Holdings Ltd
Bronze Medal	The Universal Elgorithm: A Vision-based AI Algorithm for Robot-Elevator Interaction 	The Universal Elgorithm, which means “Elevator” and “Algorithm”, is a vision-based Artificial Intelligence (AI) Elevator Control System for realising a passenger-friendly and safe elevator ride through wireless connection. The system can detect the motion of elevator via AI, thereby alerting pedestrians nearby with visual and audible cues.	/
Bronze Medal	Smart Egg Waffle Making Robot	This is the first automated egg waffle making robot in the world which enhances the overall productivity and	HK Streets Eat Ltd

		saves production cost, helping the client to bring this authentic Hong Kong gourmet to the world market. This intelligent robot can make 9 egg waffles simultaneously, increasing productivity by 450% and saving 70% of factory space. It automates egg batter pumping for filling the egg waffle moulds with extremely high precision. The robot can replicate the egg waffle making techniques of a well-experienced master, including the 180° flipping of the moulds, the minor but important shaking motion and the precise temperature control, etc.	
Bronze Medal	Digital Lean Analyser 	Integrating software and hardware development, this invention can be applied in the labour-intensive assembly line or production processes to capture real-time manufacturing data, such as operating cycle time, idle time, production capacity, and defect rate, etc. These data will then be transferred to the user interface dashboard for instant monitoring, devising the design of production lines, and optimising workflow.	/
Bronze Medal	Photosensitive Antimicrobial Coating 	This long-lasting coating is equipped with a “self-disinfection” function that prohibits the growth of bacteria indoors with non-UV light, even under low light intensity. It has also been certified to suppress the growth of common types of bacteria and viruses such as S. Aureus, H1N1 and human coronavirus (HCov-229E). Photosensitive Antimicrobial Coating is water, detergent, and alcohol proof, which can be applied on various surfaces including wood, metal, plastic.	/

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