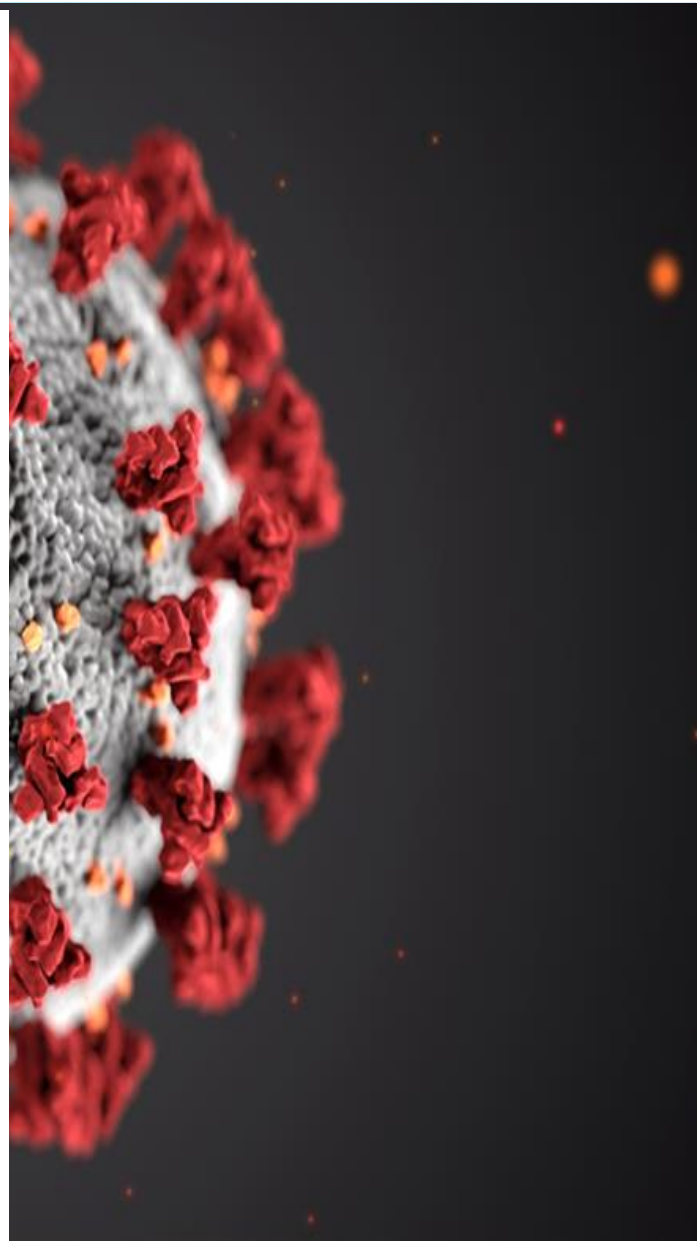

TAIWAN ROBOT USE CASES FOR CORONAVIRUS

FIRST EDITION 2020/06/17

 **TAIROA** 社團法人台灣智慧自動化與機器人協會
Taiwan Automation Intelligence and Robotics Association



Dear Partners,

Hope you are all doing well at this difficult time. We would like to let you know we are with everyone who is suffering from and trying to stop covid-19 pandemic. These are the most uncertain times we have ever faced, but we sure our partners will succeed the fight with this pandemic and believe that after crisis the robot and automation industry will open a new era and more opportunity and huge growth will come out in the future.

TAIROA is always here to help our partners to build global connection as much as we can do.

We noticed that during the pandemic lots of countries are lockdown or keep social distance. Due to the concern of the spread of the virus, many service robots or digital tools will be applied to the places with a large flow of people, such as hospitals, restaurants, office buildings, to reduce human contact. TAIROA has many members are doing related products and have good technologies on this field. For this demand we call for our association members and service robot alliance members to share their robot application cases and product information for fighting with covid-19. Although some of them only have Chinese version of product information in their websites, We try to help them to produce the corresponding product information in English version. This brochure consists of both Chinese and English product and service information of related companies for anti-coronavirus.

Hope all of you can benefit from this brochure and find the new business. Your continuous support to TAIROA is greatly appreciated.

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SOLOMON Technology Corporation

Product : SUV100



Solomon launched the Smart Disinfection Robot (SUV100), which integrates the robot truck of MiR, a Danish mobile robot manufacturer, and UVC Disinfection. This product is specially designed for people with non-engineering backgrounds. Through simple operations, the robot can scan the work area first, scan the current generated image, and then it can immediately move freely in the set area without track restrictions. Stay in time and carry out key disinfection. The product has the function of intelligently planning the path independently. If an unexpected obstacle appears in the action path, it can be re-planned and evaded, which has a high degree of flexibility in operation. In addition, the product can be connected to the Internet of Things equipment, and elevators, etc. Therefore, it can move on each floor of the building to expand the entire use area.

The product is equipped with ultraviolet UVC with a wavelength of 200 to 280 nanometers. When exposed to microorganisms such as bacteria and viruses, it can destroy the DNA or RNA structure of its microbial body cells, resulting in the death of bacteria and achieving a sterilizing effect. UVC has been widely used in the medical industry, but as an automated product, in order to avoid long-term human exposure to ultraviolet rays and damage, the intelligent protection function of this product can detect the human body and automatically avoid or approach the human, so it can meet the disinfection needs of unmanned environments (for example, during off-hours). It can also work in the environment where occasional people enter and exit (such as a warehouse). It also provides multiple security mechanism check to protect the safety of personnel, so that epidemic prevention will not affect daily operations.

Product Specificification

Use area	Unmanned indoor area	
UV lamp wavelength	254nm (UV-C short wave)	
UV effective distance	60cm	
UV disinfection range	360°	
Dimensions (L*W*H)	850*600*1,840mm	
Battery runtime	10hr	
Maximum speed	1.5m/s	
Battery	Li-ion battery	
Battery capacity	40Ah, 24V *2	
Charging time	6hr (0-80% 4hr)	
Charger	Input	100-230V AC 50-60Hz
	Output	24V, Max 15A
Maximum gradeability	5% (2.9°)	
Communication	WiFi dual-band AC/G/N/B	

Temperature	+5°C ~ +40°C
Relative humidity	10-95%
Operation interface	Mobile phone / Tablet / Notebook / Desktop
Mobility	360 ° steering in place, forward movement in front of the vehicle, and constant speed movement
Safety mechanism	1. 2 groups of laser scanners 360 ° (anti-collision distance can be customized) 2. Ultrasonic detector 2 groups 3. 3D Depth Camera

The Solomon Smart Disinfection Robot SUV100 is easy to use, highly flexible, fully automatic, and zero-risk. It can adapt to the needs of various fields for automatic environmental disinfection, such as office buildings, shopping malls, medical environments, and other labor-intensive work environments. The effective use of this automated equipment can achieve environmental disinfection.

1. Office building: Due to the intensive labor during working hours, it can be automatically disinfected after work or during holidays; the characteristic is the integration of the elevator system, which can expand the scope of application to the maximum.
2. Shopping mall: Manpower is very intensive during the opening period. Although disinfection can be arranged during the closing period, the implementation cost is relatively high due to the large area. The introduction of automation has the opportunity to disinfect the entire area at a higher frequency.
3. Medical environment: There is a clear need for disinfection in wards, operating rooms, etc. Automation helps them to reduce the manpower required for current practices, and to expand the scope of disinfection in areas that were not previously disinfected, such as corridors and clinics.

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ROBOGO TECHNOLOGY Co., Ltd.

Product : Rungo Delivery Robot



Product Features	Product Specification
<ul style="list-style-type: none">♦ Automatic delivery service♦ ea disinfection service♦ Automatic Elevator Calling System♦ Automatic Telephone Notification System♦ Intelligent Obstacle Avoidance	<ul style="list-style-type: none">♦ Name : Hotel Service Robot♦ Nickname : Rungo♦ Dimension : Height : 100cm Diameter : 50cm♦ Weight : 45kg♦ Storage Dimension : 27*22*30cm♦ Load Bearing : 10kg♦ Motion Speed : 0.7-1.0m/s (normal walking speed)♦ Battery Life with Zero-Load : 3.5-4.5H

Rungo Delivery Robot can be used in hospitals, restaurants, commercial buildings, community houses, shopping malls and other indoor attribute environments. Based on the coronavirus pandemic situation, in the above fields, it is necessary to reduce the face-to-face contact between people and the probability of virus transmission, Rungo Delivery Robot can be used in food-delivery carries out tasks such as the delivery of meals, documents, instruments, parcels, other spare parts, etc. Because the robot is equipped with an autonomous obstacle avoidance system, as well as a serial elevator and telephone IoT system, the robot can receive Autonomously and automatically take all the obstacles in the elevator and dodge route to the designated floor and room entrance (such as negative isolation room, epidemic prevention hotel room), then dial the phone to the room through the telephone system, and inform the personnel in the room to come out and get things.

Rungo delivery robot can be equipped with a water mist device with disinfection and sterilization liquid to perform disinfection and sterilization work in the entire field. For indoor environments such as hospitals, restaurants, commercial buildings, community houses, shopping malls, etc., poorly ventilated places is prone to cause bacteria Risk of



infection, such as the ability to regularly disinfect the environment through the Rungo delivery robot, the advantage of using the robot to take the elevator to go around independently on each floor, and the use of the water spray machine can allow the disinfectant to be sprayed in a mist, which will greatly reduce environmental bacteria Possibility of spread.



Cases Video

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Imedtac

Product : Quarantine Area Mobile Robot



Lack of medical personnel is the common plan point in the world. iMRobot can assist in general affairs like transportation and reception, help to release the workload of medical personnel. The caregiver can be more focused on the medical service, therefore the quality of medical service will be increased and the possibility of medical error will be decreased.

Product Features

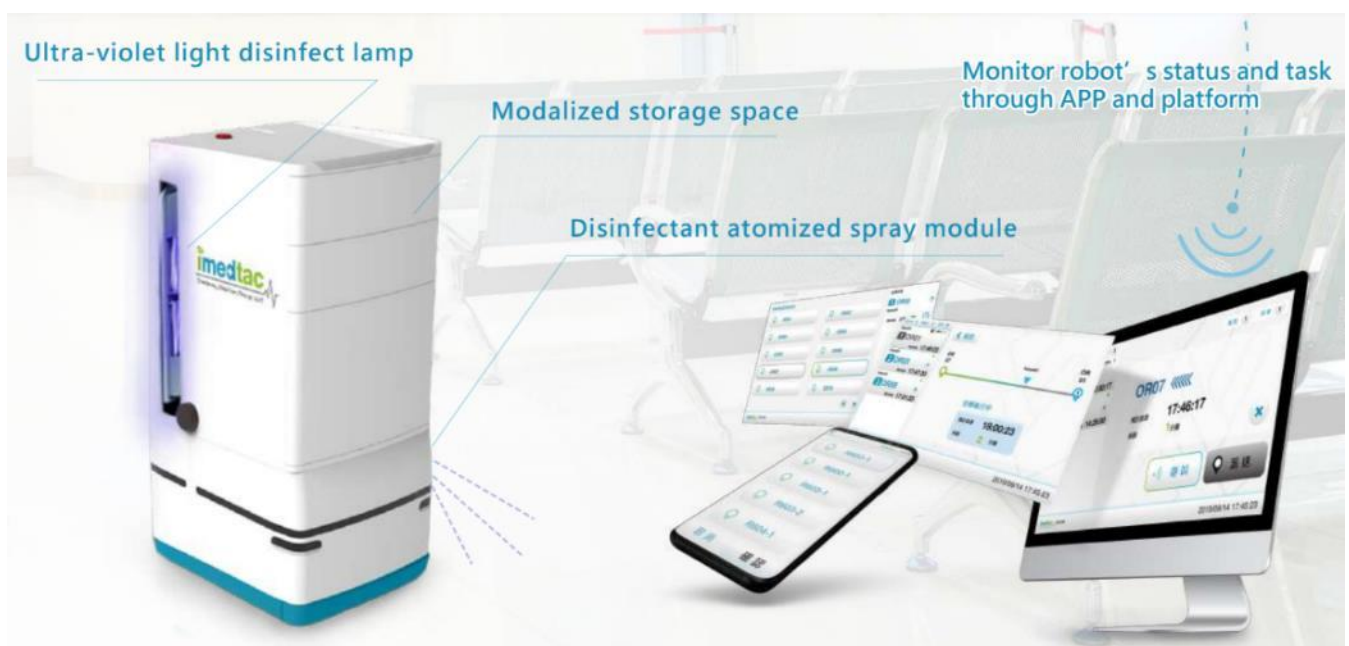
1. Replace caregiver transporting medicine, supplements, meal to quarantine area reduce infection.
2. Build in UV light auto disinfecting while moving.
3. Mobile Robot can be thoroughly disinfected.

Product Specific

Size	L500*W440*H1200(mm)
Position accuracy	±10mm
Navigation	Laser guiding with position algorithms
Driven	Two-wheels differentially driven

Turning radius	500
Maximum load	100KG
Wireless	Wifi A/B/G/N/AC
I/O,	Usb/Ethernet
Power	lithium battery 24V 24.3Ah
Charging time	1.5hr 70% 4hr 100%
Sensor	Laser, ultrasound, bumper
Case	plastic shell
Highest speed	90M/min
Disinfectant atomized spray module (optional)	900mL tank, able to Continuous spray 6 hrs, able to use with hypochlorous acid water, diluted DEET, diluted bleach, Sodium hypochlorite disinfectant
UV lamp (optional)	Wavelength: 253.7 nm, energy: 35,000 μ w-sec/cm ² , Lamp type: E27, Ozone-free

Product : Quarantine and polluted area disinfect robot



1. Scheduled disinfect work with UV light and spray module, increase disinfect efficiency and safety.
2. Assist to deliver the items to isolation ward, avoid human infections.
3. Able to remote control, monitor robot's status and task through APP and platform.

Product Features

1. 360 °UV light and build in spray disinfecting seamless.
2. Can set up by time, by area automatically patrol.
3. Track less auto guiding, can use fleet management set up various route and low battery station self-charging.

Product Specific

Size	L500*W440*H1200(mm)
Position accuracy	±10mm
Navigation	Laser guiding with position algorithms
Driven	Two-wheels differentially driven
Turning radius	500
Maximum load	100KG
Wireless	Wifi A/B/G/N/AC
I/O,	Usb/Ethernet
Power	lithium battery 24V 24.3Ah
Charging time	1.5hr 70% 4hr 100%
Sensor	Laser, ultrasound, bumper
Case	plastic shell
Highest speed	90M/min

Disinfectant atomized spray module (optional)	900mL tank, able to Continuous spray 6 hrs., able to use with hypochlorous acid water, diluted DEET, diluted bleach, Sodium hypochlorite disinfectant
UV lamp (optional)	Wavelength: 253.7 nm, energy: 35,000µw-sec/cm2, Lamp type: E27, Ozone-free

Product : Telemedicine cart at quarantine area

Product Features

1. With high mobility, support to establish telemedicine immediately.
2. Integrated ECG, ultrasound, otorhinolaryngology diagnosis for data sharing.
3. Battery replaceable, system can operate none stop.

Product Specific

1. Nursing Cart

- ◆ Mounting Option: Dual monitor type
- ◆ Height Adjustment Range: 907~1207mm
- ◆ Main Material: Aluminum alloy / Stainless steel / ABS(VO)
- ◆ Lift Mechanism: Gas spring
- ◆ Work Surface: 538(W)×449(D) mm with integrated forward-facing handles
- ◆ Caster: 4 casters" 2 locking
- ◆ 420W DC output for integration ol various devices
- ◆ Fanless design for hospital environment
- ◆ Swappable battery pack design for quick and easy replacement

2. .Video Stream

- ◆ Support up to 4K UHD+ video in-put & out-put
- ◆ Camera follow voice source automatically
- ◆ Build-in high quality speaker and microphone

- ◆ Integrated control panel, easy to set up connecting work
- ◆ Seamless switching sources in Matrix mode
- ◆ HI resolution monitor for deep color display

Product : Realtime vital sign monitoring for quarantine patient



Product Specific

1. Integrated vital sign system and upload data to HIS/NIS.
2. Monitoring all patient status from nursing station, avoid caregiver's entry quarantine area repletely to reduce cross infection.

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UniRing Tech Co. Ltd

Product : Floor Scrubber Robot



Floor Scrubber Robot –MAX used in the outpatient hall which place with a large flow of people. Due to the large number of patients, need to clean and disinfect the floor daily. For now, the robot is used at night during the unmanned period, with clean water or designated disinfection tablets to clean and maintain the ground. MAX can also provide execution reports to improve the credibility of the actual execution and make it easier for management to grasp the actual situation.

Product Features

1. Indoor Localization: accuracy rate $\pm 5\text{cm}$
2. Environment Sensing: Human-Robot Collaboration Safety
3. AI Route Planning: According to Customers' needs, MAX can plan the cleaning route automatically.

4. cleaning function in ONE robot: Vacuum, Scrubber and vacuum squeegee.
5. LFP Battery: Up to 2 hours usage time, and battery performance in battery life.
6. Eco Mode: Able to reduce 82% water usage (compare to tradition cleaning way)



Product specifics

- ◆ Maximum using time: 2.5HR
- ◆ Maximum Speed per hour: 2.2KM/H
- ◆ Scrubber: 2pcs; 12inches/ pcs
- ◆ Solution and Recovery water tank:25L/each
- ◆ Dimensions: 90*79*64 cm
- ◆ Weight: 175kg (without water)
- ◆ Additional Specs: a. Auto Recharger b. 3D environment sensing modul

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Cheetah Mobile

Product : Cheetah GreetBot



[Cases Video](#)

Hospital

Set up a robot at the entrance of a hospital with a large flow of people to measure the body temperature of patients and doctors in and out. If the body temperature is normal, it can pass the abnormal temperature robot and report the system and medical staff will assist take person to isolation.

Transportations

Set up robot in Wharf/metro/airport for large flow points, body temperature measurement for passengers in and out is also set to active patrol for large areas. Initiate infrared temperature measurement mode for dense crowds. Staff can perform remote monitoring and control.



Community

Assist community residents to strengthen their awareness of epidemic control. Serves at residents' entry and exit for visitors to measure body temperature. If the body temperature is normal and passes the body temperature abnormally, the system will be reported and the community security will take person to isolation.



Company

Set up a robot at the entrance of Industrial park/office zone. Assist enterprises to strengthen awareness of epidemic prevention and control. Service for clock in/out zone and measuring temperature of staff. If the body temperature is normal and passes the body temperature abnormally, the system will be reported.

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CloudMinds

Product : 5G cloud intelligent patrol temperature measurement and disinfection robot



[Cases Video](#)

The robot uses to in a large flow of people area such as airport, train station, metro, harbor, industrial park...etc.

Outdoor disinfection: The outdoor activities of the park, public areas, plazas where with crowd activities and large disinfection scope. Due to the wide space and complex environment, it is necessary to use disinfectant inspection robots to spray regularly to ensure the safety of the environment.



Product : 5G cloud intelligent disinfection and cleaning robot

The Robot use in hospital lobby, room, office area, entrance of bank, exhibition center, metro station.

A large scale with open door space disinfection: the activity time of crowd is not frequency such as the corridor of large office, lobby, and food court.

Indoor closed small space disinfection: The activity time of the crowd is frequency, and the crowd gathers in a specific period of time, and the small enclosed spaces inside the park, such as offices, dormitories, and office buildings that need to be regularly disinfected repeatedly



[Cases Video](#)

[Cases Video](#)

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Institute of Electrical and Control Engineering, National Chiao Tung University

(Empirical Research)

Product : NCTU1 Intelligent IoT Robot

Hospital reception and guidance

An IC card reader mounted on NCTU1 retrieves user's personal information from the cloud server. After data retrieval, a visiting list in the hospital is automatically scheduled for each patient or person for health-checkup. Next, the robot guides each user according to the scheduled list.



Product Features

NCTU1 is an intelligent IoT robot. It combines cloud computing to detect the environment and user information and execute human-centered tasks. Based on the environment map in the cloud database and the user location information, the robot can understand the

relative relationship among the environment, human and robot itself. The major functions of the robot include SLAM, navigation control, obstacle avoidance, user following, user guiding, user recognition and human-robot interaction. According to the acquired information, NCTU1 can plan and complete the task autonomously and ensure the safety of user and robot during task execution.

NCTU1 has demonstrated an application for hospital reception and health checkup guidance through an integration of cloud computing, scheduling planning, robot positioning guidance control, obstacle avoidance and personnel detection. NCTU1 will schedule and plan for each user after it receives the registration from health-insurance card, and guide the user to the health-checkup station in sequence with the coordinate user's movement speed.

For epidemic precautions, NCTU1 can be used as an automatic temperature measurement robot. Using face recognition to identity of the visitor, and record the face information and temperature of the visitor to the cloud platform. Or it can be used as a meal delivery, drug distribution robot. With the indoor localization and navigation, obstacle avoidance, and user recognition functions, NCTU1 can assist to distribute meals or drugs in hospitals or isolation centers to relieve the burden of human workers, and reduce the risk of infection.

Product Specific

- ◆ Size (Length×Width×Height): 80cm×80cm×130cm
- ◆ Hardware:
 - PC-Based Robot Controller
 - Two-independent drives with DC motors
 - Front and rear Laser Rangefinders
 - Development Environment: Ubuntu 16.04 with ROS Kinetic
- ◆ Key Technology:
 - Self-Localization:
 - NCTU1 navigates with simultaneous localization and mapping (SLAM) in ROS system to locate itself in the environment. Experimental result shows that the average error of 6.0cm in X direction in average, 1.3cm in Y direction, and 0.2

degrees in orientation.

- **User guiding:**

NCTU1 is equipped with two laser rangefinders at the front and the rear. Through the user-leg detection function, NCTU1 can guide the user to the destination in accordance with the user walking speed. The leg information can be accurately detected within 2 meters away from the robot.

- **Obstacle avoidance:**

NCTU1 detects the obstacles in the environment through the laser rangefinder equipped on the front of the robot. Based on the detected information, NCTU1 corrects the moving path to have collision-free motion.

- **Specific user recognition and interaction:**

A webcam at the top of NCTU1 detects and recognize user's face. Integrated with the Bluetooth indoor localization module of mobile phones, NCTU1 first navigate to the user and then finds the specific user with face recognition to provide service. The indoor localization accuracy is within 50cm, and the maximum distance of the user recognition is 3 meters.



Specific user finding and interaction

By combining Bluetooth indoor localization and facial recognition system, NCTU1 can autonomously find and interact with specific user. When a user requests a service through a mobile device, NCTU1 obtains the user's indoor location and facial information through the cloud platform, autonomously finds and tracks specific users and interact with the user.



[Cases Video](#)

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QNAP Systems, Inc.

Product : AfoBot



The world's first AI intelligent nanny robot, technology-assistant nursery launched all over Taiwan, protecting baby's safety and health in all aspect.

QNAP® Systems, Inc. AfoBot, a companion robot, together with Huijia Health Life Technology launched the IoT automatic smart care solution. Through AfoBot's voice and video functions, combined with intelligent sensing baby mattresses, it provides multiple home care services and can be used for remote monitoring and care applications.

Huijia Healthy Life Technology has created a non-invasive optical fiber technology to create a high-precision physiological sensor that can monitor human physiological activities, such as changes in respiration, heart rate, blood pressure, sleep analysis, activity

status, etc. This technology extends to UBabyCare activity sensing mattresses, pillows and other home applications, combined with App data analysis to help parents more fully grasp the baby's environmental status. At present, more than 160 maternity and child hospitals, confinement centers and childcare centers in Taiwan have adopted this service.

This time QNAP joins Huijia Healthy Life Technology Smart Ecosystem, AfoBot can not only receive UBabyCare activity-sensing mattresses, but also respond immediately. For example, when data abnormality occurs, in addition to automatically monitoring the baby's status in realtime through AfoBot, it can also make a video call or control home appliances by voice, and control the situation in the home at 360 degrees without dead ends. Novice parents no longer need to get up at any time in the middle of the night to check on the baby's condition, so that AfoBot can protect their children's growth.

TourTalk and QNAP AfoBot launch live video interpreter



TourTalk, Inc. and QNAP® Systems, Inc. launched the TourTalk Travel Enterprise Edition, which provides hoteliers with more complete, convenient and low-cost multilingual services. Smart robots equipped with live translation services are placed on the hotel counter to solve the communication problem between the accommodation counter and foreign passengers at a tenth of the labor cost. It can also be used as an anti-epidemic application for unmanned reception machines to serve passengers in English, Japanese and Korean languages.

Under the strategy of the Tourism Bureau to promote the development of “multiple tourism”, tourists from Japan, South Korea, Southeast Asia and Europe and the United States showed high growth rates, of which the annual growth rate of tourists from Japan and South Korea was double-digit growth (Japan 16.5%, South Korea 34.3 %) Has become a new driving force for the tourism industry. However, Taiwan ’s small and medium-sized travel and tourism industry has a relatively small scale of staff. The hotel employs an average of 15.41 people, and the average number of people employed in homestays is 1.23. On the other hand, the limited supply of foreign language talents in Taiwan has made the travel and tourism industry to the point of hiring full-time foreign language personnel.

The TourTalk live translation machine has also been used in the multilingual service procurement case of the National Scenic Area Management Office and Passenger Service Center of the Tourism Bureau of the Ministry of Communications in 2018. Six National Landscape Management Office passenger service centers including Taichung Guguan, North Gate of Yunjia, Xiaoliuqiu in Pingtung, Fulong in the northeast corner, Liyu Lake in Hualien and Ita Shao in Sun Moon Lake are online.

More information: <https://afobot.qnap.com/en/commercial>

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