SENGITAL

Proposal for EMSD Touchless Lift Button System

Sengital Limited

Last updated: 26/4/2020

Company Capability:

Company Awards:

SME's Youth Entrepreneurship Award 2015 中小企青年創業獎

Hong Kong ICT Awards 2015 香港資訊及通訊科技獎 Gold Award 金獎

Hong Kong ICT Awards 2014 香港資訊及通訊科技獎 Gold Award 金獎

HKEIA Award Innovation • Technology 創新科技產品獎

Hong Kong ICT Awards 2013 香港資訊及通訊科技獎

APICTA Asia Pacific ICT Alliance AWARDS 2013 Winner Award

2013 香港工商業獎 HONG KONG AWARDS FOR INDUSTRIES 創意獎 INNOVATION AND CREATIVITY AWARD

2013 香港工商業獎 HONG KONG AWARDS FOR INDUSTRIES 科技成就獎 TECHNOLOGICAL ACHIEVEMENT AWARD

Hong Kong ICT Awards 2011 香港資訊及通訊科技獎 Silver Award 銀獎

Hong Kong ICT Awards 2011 香港資訊及通訊科技獎 Cert of Merit 優異證書

2010 INNOVATIVE DESIGN & ENGINEERING SHOWCASE HONOR

CTIA 2009 HOT FOR THE HOLIDAYS

global 2010 INNOVATIVE PRODUCT AWARD

Mobile Excellence Awards

2007 香港工商業獎 HONG KONG AWARDS FOR INDUSTRIES 科技成就優異證書 TECHNOLOGICAL ACHIEVEMENT CERTIFICATE OF MERIT

Hong Kong ICT Awards 2007 香港資訊及通訊科技獎

Hong Kong ICT Awards 2006 香港資訊及通訊科技獎

ABOUT SENGITAL

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20 years+ Experience in :

1. Since 1999: Sensor Applications
2. Since 2001: Wireless Network (RF, ZigBee, Bluetooth, WiFi, BLE, LoRaWAN)
3. Since 2001: Firmware and Embedded System (4bit, 8bit, 16bit, 32bit MCU, ARM and Cortex Embedded system with Android, Embedded Linux)
4. Since 2002: Software, game, server, mobile app, CMS development
5. Since 2004: Consumer Electronics
6. Since 2009: Medical and Healthcare Products
7. Since 2010: Artificial Intelligence and machine learning
8. Since 2012: Augmented Reality and Virtual Reality

Professional Qualification:

1. Graduated from HKSTP Incubation Program
2. ZigBee Alliance Adaptor Member
3. Freescale Design Alliance Member
4. HKMHDIA Corporate Member
5. LSCM Corporate Member
6. HKEIA Corporate Member
7. HKETA Corporate Member
8. CAHK Full Member
9. ITJC member

Our Capability

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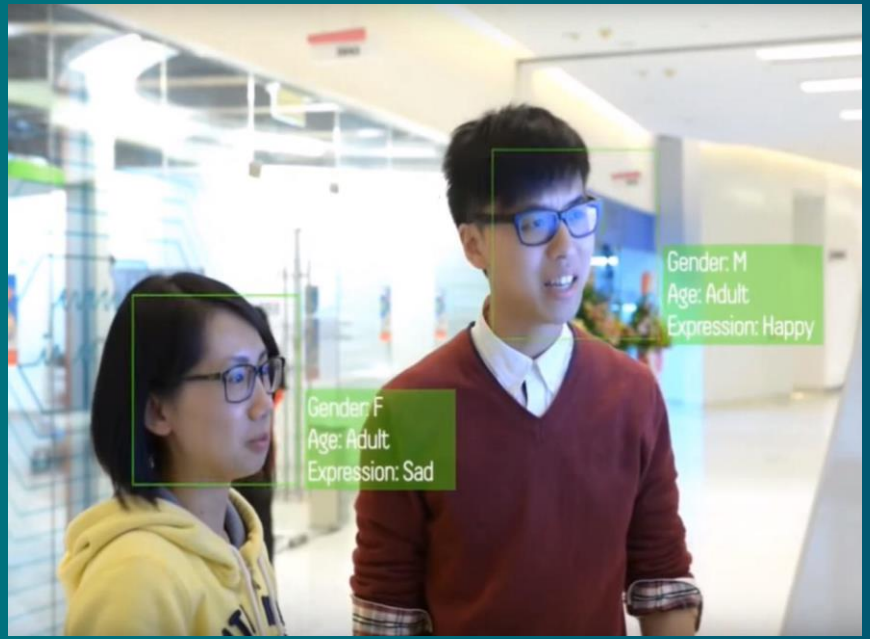

IoT Sensor Network
- Motion sensor
- Wireless module (BT, Wifi, Ethernet)
- Camera module

Embedded Electronics System
- Raspberry Pi
- Arduino
- ARM and MCU

AI Algorithm and Analytics
- Image and Video Processing
- Image and Facial Recognition
- Data Analytics

Interactive Interface
- Augmented Reality (AR)
- Virtual Reality (VR)

Company Mission is to design products to solve people's pain by innovation.

IoT Technical Team

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The project technical team is formed by a group of experienced technical members leading by Ir Dr Alan Lam and Mr. Joe Wong with IoT Team from Sengital group.

Co-Principal Investigator (Co-PI):
Ir Dr Alan Lam

Co-Principal Investigator (Co-PI):
Mr Joe Wong

Amber
Project Coordinator

Jacky
Hardware Engineer

Ben
Firmware Engineer

Leon
Software Engineer (Server)

Jeff
Software Engineer (Web and app)

Fred
Hardware Engineer

John
Firmware Engineer

Vincent
Software Engineer (App and server)

Publications

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- Alan H. F. Lam, “ZigBee Sensor Network System and Positioning Tracking Applications”, Conference Proceedings 2010 of the 4th ZigBee Developers’ Conference, April 2010, section 5, paper 02.
- Alan H. F. Lam, Raymond H. W. Lam, Wen J. Li, Martin Y. Y. Leung, and Yunhui Liu, “Motion sensing for robot hands using MIDS”, Proceedings of the 2003 IEEE International Conference on Robotics and Automation, September 2003, pp. 3181-3186.
- Alan H. F. Lam, Raymond H. W. Lam, and Wen J. Li, “Micro Input Devices System (MIDS): A New Class of Input and Sensing Devices Using MEMS Sensors for Computer and Robotic Applications”, Proceedings of 2003 Regional Inter-University Postgraduate Electrical and Electronic Engineering Conference (RIUPEEEC 2003), Hong Kong, August 2003, C1-8, pp. 1-6.
- Alan H. F. Lam and W. H. Liao, “Semi-Active Control of Automotive Suspension Systems with Magnetorheological Dampers,” International Journal of Vehicle Design (IJVD), Vol. 33, Nos. 1/2/3 (2003), pp50-75, 2003.
- Alan H. F. Lam, “Micro Input Devices System (MIDS): Using MEMS sensors and wireless technology for generalized computer interface functions”, Proceedings of the 4th ACM Postgraduate Research Day 2003, Hong Kong January 2003, pp. 31-38.
- Alan H. F. Lam, Wen J. Li, Yunhui Liu, and Ning Xi, “MIDS: Micro Input Devices System Using MEMS Sensors”, Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems, Switzerland October 2002, pp. 1184 - 1189.
- Alan H. F. Lam and Wen J. Li, “MIDS: GUI and TUI in Mid-Air Using MEMS Sensors”, Proceedings of the International Conference on Control and Automation, June 2002, pp. 1218-1222.
- H. F. Lam and W. H. Liao, “Semi-active Control of Automotive Suspension Systems with Magnetorheological Dampers” in Smart Structures and Materials 2001: Smart Structures and Integrated Systems, Proceedings of SPIE Vol. 4327, pp125-136, 2001.

ZigBee Alliance

4th European ZigBee Developers’ Conference

April 27-28, 2010, Munich, Germany

General Information & Author Guidelines

Dear Author,

congratulations, your abstract has been accepted by the advisory board of the 4th European ZigBee Developers´ Conference. Due to the excellent quality and large number of abstracts we are expecting a very interesting conference.

A ZigBee-based Sensor Network System for Large-Scale Integrated Measurement Applications

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Sengital Limited
alan@sengital.com

ABSTRACT

Since ZigBee Alliance launched the ZigBee standard and protocol stack in 2004, many researchers and companies including us have developed various ZigBee-related systems and applications. In this paper, we introduce a special design of ZigBee-based system as an internet-based large scale network system integrated with mesh networks via extra link-to-LAN lines, while each mesh network is a sub-system inter-connecting sensors, dual ZigBee-module designed gateways and the ZigBee dongle. The hardware configuration, firmware application layer design, communication protocol architecture are described. To demonstrate the functionality and performance of such system, we have developed several sample applications including sensor integration and RSSI position tracking. The further development of the technology and its potential applications are also discussed.

Keywords: ZigBee; 802.15.4; Wireless sensor networks; Application layer; Routing; RSSI; Position tracking,

INTRODUCTION

ZigBee technology has been widely adopted in many different applications such as wireless mesh networks [1][2][3][4] to achieve a self-organized and self-configured communication network, and for more stable and reliable wireless connectivity. With the advantage of low power consumption of ZigBee, various wireless sensor networks for monitoring applications were developed and the corresponding characteristics were analyzed [5][6]. Additionally, researches have thought of using the received signal strength indictor (RSSI) in mesh network for localization purposes [7][8][9][10].

In this paper, our ZigBee-based wireless sensor network system has been developed to integrate the excellent features of mesh topology for wireless networking, multiple measurements and monitoring over indoor/outdoor environments, and position tracking capability of RSSI. Such technology integration can come up with a system which can handle large-scale measurement applications for multiple signals such as production monitoring in factories, energy saving in unoccupied office areas, machine monitoring for higher reliability and stability; identification of object positions, patient monitoring, data logging and alert, truck and cargo tracking for delivery, etc.

These applications are required to gather information at various locations with large network size, and even in real-time. The traditional mesh networks and sensor systems may not achieve the requirements for large-scaled networks. So, our proposed system further integrated multiple mesh networks with an internet server into the internet-accessible large scale network with centralized web interface to provide user-friendly, real-time monitoring, user defined system logic with automatic feedback control functionality.

For many large-scale network applications, it is required to include various sub-networks to perform different sub-tasks. Sometimes those sub networks are in different frequency channels in order to avoid interference. However, this would isolate the communication between devices/node in separated sub-networks. To perform the predefined global task, those sub-networks have to interact among each other, and terminal devices may even need to work for other external sub-networks. Such concept is similar to the roaming function in mobile phone applications. In our novel design with dual ZigBee modules in a single gateway, the Mesh network acquires the capability to transmit data and scan various devices/nodes from different sub-networks even in different frequency channels. The end devices would eventually be able to access all sub-networks in system via different frequency channels.

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Touchless Lift Button System

Sengital Group

Touchless Lift Button System

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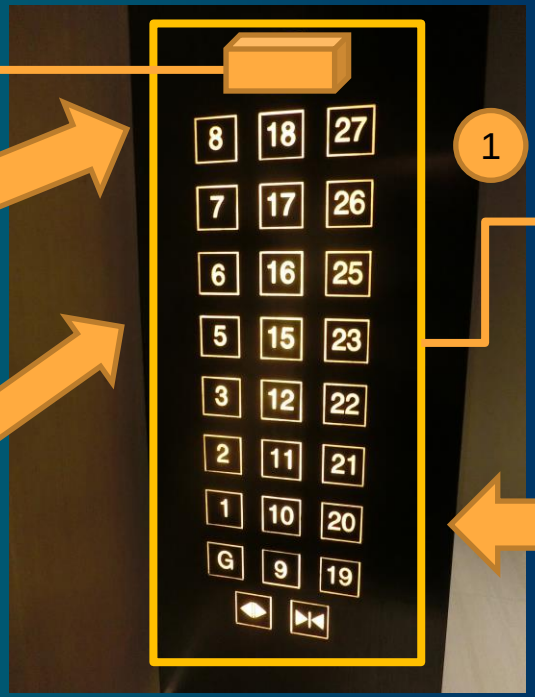
Three Solutions: 1) Infrared Solution 2) CMOS Camera Solution and 3) QR code Scanner Solution

CMOS Camera Module

2



1

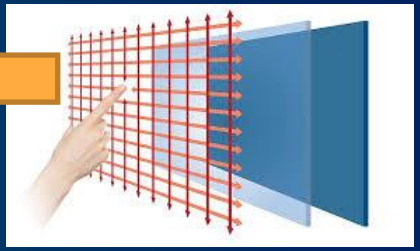
Mirror

Camera

Light from button panel

3

Scan by the camera



Our Solution

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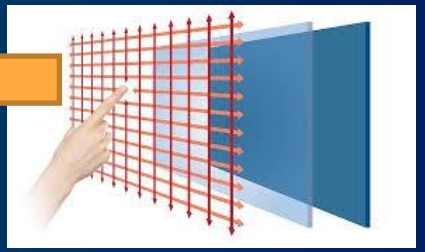
Solution 1: Infrared panel and image processing engine for non-contact elevator button system

1）Sengital IoT team developed a technology that is our award winning technology: DigiTouch that we developed since 2013. Making use of our IR panel on top of the existing lift button panel that can sense the exact position of the figure or any object in the mid air on top of the lift button. Again, the passenger's selection can be detected in the mid air and translate to the button command to be sent to the lift system by our microprocessor through the mentioned interface.

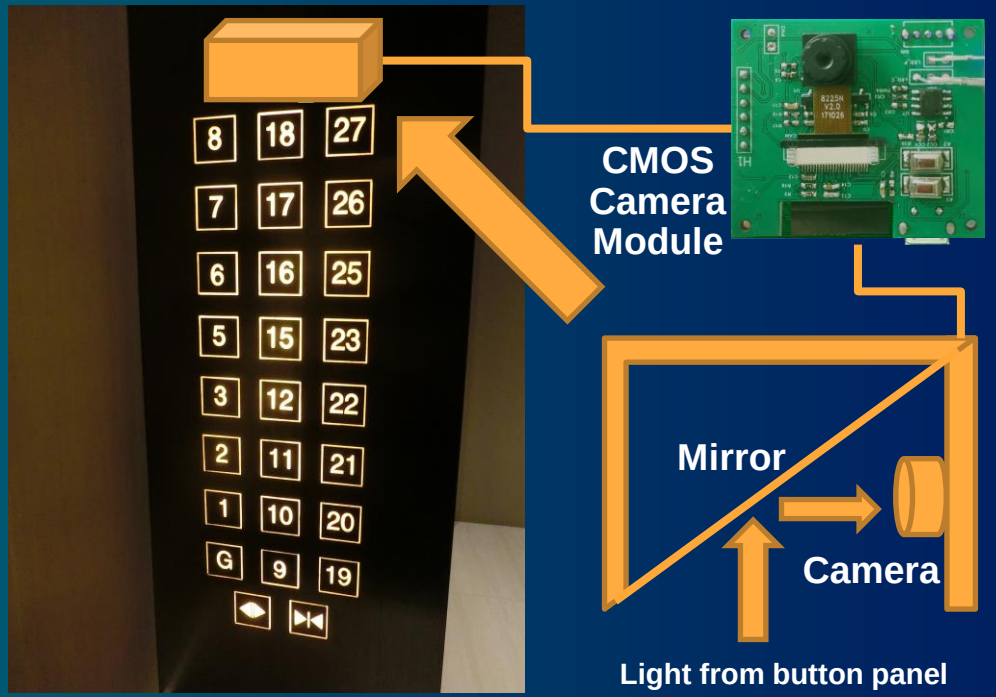


Our Solution

SENGITAL

Solution 2: Optical structure CMOS camera lens with image processing engine for non-contact elevator button system

2）On the other hand, Sengital IoT team developed a microprocessor running our computer vision algorithm to analyse the image from the CMOS camera　with the mechanical structure like a telescope that can be reflect the image on the button panel of the lift. Once the passenger's finger is closing and pointing to that particular button, our system will know which button is selected. Then through the communication interface with the lift system (UART/SPI/I2C/RS232/RS485) to send the command by our microprocessor in order to control the lift without touching physically.



Our Solution

SENGITAL

Solution 3: CMOS camera lens with QR code scanner function and image processing engine for non-contact elevator button system

3) The third option is to make use of our existing camera module that is running a image processing recognition algorithm to scan the QR code from the passenger app or web that we provide the QR code for passenger to get the link for the web or app so that they can select the button by their mobile phone to display the QR code for our camera system to scan.

Our Solution

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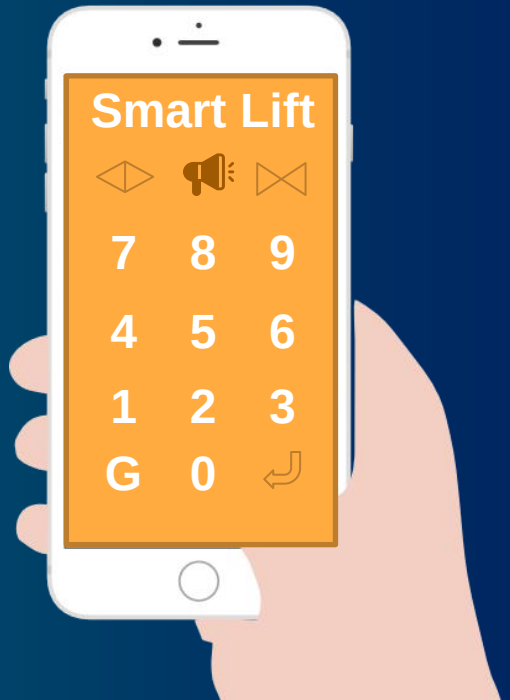
Supplementary Solution 1:
Mobile application or control interface webpage

4) These three solutions mentioned above can be modified in both hardware and software based on the requirements of different lift systems in order fit in different buildings and applications



Our Solution

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Supplementary Solution 2:
Additional sensors with big data display and analysis server

5) Our solution has flexibility to further install different sensors. With the embedded WiFi/Bluetooth connectivity in our microprocessor, the sensor data and even lift usage, power consumption, lift condition and etc can be measured and transmit to EMSD server. Mobile app or web for the backend system can be further developed to show and handle the big data analytics

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Sengital Portfolio

Sengital Group

Motion Sensing Consumer Products

Motion Sensing Modules, Game Controller and Remote

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Controller and Remote: Motion Sensing Technology

Sengital involved in multiple product development projects such as game controllers, TV remote and PC controllers for different customers and brands such as VRMS, i-too, PXN, BQT, eDimensional, Snakebyte, ICHONA, Futaba, iGUGU, WestingHouseand etc.

For detail information:

http://www.vrmsgame.com
http:/www.kamtech.com.hk
http://www.iGUGU.com
http://www.wde.com
http://www.ichona.com/
http://www.futaba-rc.com/
http://www.snakebyte-europe.com

Wireless Network System

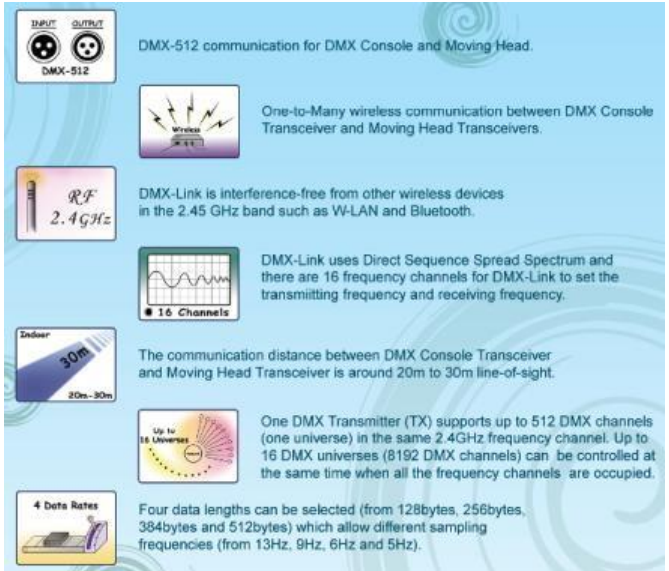
Wireless DMX Transeciver

- Sengital has developed a DMX transceiver which won ICT Award and DMX512 is a standard for digital communication networks that are commonly used to control stage lighting and effect. Our Transceiver allows the console to send such commands to the device simultaneously. Data length, sampling frequency and communication frequency can all be adjusted.

Customers:

Mc CRYPT

Hong Kong ICT Awards 2007 香港資訊及通訊科技獎



Embedded System

Android-based Smart TV Box

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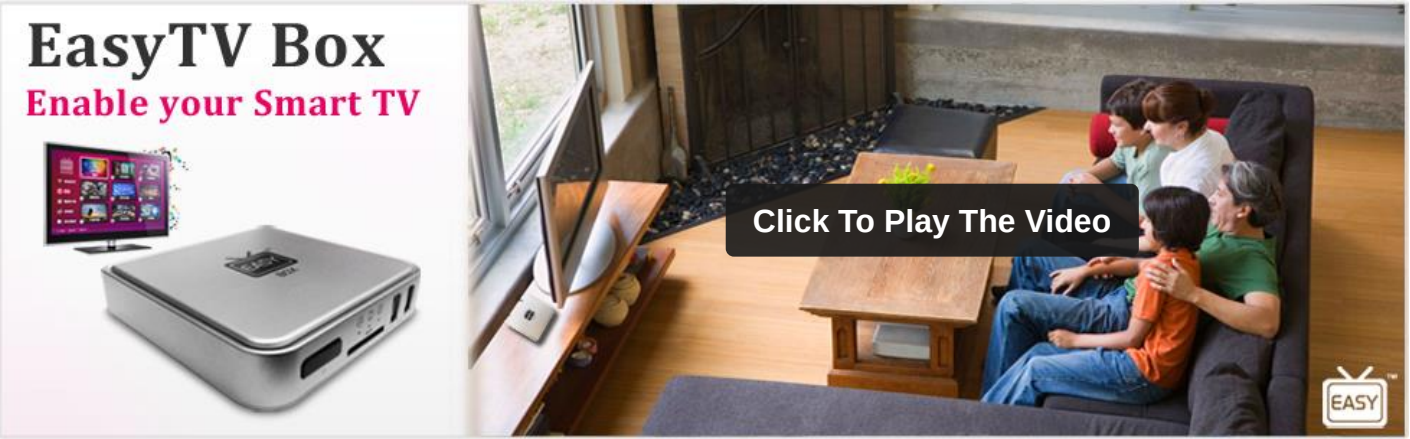
Sengital has developed an Android TV box for the brand called EasyTV (www.easytv.com.hk) which is selling in HK for local consumer market. By using Cortex A9 processor and Android 2.3 OS with customized hardware, firmware and software, EasyTV box provides very smooth and stable performance.

By using Cortex A9 processor and Android 2.3 OS with customized hardware, firmware and software, EasyTV box provides very smooth and stable performance. With patented technology, EasyTV includes many user friendly features to make your user experience more enjoyable!

Customers:

EASY™

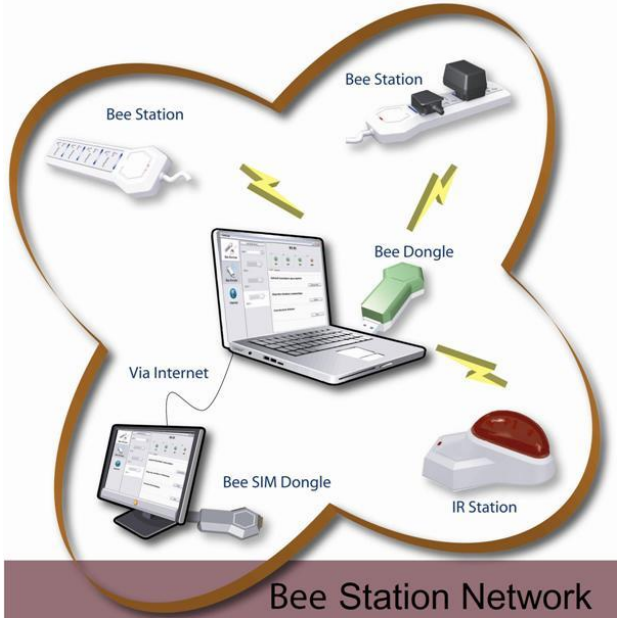
iStream
Digital Entertainment Solution



Wireless Network System

Bee Station Home Automation System

SENGITAL



Customers:

Bee Connect

Hong Kong ICT Awards 2006 香港資訊及通訊科技獎

Bee Station is a wireless power socket which is connected by 2-ways 2.4GHz RF wireless communication. The Bee Station can be used to control the power of the home appliances.

Bee IR station is a wireless IR Remote station which receives the control command from RF module and then transmit the IR control command to the home appliances.

The Bee Dongle provides USB interface to connect to PC and transmit & receive the command signal between Bee Station / IR Station / or devices and PC.

With the Bee Control Panel, a **GUI software** provides a user friendly interface to user to control the Wireless Home Automation Network. Through the Internet, the Bee SIM dongle can be used to connect the Bee Control Panel to control the Wireless Home Automation Network.

Sengital Product Brand - DigiTouch

Make TV becoming Tablet

Sengital DigiTouch includes DigiTouch Touch Panel, DigiTouch Stick and DigiTouch Computer as well as the DigiTouch Presenter which adds on the existing TV to enable it to function as an Android Tablet but much bigger screen.
For more information, pls visit:
http://www.sengital.com/DigiTouch/

HKEIA Award Innovation • Technology 創新科技產品獎

Grand Award and Gold Award of consumer electronic

Wireless Network System

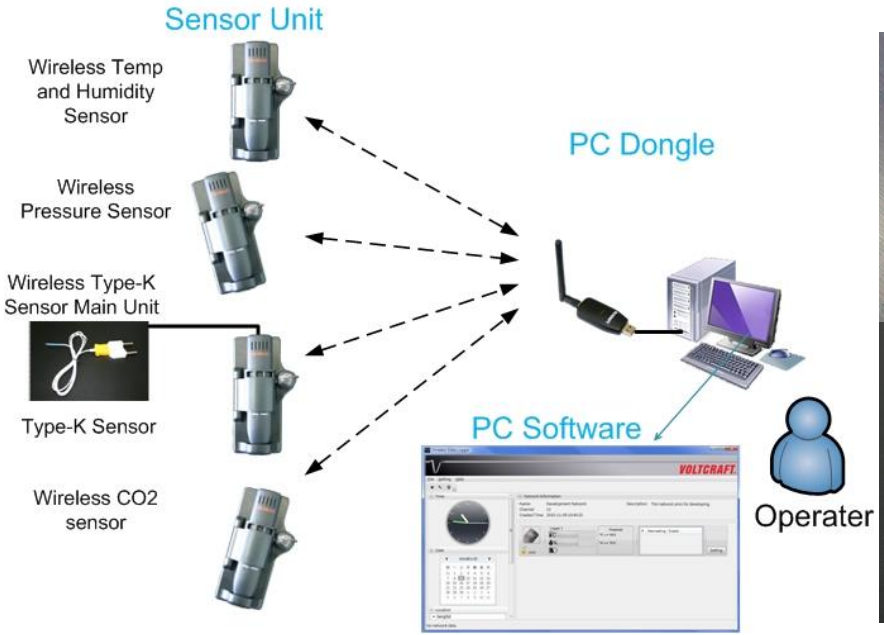
Wireless Data Logger

Wireless Data Logger (for CEI – VOLTCRAFT Brand)

- Complete system including Wireless
- 1) Temperature and Humidity Sensor, 2) Pressure Sensor,
- 3) Type K Sensor, 4) CO2 Sensor, 5)PC dongle, 6) PC software.

Customers:

VOLTCRAFT



Sengital Product Brand - PhotoGPS

Your trustful field trip partner

SENGITAL

PhotoGPS

Link your location to photo

NEW NEW NEW

TEMP HUMIDITY | AMBIENT LIGHT | PRESSURE SENSOR | SD SD CARD | GPS | DATA LOGGING | PC SOFTWARE | SENSOR PLUG-IN

Photo can only record part of the experience in the trip. Where and when we took the photo are something that we want to record too.

With our HK invention - PhotoGPS, you can have full record for your trip and field study by merging TIME and LOCATION with your own Photos taken by your own camera.

This Product is a award winning product which is designed for Hong Kong Local school in order to help student to be more convenient to do the field study work. By using normal digital camera and PhotoGPS, student can take photos during field study and the PhotoGPS will help to log the location. By using the PhotoGPS software, the photo can link up with the location information logged by PhotoGPS. For more information, pls visit:

http://www.sengital.com/PhotoGPS/

Customers:

Hong Kong Schools

Silver Award 銀獎
HONG KONG ICT AWARDS 2011 香港資訊及通訊科技獎

Cert of Merit 優異證書
HONG KONG ICT AWARDS 2011 香港資訊及通訊科技獎

Embedded System

Fleet Management and Tracking System

SENGITAL

Global Tracking System - GSM-GPS based Tracking system

- Vehicle tracking module (Global Tracker)
- Dead reckoning module (Global Tracker DRM)
- Server system (Global Tracking Server)
  with web-based online fleet management portal (Global Tracking Portal).

Customers:

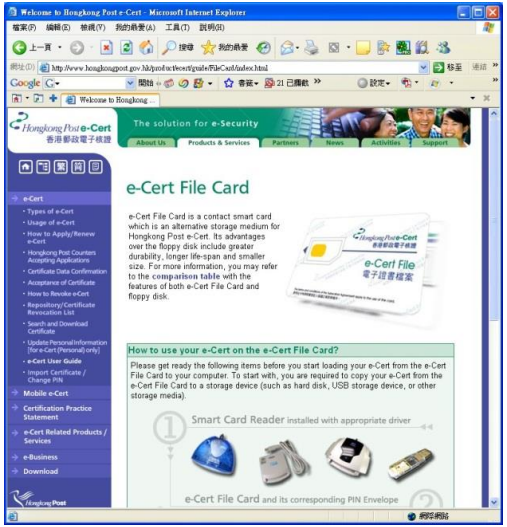
Autotoll 快易通

ARMY TRACK

Embedded System

E-Cert Readers and Dongles

- Sengital extended the Technology in PKI:
- Invention of E-Cert applications:
- In 2006, we proposed and developed the eCertFile Drive, iBus Double, iBus Slim HKID card reader to E-Mice Solutions Limited (Operator of Hong Kong Post Office). Now HK Post Office and Hang Seng Bank is now using our reader for their E-Cert service.
-
- Sengital is now supplying the E-Cert USB Dongle to Bank of China (HK), Nanyang Commercial Bank, Chiyu Bank



Embedded System

RC Helicopter Sensing and Logging System

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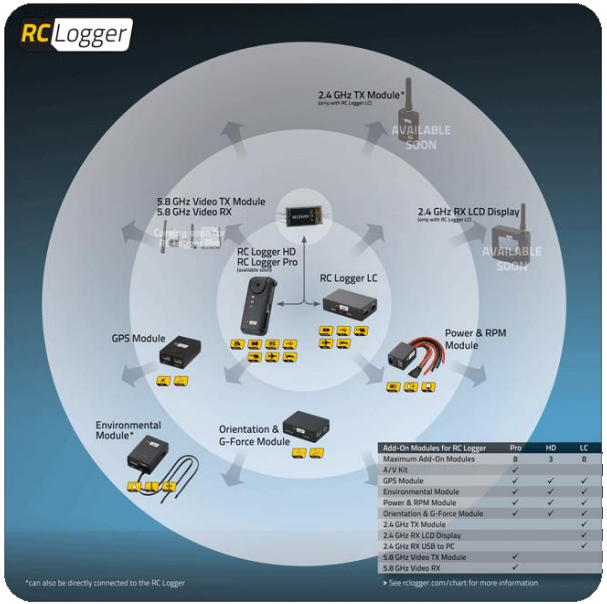
- Sengital has developed and is now developing a series of products for Remote Control Helicopter using sensors and wireless technologies for Conrad Electronics International (CEI) for their brands called Modelcraft and RCLogger.

Customers:

MODELCRAFT

RC Logger



Embedded System

Patient Monitoring System

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Wireless Cardiovascular Patient Monitoring System

Sengital involved in multiple product development projects with Corventis on medical and healthcare device in 2008 and 2009. The team involved in Piix testing and manufacturing, AZURIS and zLink GSM Mobile device development and manufacturing. Moreover, for in-hospital application, we have also developed Bluetoth-ZigBee In-hospital gateways, ZigBee Patch, ZigBee-based In-hospital Gateway, PC dongle, PC software.

For detail information: http://www.corventis.com

Besides the project for Corventis, Sengital also develops another patient monitoring system for Cyberonics.

On the other hand, Sengital is supporting many academic research projects in University. Details will be mentioned in University Research section.

Customers:

corventis

Cyberonics

Selected Customers

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THANKS

Any questions?
Please feel free to contact us.

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