Robotic RFID Stocktaking System

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Advised by

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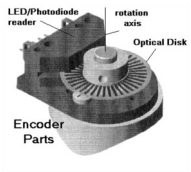
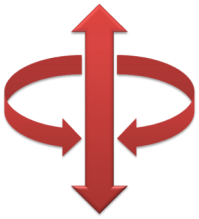
101 Robot Design - Mechanical and Electronic

Moveable RFID Antenna

Embedded with high precise Encoder, the RFID Antenna can be move upward/downward and with 270 degree freedom in the horizontal movement.



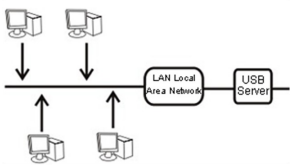


Anti- Damping Design

With the help of three dampers, the machine can cope with different environment and give the strongest protection to the hardware.

Wireless Communication

With our own design of electronics, Different types of wireless communication and wireless to LAN / USB can be achieved.



Vision System

With the help of the Wireless System, wireless vision system has been implemented in this machine and responsible for the Security Function.

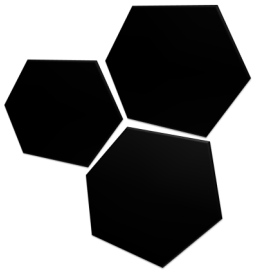
Modulate Design

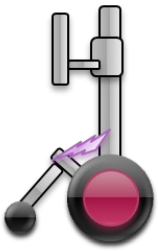
Modulate Design has been adopted In this machine and parts can be changed or added easily in order to cope with different situation.

Embedded Computation Power

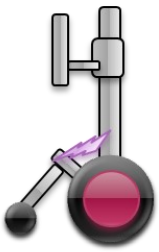
32bit high computation power MCU has been embedded in the machine and with the OO Programming Concept, Sensors can be easily added or removal.

02 Cloud Computer - Robot System Introduction

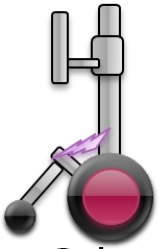




Robot in China



Robot in Spain

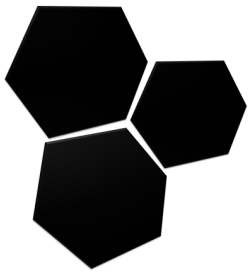


Robot in Australia

Via Internet

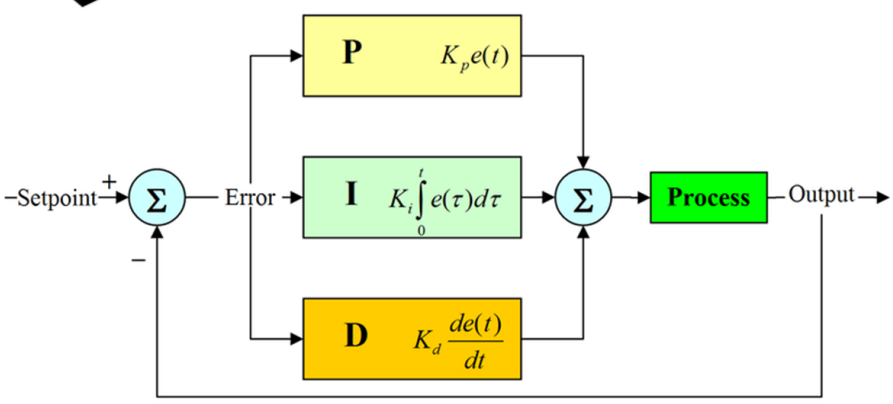
Headquarter in Hong Kong

Through the specially design wireless system, cloud computer—robot system has been achieved. Only one computer would be needed to control all robots all over worldwide via internet and all the high level calculation and computation power would be left in this computer.



03 Precise Motion Control Algorithm

With the help of precise encoder, PID control algorithm has been adopted in this robot to help controlling precise motion and movements in both manual and auto

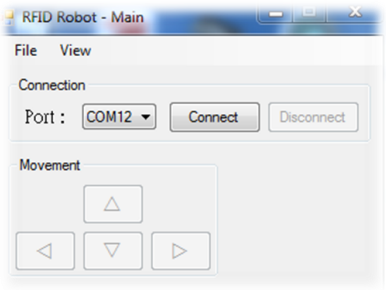


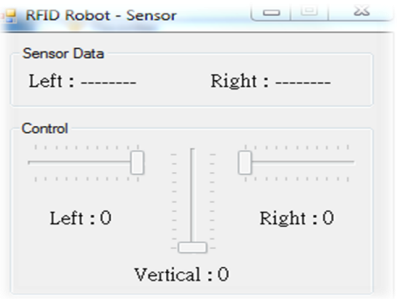
$$u(t) = MV(t) = K_p e(t) + K_i \int_0^t e(\tau)\,d\tau + K_d \frac{d}{dt} e(t)$$

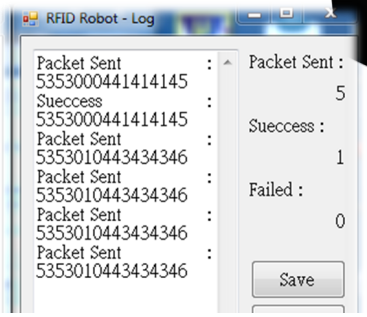
where

P_{out}: Proportional term of output
K_p: Proportional gain, a tuning parameter
K_i: Integral gain, a tuning parameter
K_d: Derivative gain, a tuning parameter
e: Error = $SP - PV$
t: Time or instantaneous time (the present)

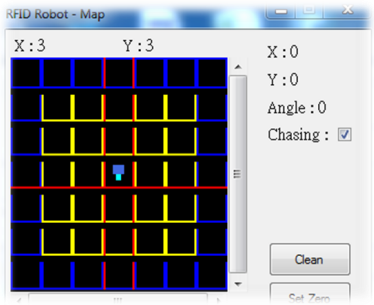
04 Computer Control Program and GUI

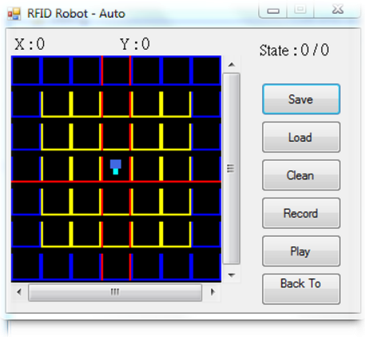


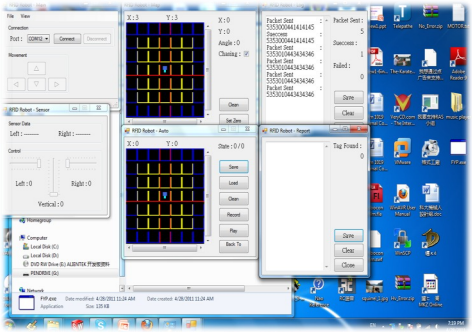


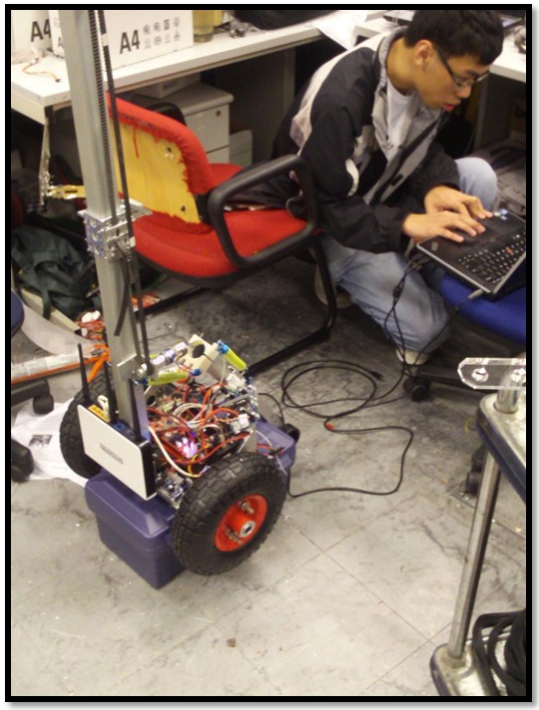


By using Visual Studio C++, a control program with full API function has been achieved. Auto Save and Log system has been embedded in the design and 100% Error handling and Safe function has been achieved.









05 Evaluation and Testing Performance

Evaluation of the system efficiency and the Code speed has been done. Also, Debug tools for the machine has also developed. Several Testing for the machine of working in different environment has also tried out.

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