

遠端照護即時監控系統

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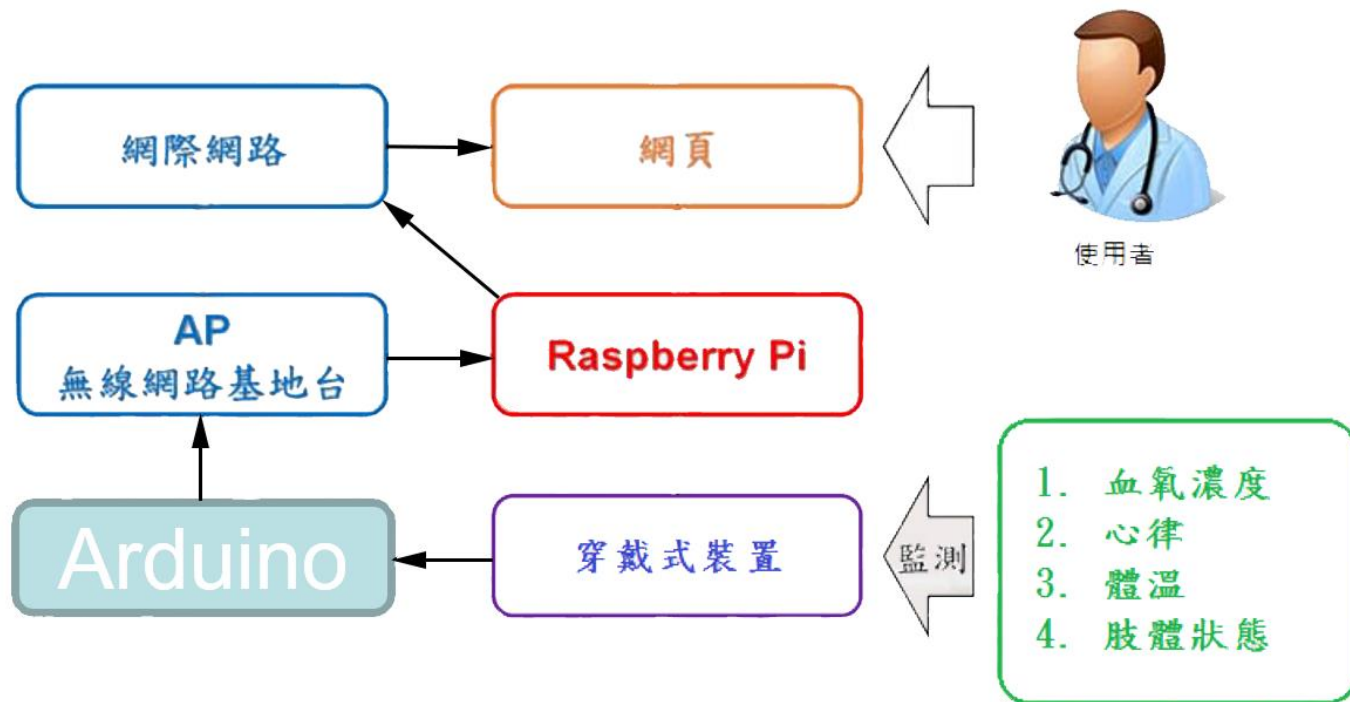
摘要

- * 在這大數據的時代，每個行業都有資訊上的創新，業者也不斷推陳出新，這讓我們想到家裡長輩的健康狀況問題，在這個雙薪家庭居多的時代，除了有孩童照顧的問題以外，家中長輩的健康與突發狀況、寵物照護等問題，是現今社會上許多人共有的煩惱。透過遠端照護即時監控系統，就算讓長輩或寵物獨自留在家中、替孩童請保姆等等，皆能利用3c產品獲得第1時間的了解。而這每個動作都會將資料存於資料庫中，方便未來資料分析與資料探勘之使用。

功能概述

- 利用穿戴裝置測得體溫以及肢體狀態。
- 透過 Arduino 將數據傳送至資料庫，再從資料庫輸出數據便可以得到即時資料。
- 經由網頁更新隨時監控使用者生理及身體狀況。

流程圖



左側:肢體感測元件
中間:血壓感測元件
右側:溫度感測元件



arduino程式

- * 開頭需要引入需要的函式庫

```
1 #include <MySignals.h>  
2 #include "Wire.h"  
3 #include "SPI.h"
```

Setup

- * Setup方法會在程式執行的最一開始執行，也只會執行這一次
- * Setup方法裡面需要定義程式所使用的鮑率，以及初始化各個感測器及部件(比如wi-fi模組ESP8266)

```
31 void setup()
32 {
33     Serial.begin(115200);
34
35     MySignals.begin();
36
37     //Enable WiFi ESP8266 Power -> bit1:1|
38     bitSet(MySignals.expanderState, EXP_ESP8266_POWER);
39     MySignals.expanderWrite(MySignals.expanderState);
40
41     MySignals.initSensorUART();
42
43     MySignals.initBodyPosition(); //姿態感測
44
45     MySignals.enableSensorUART(WIFI_ESP8266);
46     delay(1000);
47
48     // Checks if the WiFi module is started
49     int8_t answer = sendATcommand("AT", "OK", 6000);
```

Loop

- * Loop方法會在setup執行後不停調用，在這裡面我們需要按步驟編寫程式

```
111 void loop()  
112 {  
113     if (sendATcommand("AT+CIPSTART=\\"TCP\\",\\"192.168.43.203\\",80", "OK", 3000))  
114     {  
115         MySignals.println("TCPconnect!");  
116     }  
117     else  
118     {  
119         MySignals.println("TCP Error");  
120     }  
121 }
```


姿態傳感器

```
122 // bodyposition
123 uint8_t position = MySignals.getBodyPosition();
124 Serial.print("Current position : ");
125 //print body position
126 MySignals.printPosition(position);
127 delay(100);
128
129 //print acc values
130 MySignals.getAcceleration();
131
132 // convert float to string
133 char bufferAcc[50];
134 char x_acc_string[10];
135 char y_acc_string[10];
136 char z_acc_string[10];
137 dtostrf(MySignals.x_data, 2, 2, x_acc_string);
138 dtostrf(MySignals.y_data, 2, 2, y_acc_string);
139 dtostrf(MySignals.z_data, 2, 2, z_acc_string);
140
141 // print the X Y Z acceleration
```

溫度傳感器

```
//temperature  
float temperature = MySignals.getTemperature();  
Serial.begin(115200);  
Serial.print(F("Temperature (*C): "));  
Serial.println(temperature, 2);
```

傳送函式

- * 傳輸的部分
sendATcommand
- * 函示的格式

```
213 int8_t sendATcommand(char* ATcommand, char* expected_answer1, unsigned int timeout)
214 {
215
216     uint8_t x = 0, answer = 0;
217     char response[500];
218     unsigned long previous;
219
220     memset(response, '\0', sizeof(response)); // Initialize the string
221
222     delay(100);
223
224     while ( Serial.available() > 0) Serial.read(); // Clean the input buffer
225
226     delay(1000);
227     Serial.println(ATcommand); // Send the AT command
228
229     x = 0;
230     previous = millis();
231
232     // this loop waits for the answer
```

傳輸字串

* 姿態傳感器的數據包裹

```
aa = "GET /sensor_tosql3.php?name=pos&value=";  
aa += position;  
aa += " HTTP/1.1\r\nHost:192.168.43.203\r\n\r\n";  
cipSend = "AT+CIPSEND=";  
cipSend += aa.length();  
aal = aa.c_str();  
cipSend1 = cipSend.c_str();  
  
if (sendATcommand(cipSend1, "OK", 3000))  
{  
    MySignals.println(cipSend1);  
    MySignals.println("send length ok!");  
}  
else  
{  
    MySignals.println("send length Error");  
}  
  
if (sendATcommand(aal, "OK", 3000))  
{
```

序列埠監控視窗

- * 將編寫好的程式進行編譯，編譯成功後燒錄至Arduino板內，燒錄完後開啟序列埠監控視窗，將鮑率設為我們需要使用的鮑率，並觀察上面輸出的文字。

```
AT
WiFi succesfully working!
AT+CWMODE=1
CWMODE OK
AT+CWJAP="13141234", "7777777777"
Error
AT+CWJAP="13141234", "7777777777"
AT+CIPSTART="TCP", "192.168.43.203", 80
TCPconnect!

Current position : Supine position
Acceleration: X= -0.06 Y= 0.06 Z= -1.00
Temperature (*C): 35.24

Pulse:75bpm / SP02:97%
Current position : Supine position
Acceleration: X= 0.00 Y= 0.19 Z= -0.94
Temperature (*C): 35.33

Pulse:74bpm / SP02:97%
Current position : Supine position
Acceleration: X= -0.06 Y= -0.06 Z= -1.06
Temperature (*C): 35.28
```

Sensor to SQL

```
<?php
$var1 = $_GET['name'];
$var2 = $_GET['value'];
$aa = "get".$var1." ".$var2;
echo $aa;
$dbhost = 'localhost';
$dbuser = 'root';
$dbpass = 'admin';
$dbname = 'iot';
$conn = mysql_connect($dbhost, $dbuser, $dbpass) or die('Error with MySQL connrction');
mysql_query("SET NAMES 'utf8'");
mysql_select_db($dbname);
if($var1 == "pos") {
    if($var2 == 1){
        $var2 = "俯視角";
    }elseif($var2 == 2){
        $var2 = "左傾";
    }elseif($var2 == 3){
        $var2 = "右傾";
    }elseif($var2 == 4){
        $var2 = "躺視角";
    }elseif($var2 == 5){
        $var2 = "站姿或坐著";
    }else{
        $var2 = "不合理姿勢";
    }
}
$sql = "INSERT INTO arduinoreceive(name,value) VALUES ('".$var1."','".$var2."')";
$result = mysql_query($sql) or die(mysql_error());
```

SQL sever

- * 資料庫
- * 資料表
- * 資料架構

←T→	Count	1	Name	Value	Datetime
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	345	pos	6	2018-12-05 18:48:45	
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	344	temp	19.60	2018-12-05 18:48:41	
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	343	pos	6	2018-12-05 18:48:08	
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	342	temp	19.41	2018-12-05 18:48:04	

#	名稱	型態	編碼與排序	屬性	空值	預設值	額外資訊
<input type="checkbox"/> 1	Count	int(10)			否	無	AUTO_INCREMENT
<input type="checkbox"/> 2	Name	varchar(50)	utf8_general_ci		否	無	
<input type="checkbox"/> 3	Value	varchar(50)	utf8_general_ci		否	無	
<input type="checkbox"/> 4	Datetime	timestamp		on update CURRENT_TIMESTAMP	否	CURRENT_TIMESTAMP	ON UPDATE CURRENT_TIMESTAMP



HTML+PHP

- * 降冪排序
- * 只顯示一筆

Count	Name	Value	Datetim
461	temp	25.98	2018-12-05 21:54:06
Count	Name	Value	Datetim
460	pos	左傾	2018-12-05 21:54:11

```
<html>
<head>
<meta charset="utf-8" />
<meta http-equiv="refresh" content="3"/>
<title>Ch11_2_3.php</title>
</head>
<body>
<?php
$servername = "localhost";
$username = "root";
$password = "admin";
$dbname = "iot";

$conn = new mysqli($servername, $username, $password, $dbname);
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}
$conn->query("set names utf8");
$sql = "SELECT * FROM arduinoreceive ORDER BY Count DESC LIMIT 1 ";
$result = $conn->query($sql);

echo "<table border='1'>
<tr>
<th>Count</th>
<th>Name</th>
<th>Value</th>
<th>Datetim</th>
</tr>";
if ($result->num_rows > 0) {
    while($row = $result->fetch_assoc()) {
        echo "<tr>";
        echo "<td>" . $row['Count'] . "</td>";
        echo "<td>" . $row['Name'] . "</td>";
        echo "<td>" . $row['Value'] . "</td>";
        echo "<td>" . $row['Datetime'] . "</td>";
        echo "</tr>";
    }
}
```