Common Sensor Node development
Collaboration with NECTEC (Thailand)

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Common Sensor Node development

There are many IVO projects on IoT. The subject of research is AI, Analyzing data, considering for optimization and it may be security etc.

<table>
<thead>
<tr>
<th>Year</th>
<th>Num. of total Project</th>
<th>Num. of project on IoT</th>
<th>Need for sensor data</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016 Project</td>
<td>8</td>
<td>2</td>
<td>1</td>
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<tr>
<td>2017 Project</td>
<td>5</td>
<td>4</td>
<td>1</td>
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<tr>
<td>2018 Project</td>
<td>6</td>
<td>5</td>
<td>4</td>
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<tr>
<td>2019 Project</td>
<td>5</td>
<td>3</td>
<td>2</td>
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</tbody>
</table>

We considered providing a general-purpose board to collect sensor data. If we provide it to projects whose research is not primarily data collection, can it be cost reduction? Can it be saving time?
Our discussion is to develop common board that is:
(1) Ras Pi (CM3) carrier board to connect several sensor as standard board
(2) Charge controller board that can run continuously and stability
Example of requirement for Visual IoT

Solar Battery & Car Battery 12V /24V
Dual LAN ports: one for IP camera (PoE: PSE support, min.15W) and the other for the Internet LTE (4G) for the Internet

Optional
- Wake up triggered by external sensors (interface unknown: UART, I2C, RS485, RS422, USB, BLE...)
- Control of external “Stepping Motor”
- USB (one port at least): for USB camera
Example of Specification for Visual IoT

1. Solar PV = 300W, Size 2x1 meter (maximum), usually using 100W
2. Battery = 12V, 115AH (sealed or semi-sealed lead acid)
3. LTE (4G) for the Internet: miniPCIE for LTE module <USB signal only>
4. WatchDog = using MCU (original & configurable via I2C)
   selectable by DIPsw : keep alive signal pin (RPi GPIO)
5. Print Circuit Board Layer (PCB Layer): number of layer is 4 or 2.
   Requires IP camera power control circuit for Power ON Reset
6. Case size = W:130mm  H:180mm  D:80mm (minimal target)
   e.g. TAKACHI BCAP131808G, BCPC162113S
7. Board size = 100m x 100m or less
   e.g. TAKACHI BMP1217P, BMP1520P
Block Diagram of Ras PI Carrier Board

- Watchdog: PIC12Fxx
- 40Pin GPIO
- RS-485 Modbus
- Fan
- DC to DC
- Power supply 9-24V
- CM3
- LAN9514i
- POE RJ45
- USB1
- USB2
- 4G LTE
- Stepping Motor Driver
- Sensors
- Charge Controller
- IP Camera
- GPS
- USB to LAN
- Antenna
- Motor
- JRTU
- RS-485
- Modbus
- Fan
- DC to DC
- Power supply 9-24V
- CM3
- LAN9514i
- POE RJ45
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- Motor
- JRTU
If some IVO project is not focus to sensor just collect data and its focus is higher level experiment such as Data analysis, AI etc.:

NICT Asia Center will rent the equipment.
At first NICT Asia Center will make the 10 set of equipment.
Objective is to reduce time consumption, cost ...:
- To be common tool for field test
- Robust for indoor and outdoor
- Stable power supply
- Running for long time experiment

Board development is supported by NECTEC.
Thanks for NECTEC cooperation.