

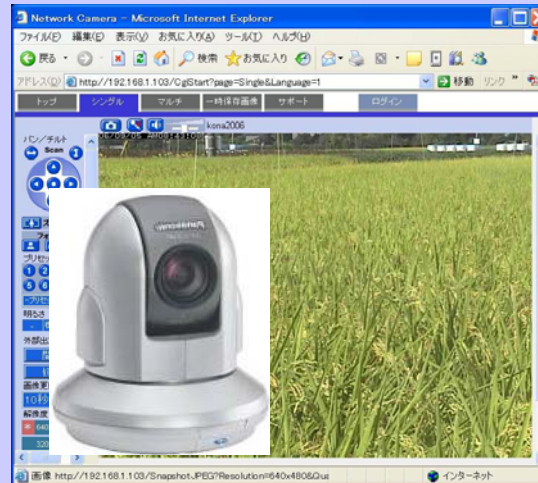
What's Field Server Agent System ?

Field Server



<http://10.1.0.2/modify.cgi>

Network Camera

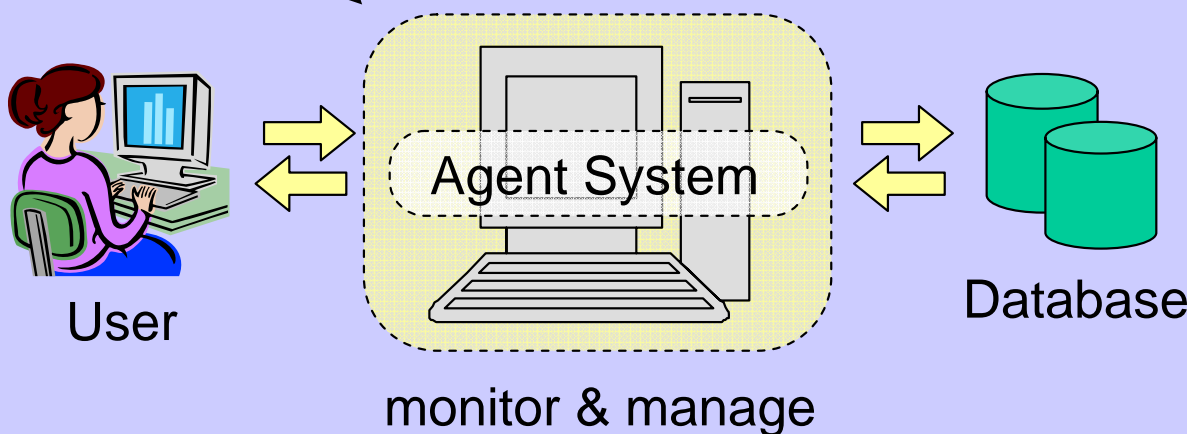


<http://10.1.0.3/SnapshotJPEG?Resolution=640x480&...>

sensor network with
Web module node

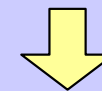
....

- various module
- simple firmware
- remote operation
- interactivity



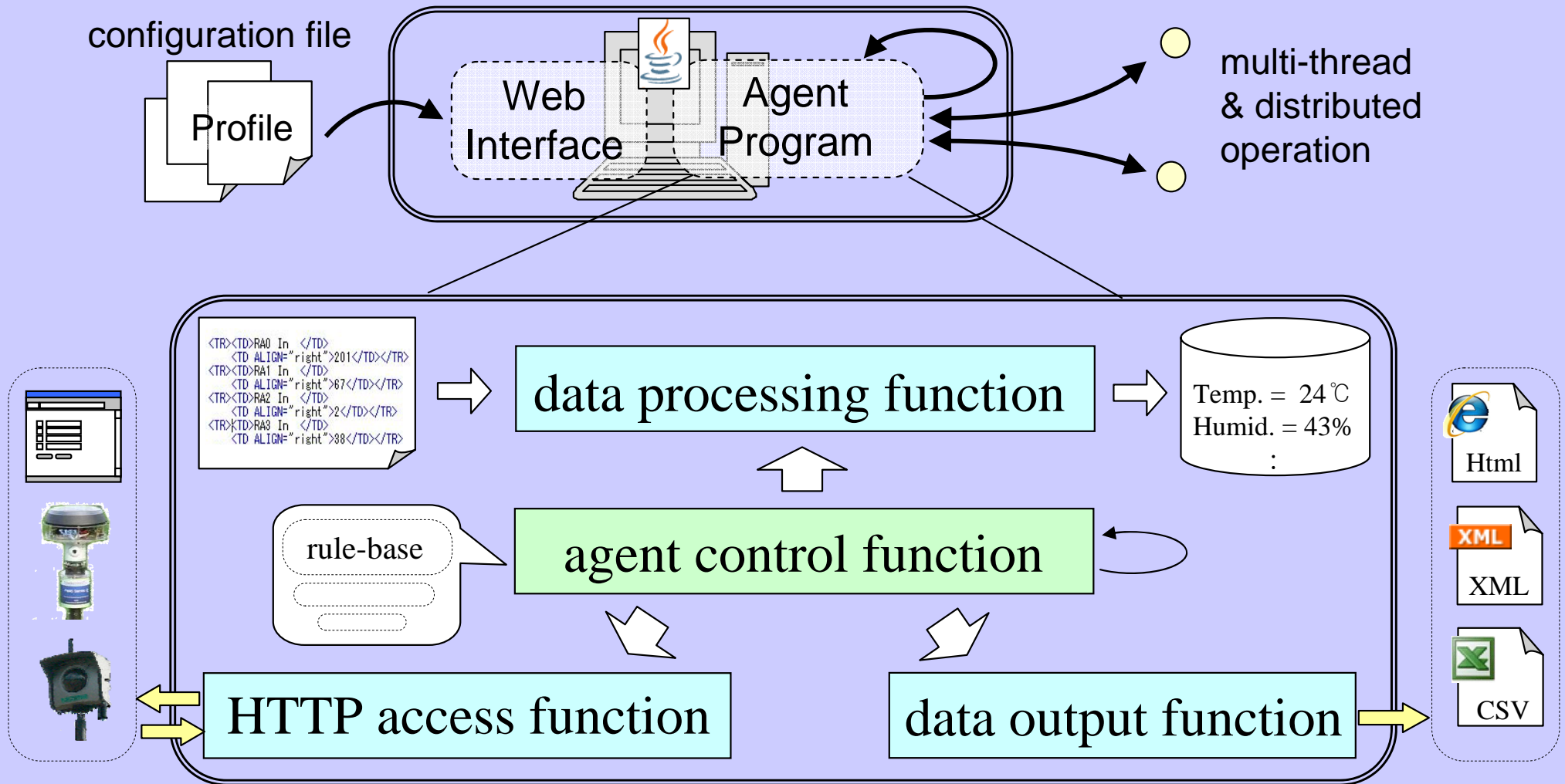
Data logger ?

Web crawler ?



more advanced & functionable

Architecture of Agent System

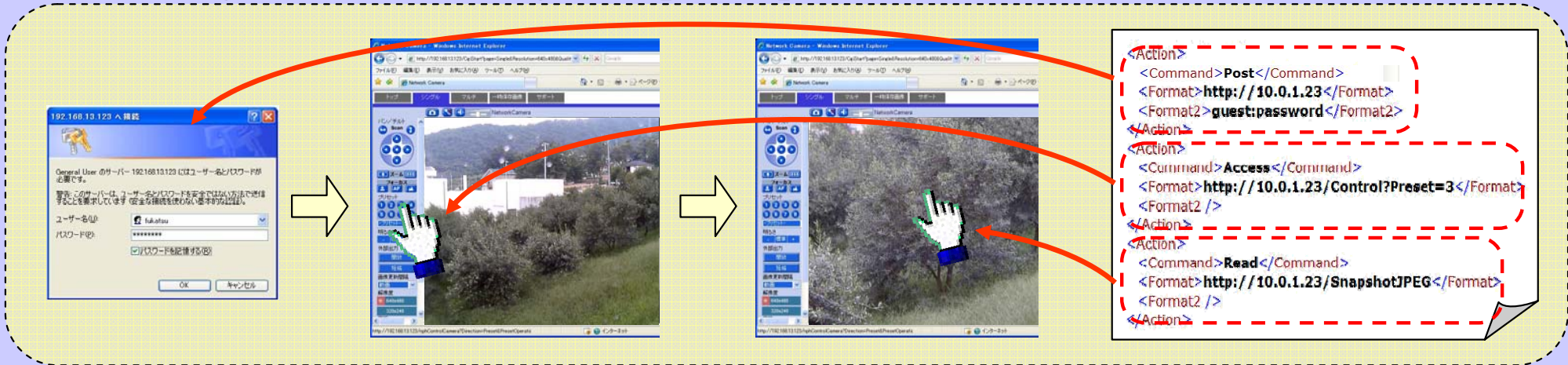


Agent System operates flexibly & sophisticatedly based on Profiles

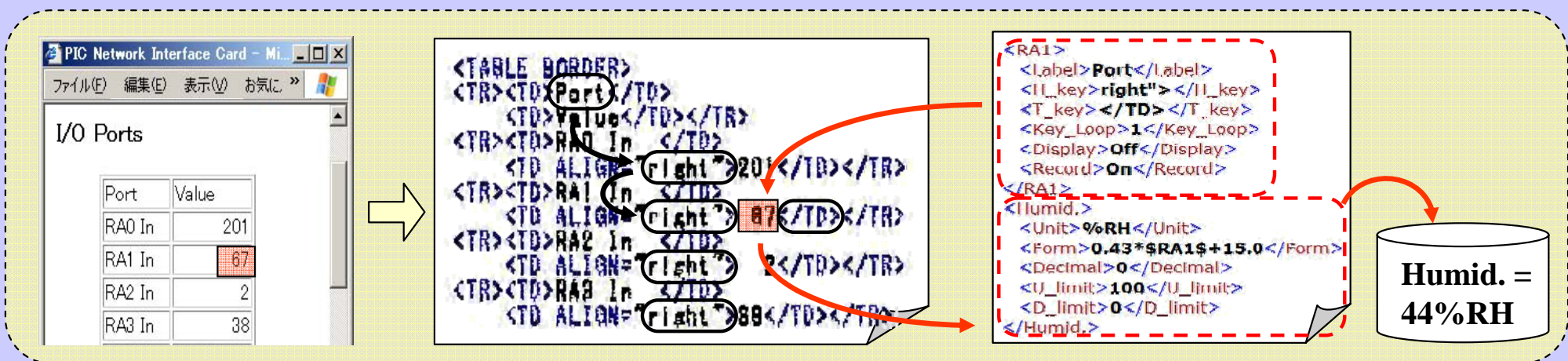
Basic function of Agent System

Agent System accepts various Web pages

obtain target data according to required procedure

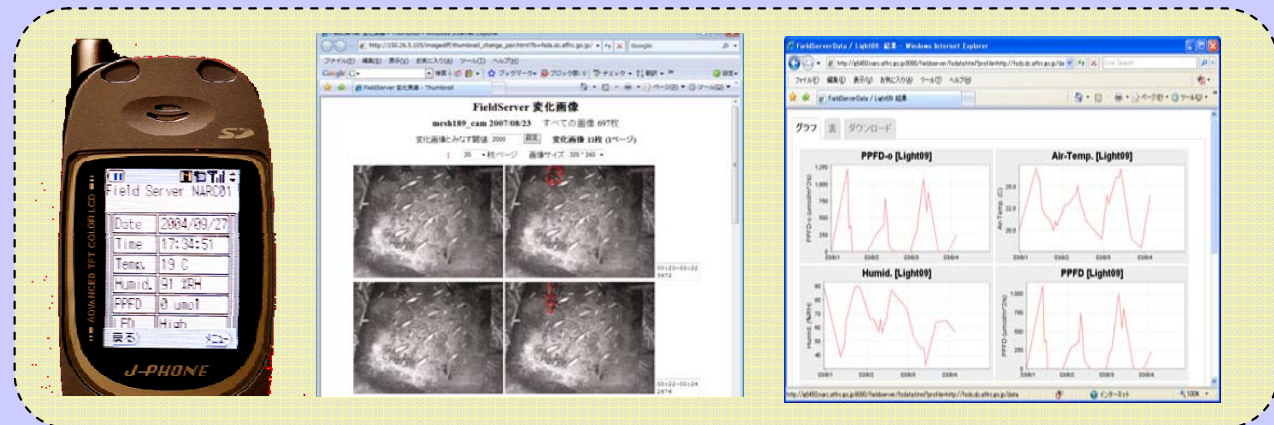
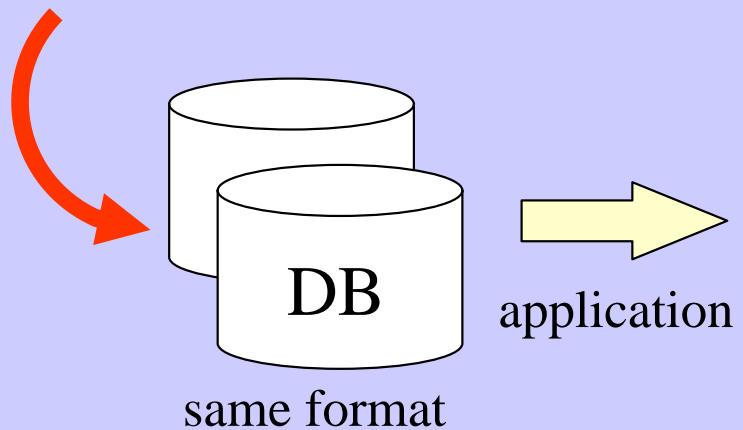
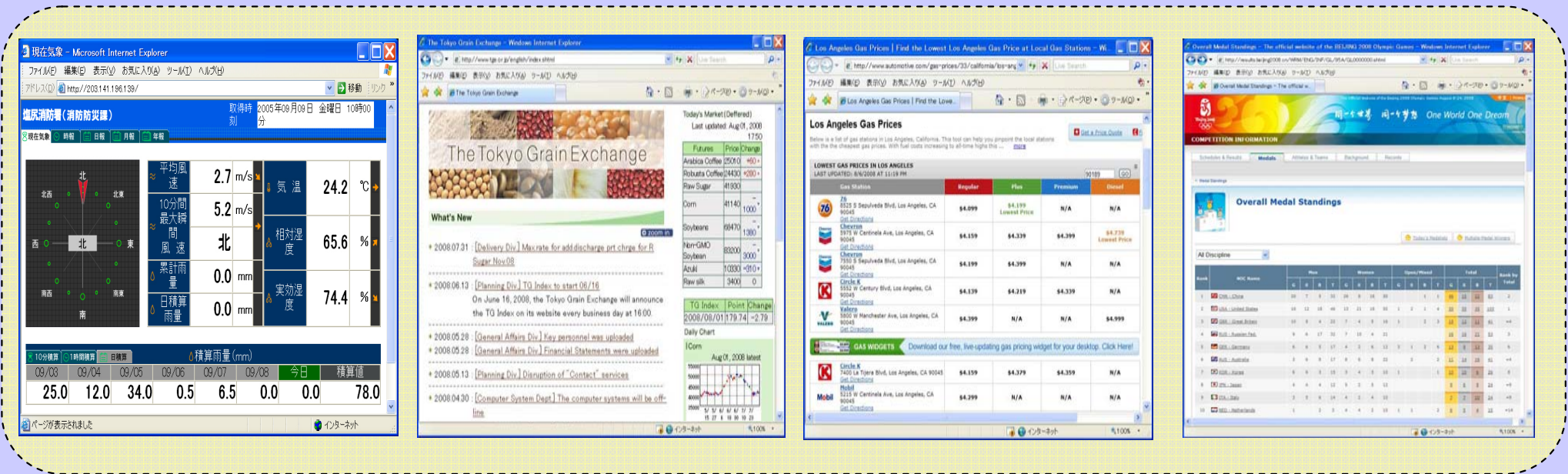


extract useful information from raw data



➡ Adequate Profiles with variable & operation content makes it possible

As a middleware for Web content data

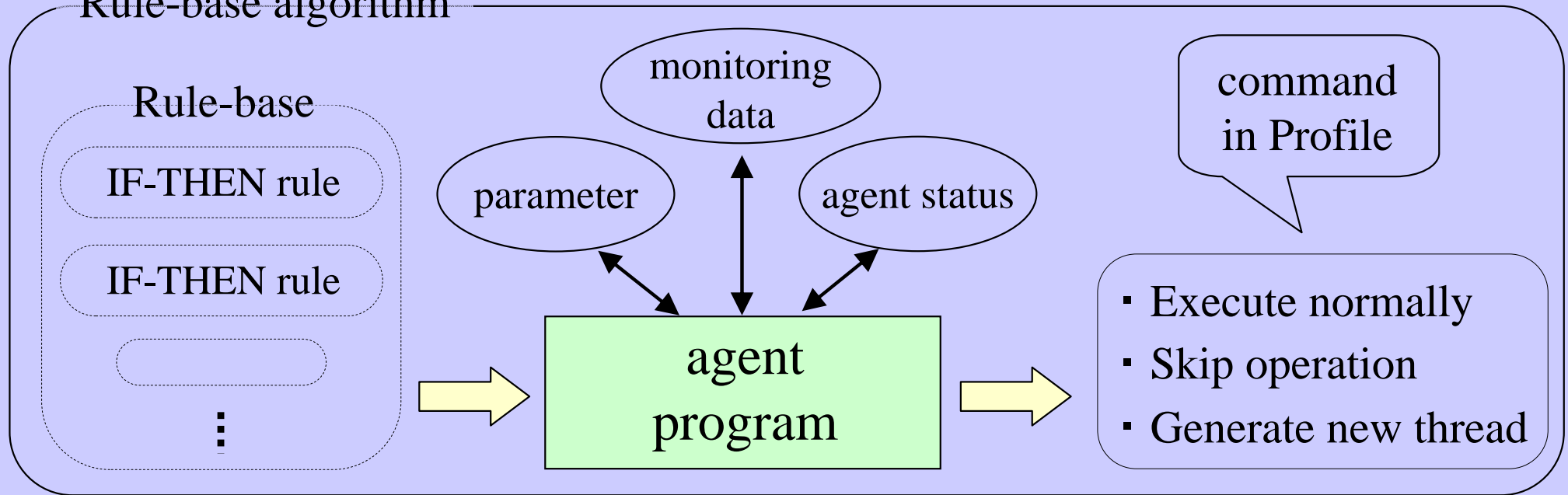


Many Web contents become available on Agent-based application

Control function of Agent System

Autonomous control according to situation

Rule-based algorithm



```

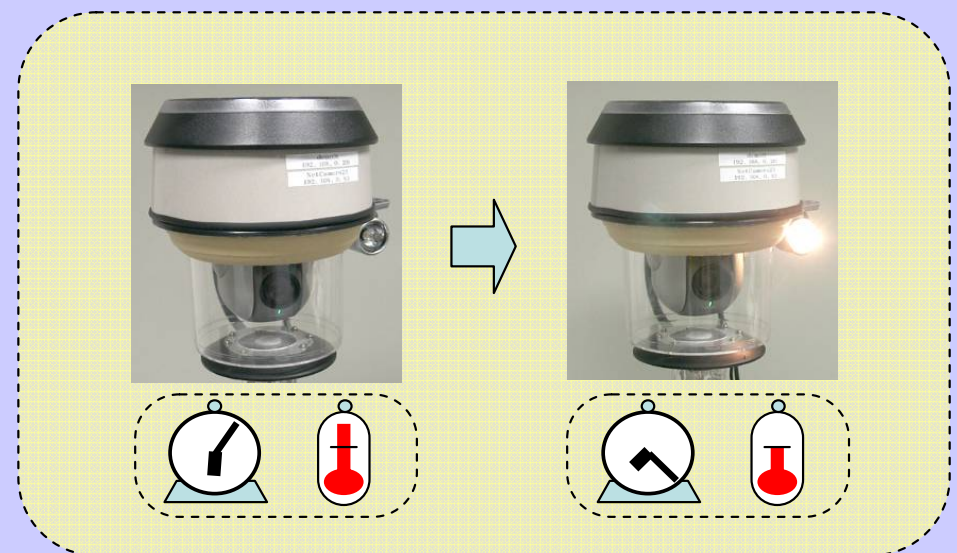
<!-- 17:15~08:45 --> Light (SW1) On -->
- <Action>
- <If>
  <Node>Time</Node>
  <Operator>gt</Operator>
  <Value>1900</Value>
</If>
- <If>
  <Node>Temp</Node>
  <Operator>lt</Operator>
  <Value>4.0</Value>
  <Relation>and</Relation>
</If>
<IP>192.168.0.200</IP>
<Command>Access</Command>
<Format>/control.cgi?SW1=On</Format>
</Action>
  
```

if (Time > 19:00)

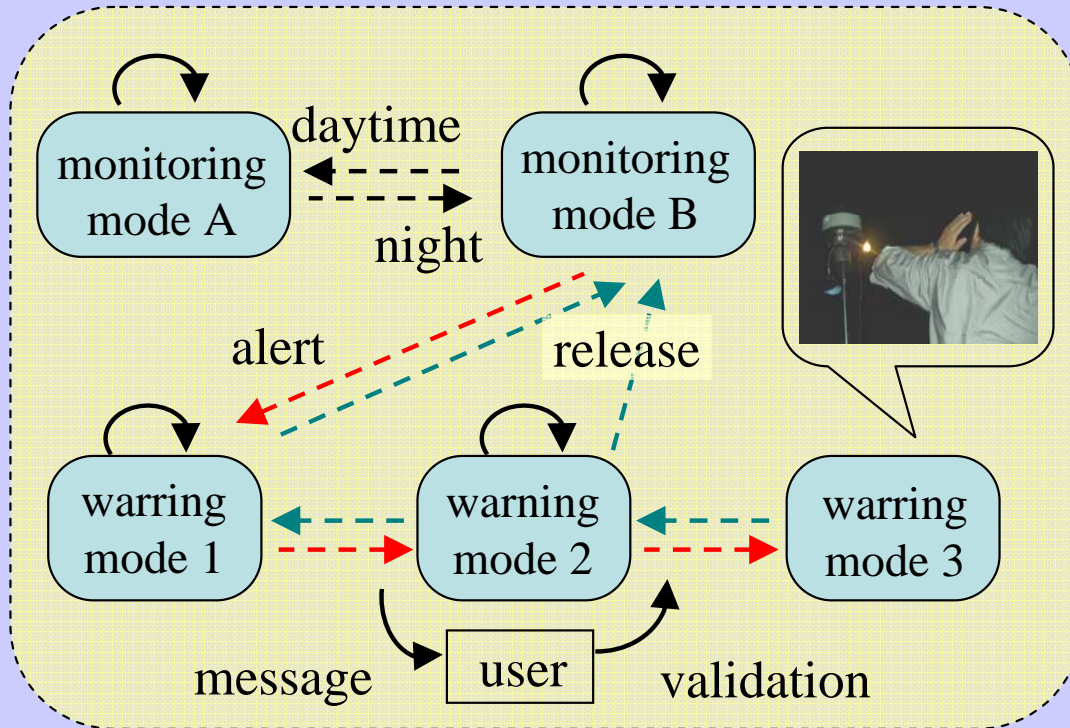
and

if (Temp < 4.0°C)

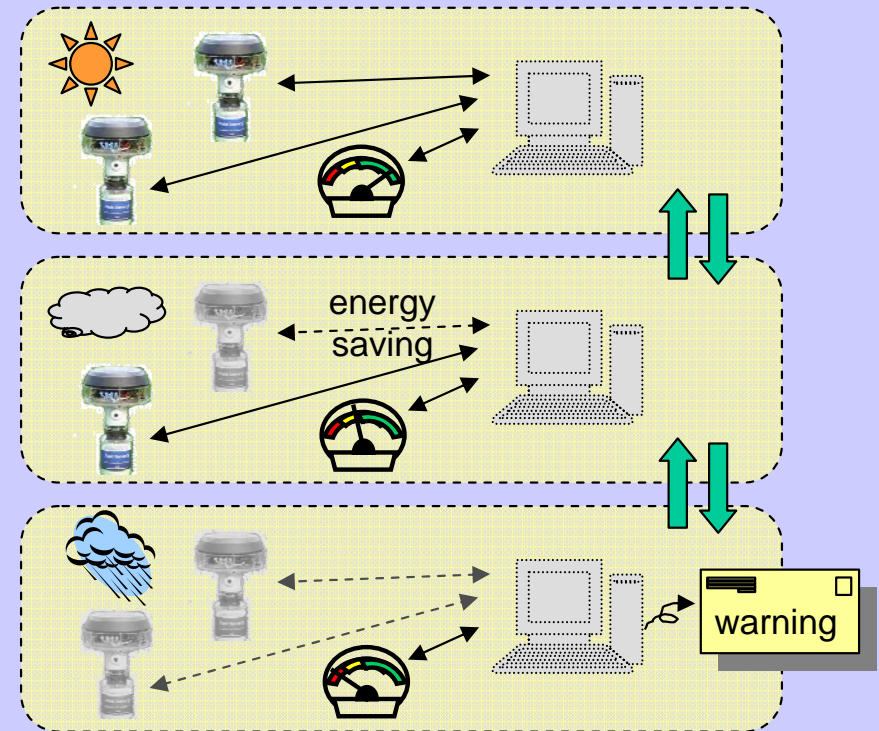
Switch ON



Applications by using Rule-base function



monitoring & surveillance system with gradual approach based on sensor & image data



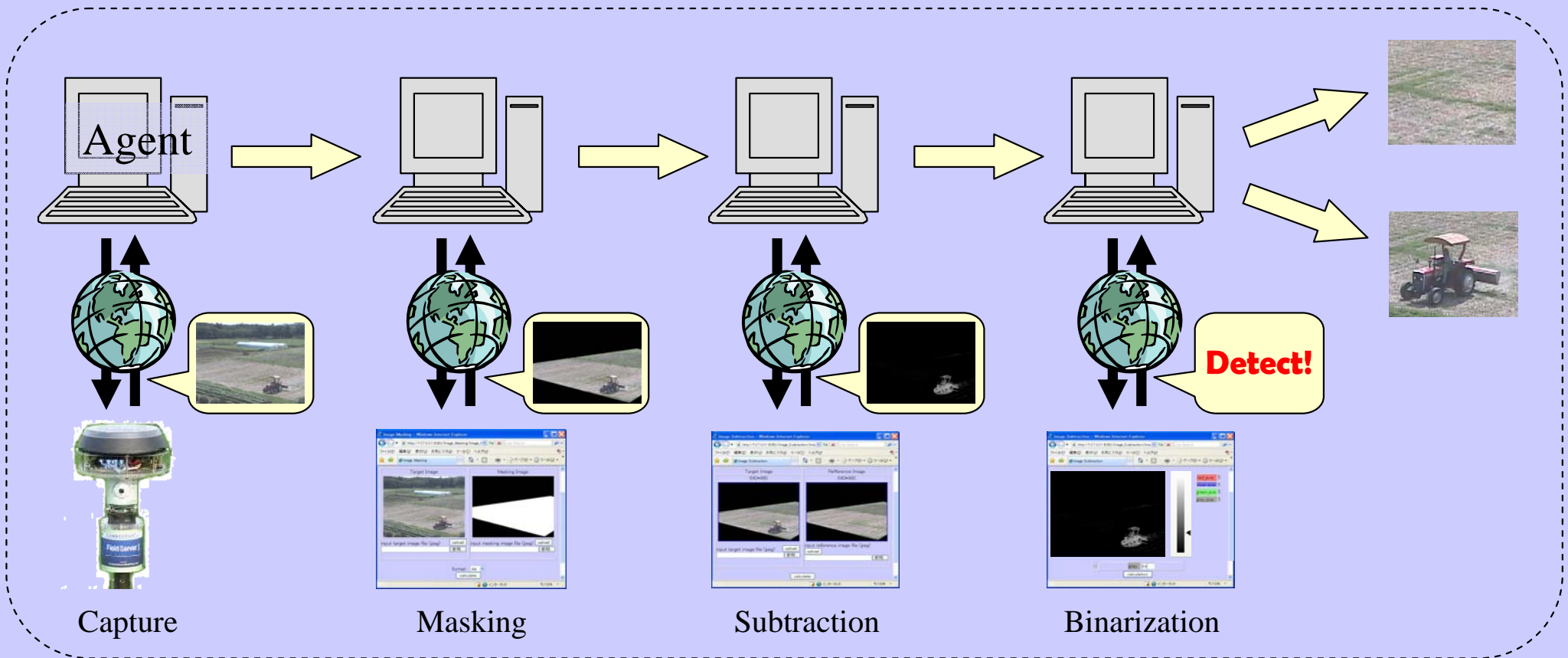
priority control of running device & access interval based on battery level

A lot of IF-THEN rules act as an autonomous decision function

➔ Agent System meets with complicated & various requests

Extended function of Agent System

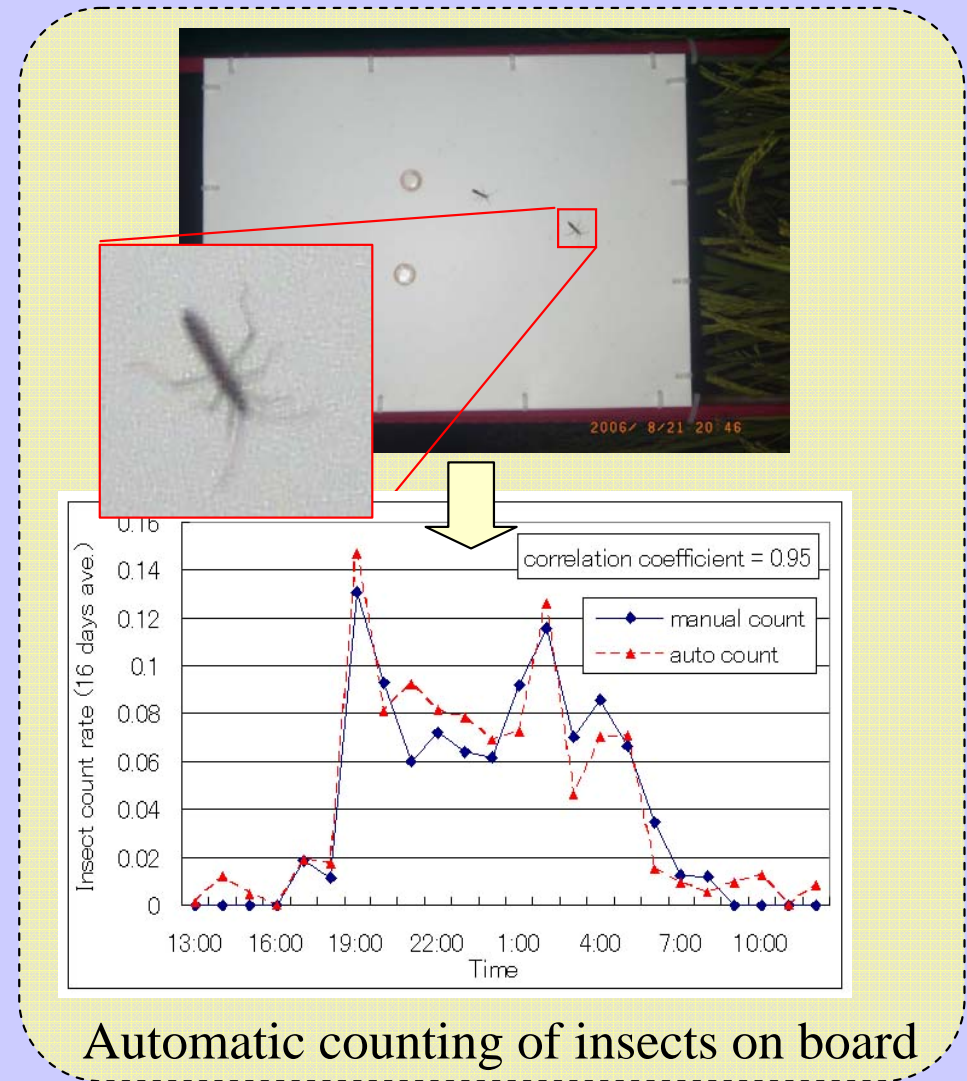
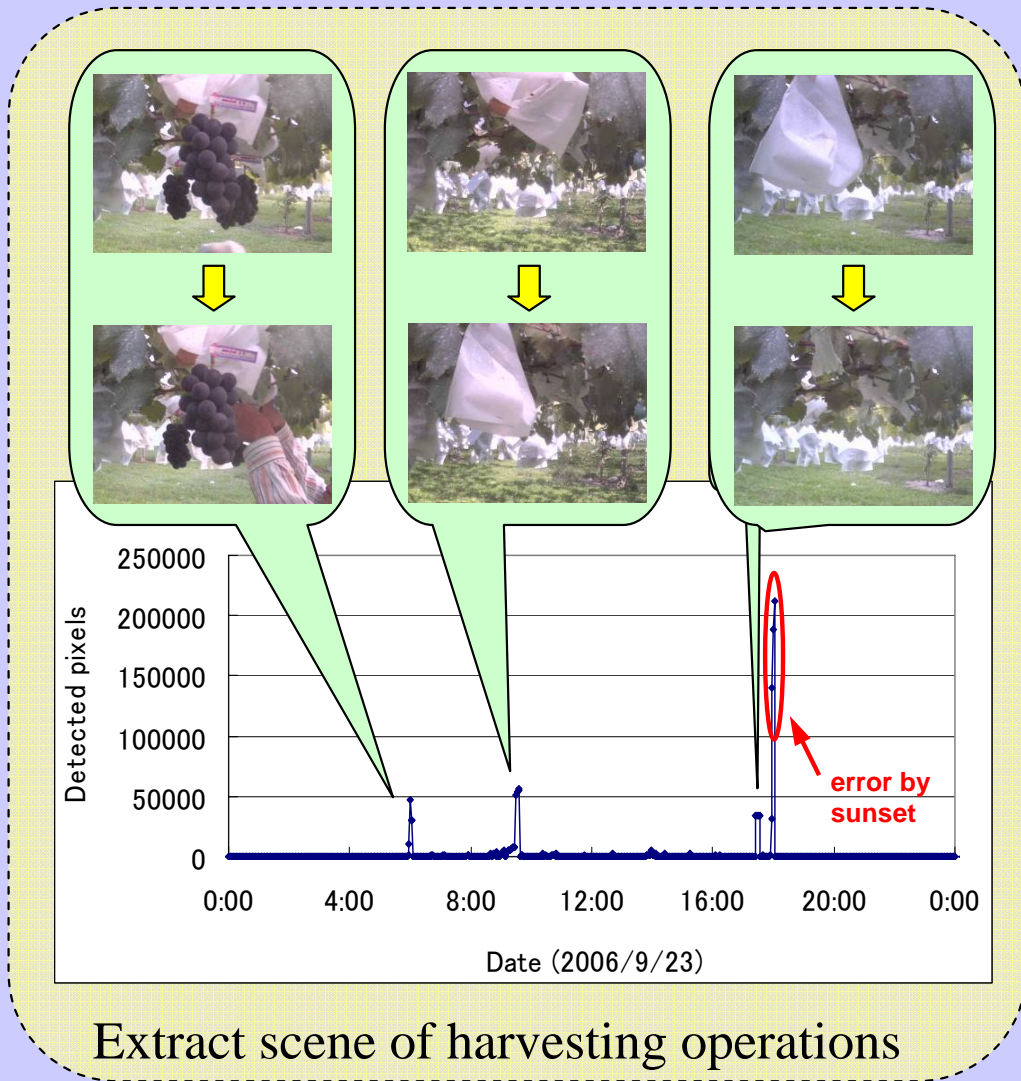
Data processing using Web application



- Agent System can access all types of Web-based modules seamlessly
- We prepare useful Web applications which analyze input data

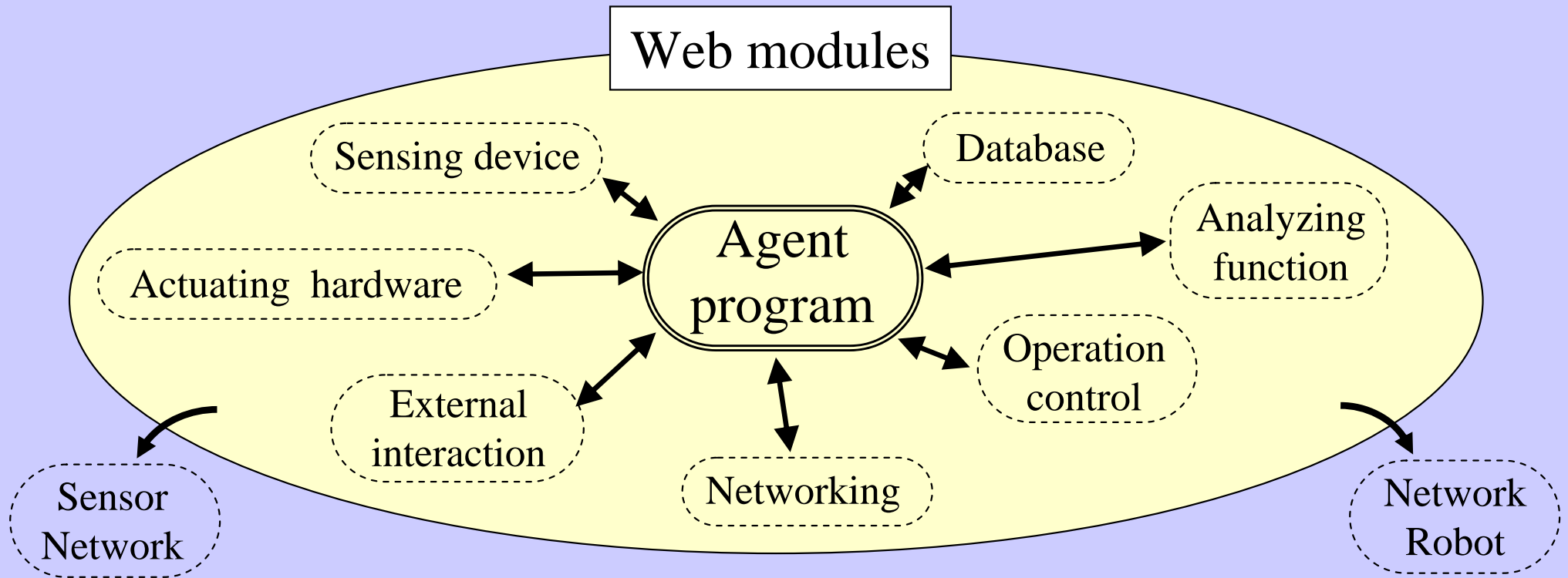
➔ It can realize complicated & versatile data processing in real-time

Experiments of image processing



It can adapt many applications only by changing Web application

As a cornerstone in distributed system



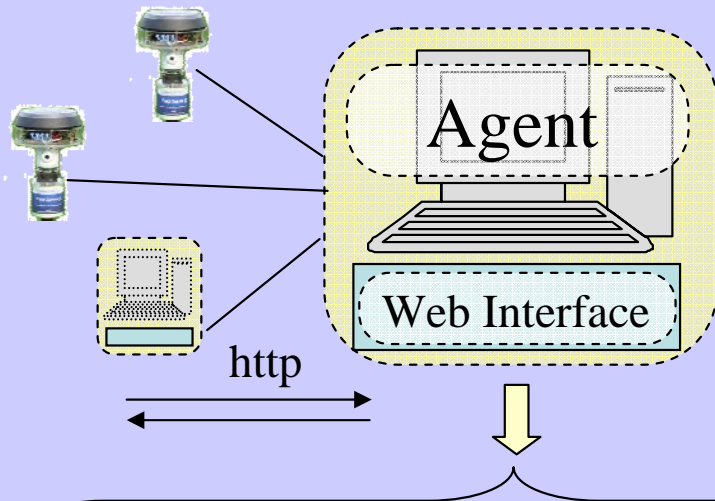
- Construct various system easily by combining necessary units
- Provide expansible architecture and sharable modules
- Control other Agent System as a Web sensor node



Agent-based Sensor Network, Distributed Module Robot

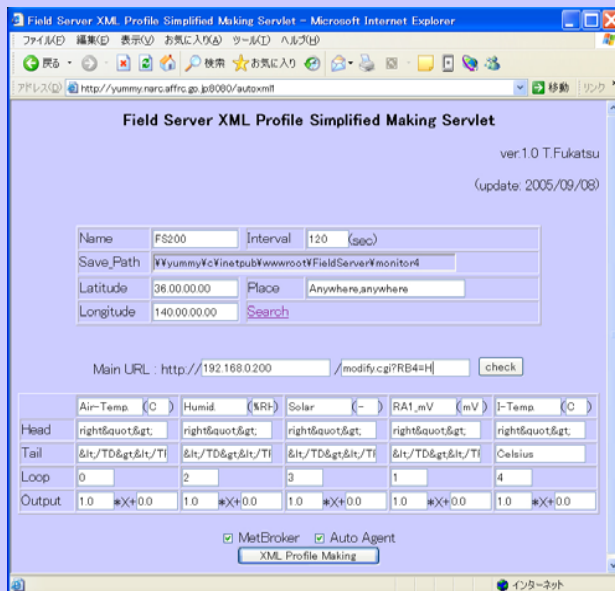
Distributed management of Agent System

Web Interface of Managing Agent System

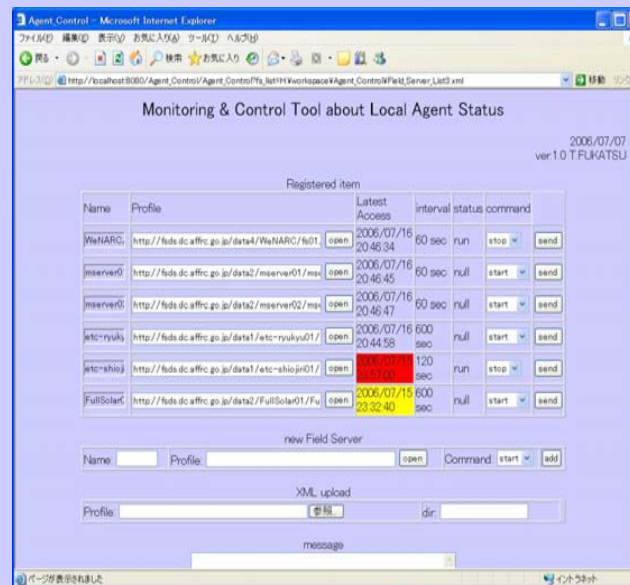


- Agent System can be operated via the Web
- It can control other Agent just as a node

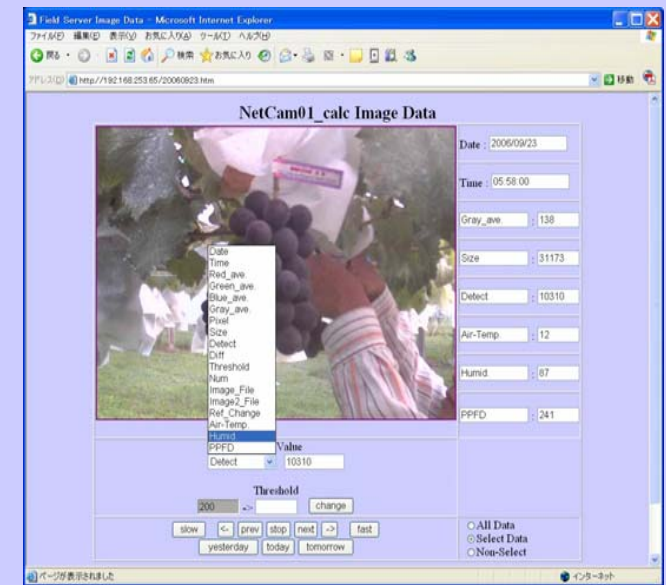
➔ A highly scalable & robust system



Profile Creation



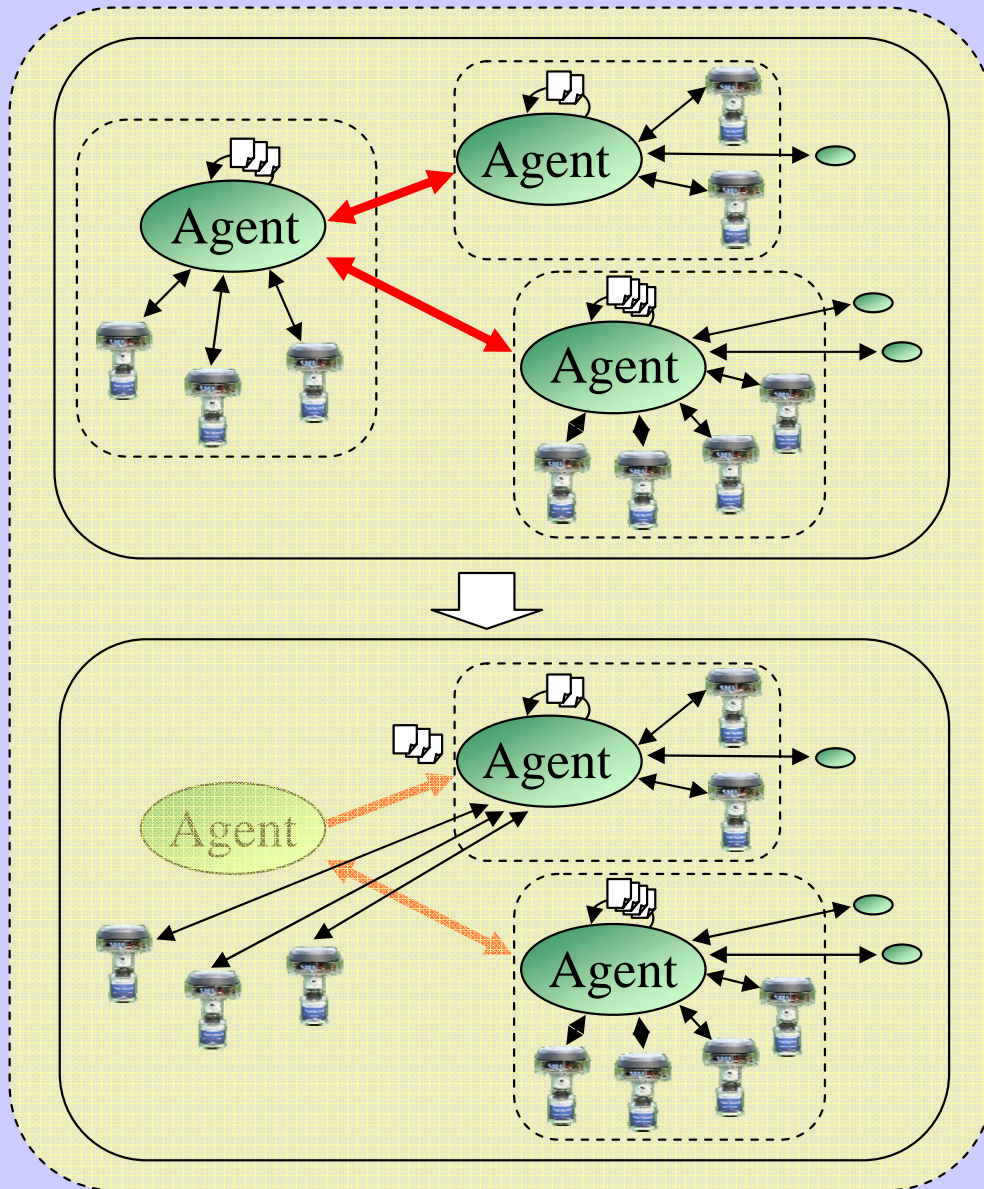
Thread Management



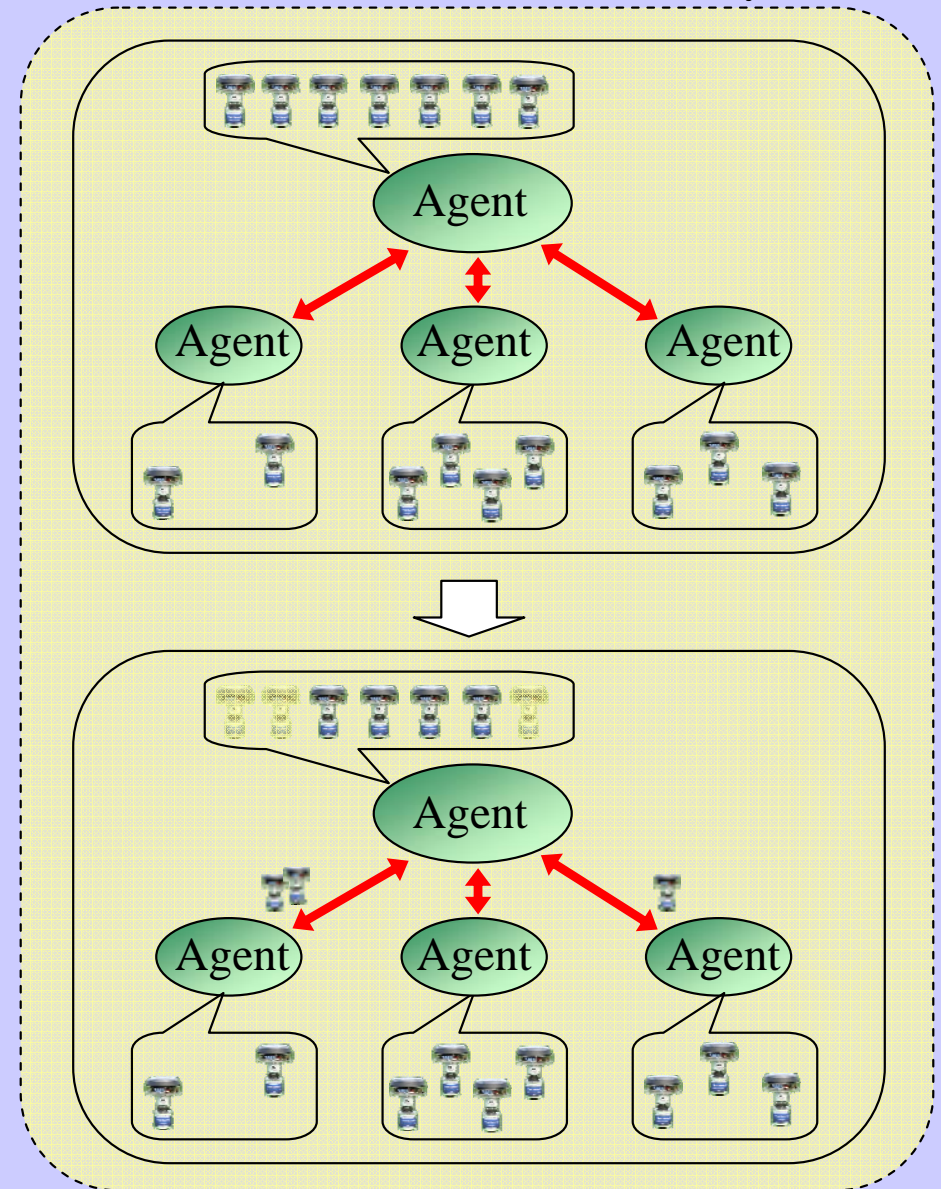
Data Handling

Coordination with Multi Agent System

Backup coordination for robust system

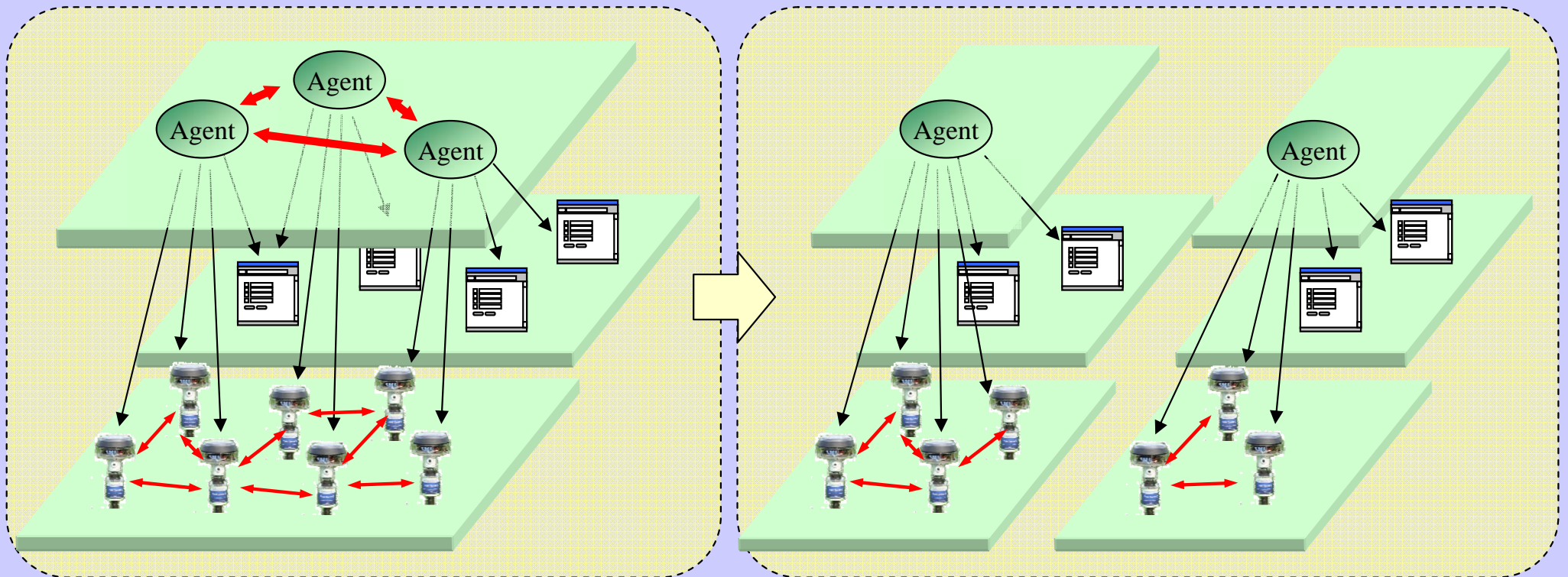


Task distribution for scalable system



As a multi-tier redundancy system

- Agent-based Sensor Network has a multi-tier architecture
- Each tier which functions independently connects organically



- handle various nodes dynamically by each agent with avoiding its collision
- restructure its system with accessible nodes depending on network space

Challenges for Future of Agent System

Discussion & Future Work

For developing the system more conveniently

- easy operating procedure to handle enormous Field Servers
- automatic calibration and active measurement of sensors
- effective management with advanced rule-based algorithms

As an active database system

- dynamical monitoring & analyzing according to user's requests
- provide useful information for users autonomously

Perform more functionable sensor network

- monitor more detail by controlling mobile node & actuator
- support user's action from operation side & information side

Thank you for your attention.