Flexibility on Quality-aware Dynamic Software Product Lines

An Approach Based on Domain Specific Languages

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MSc. Student

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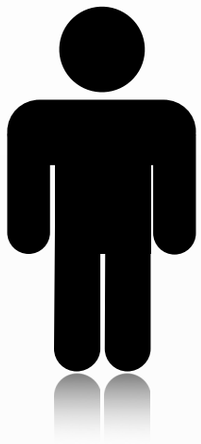
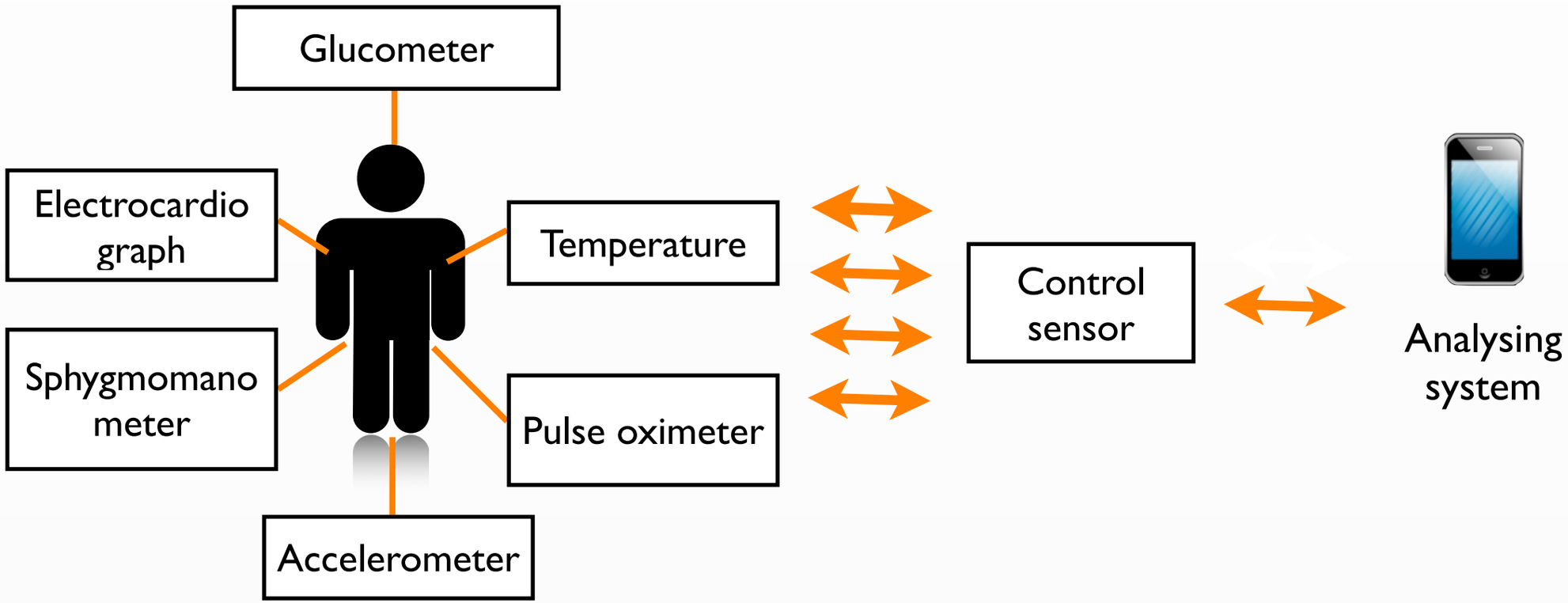
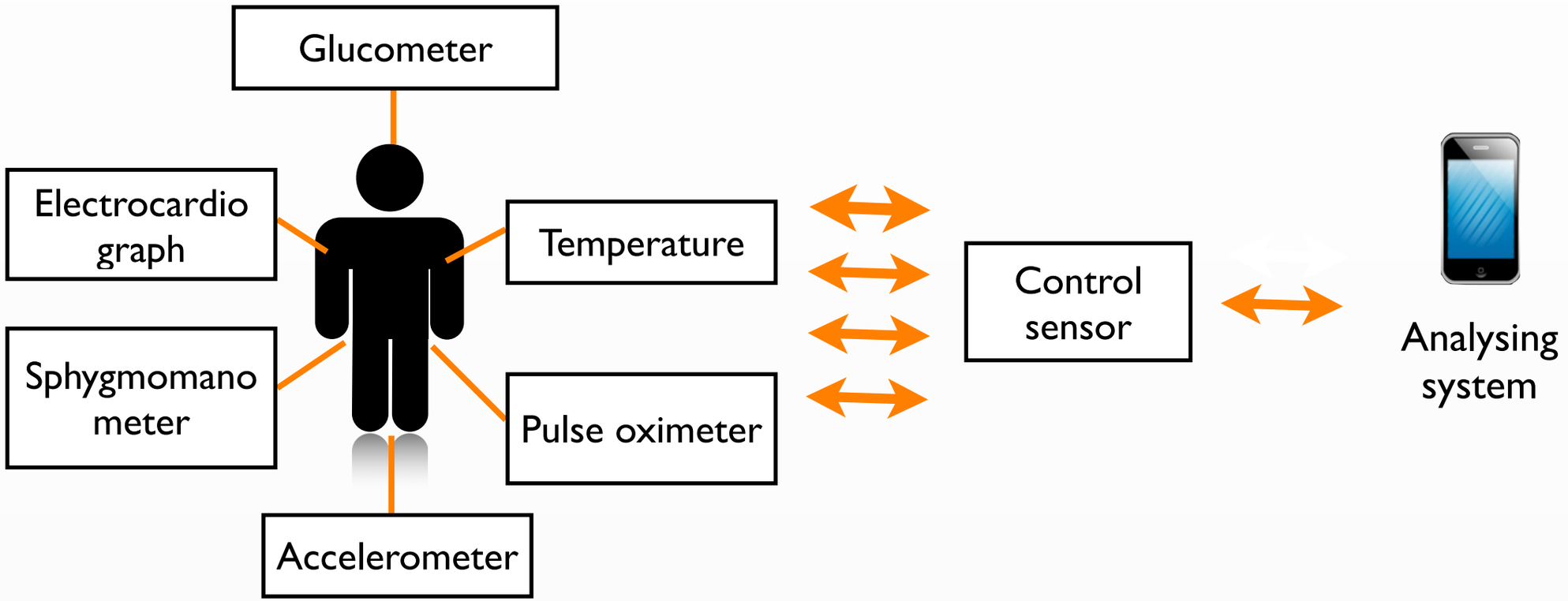
Supervisor




Glucometer
Electrocardio graph
Temperature
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
Analysing system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Accelerometer
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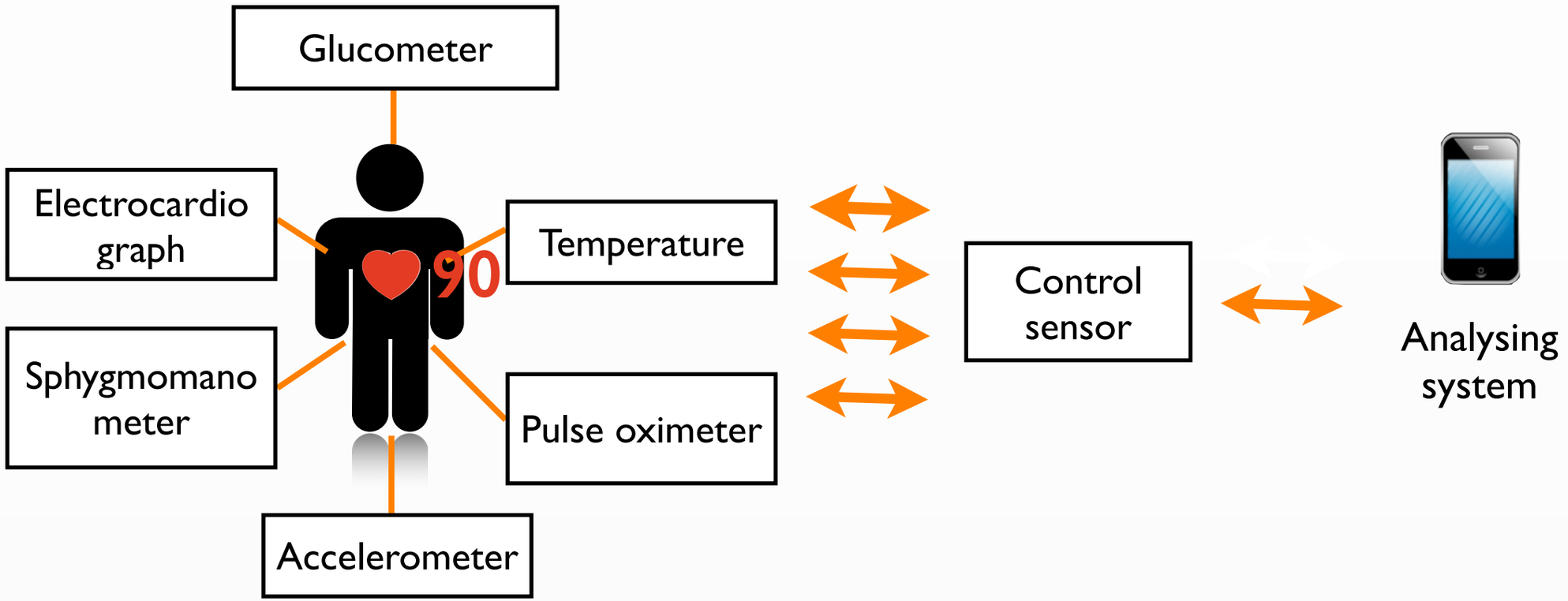
Analysing system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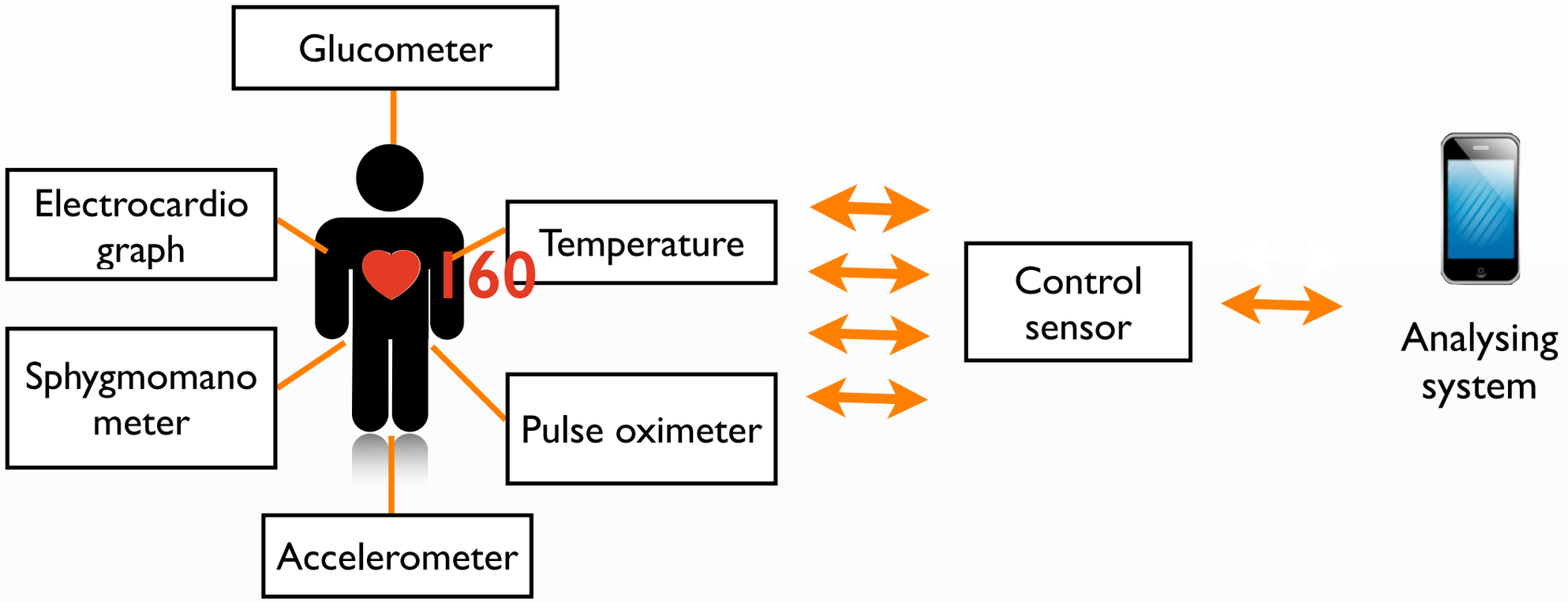
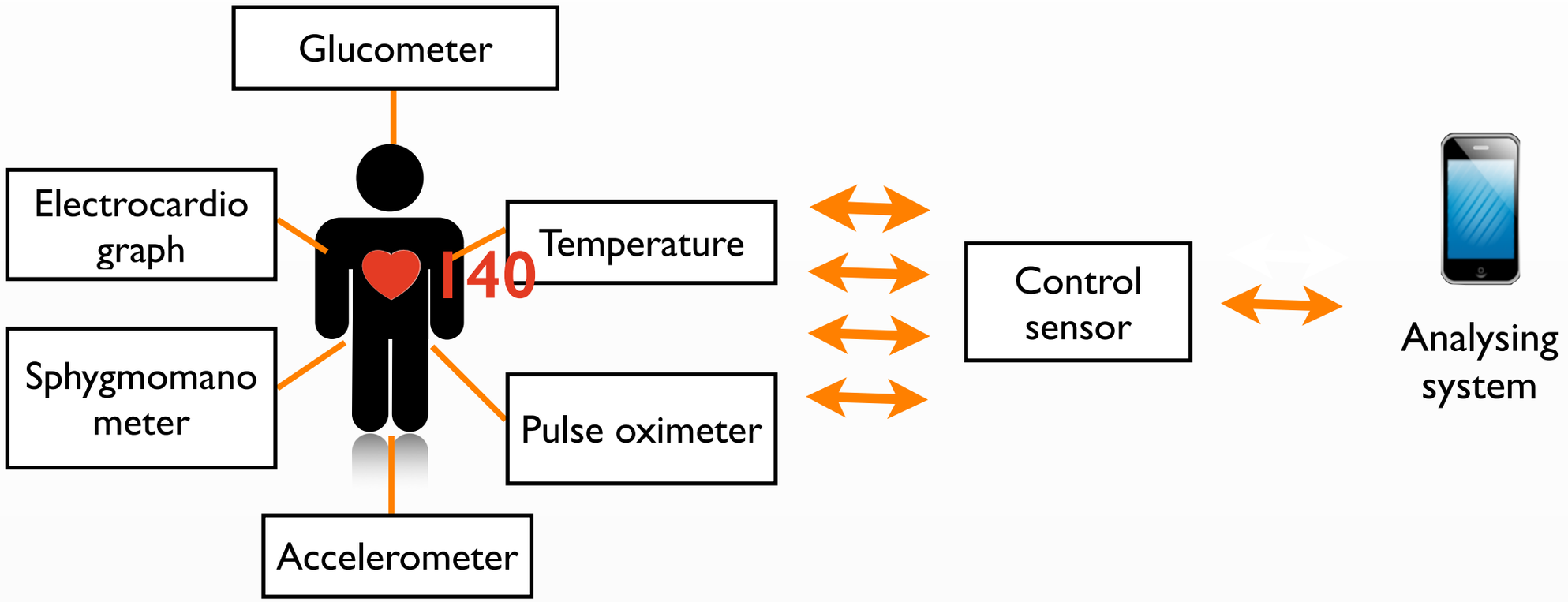
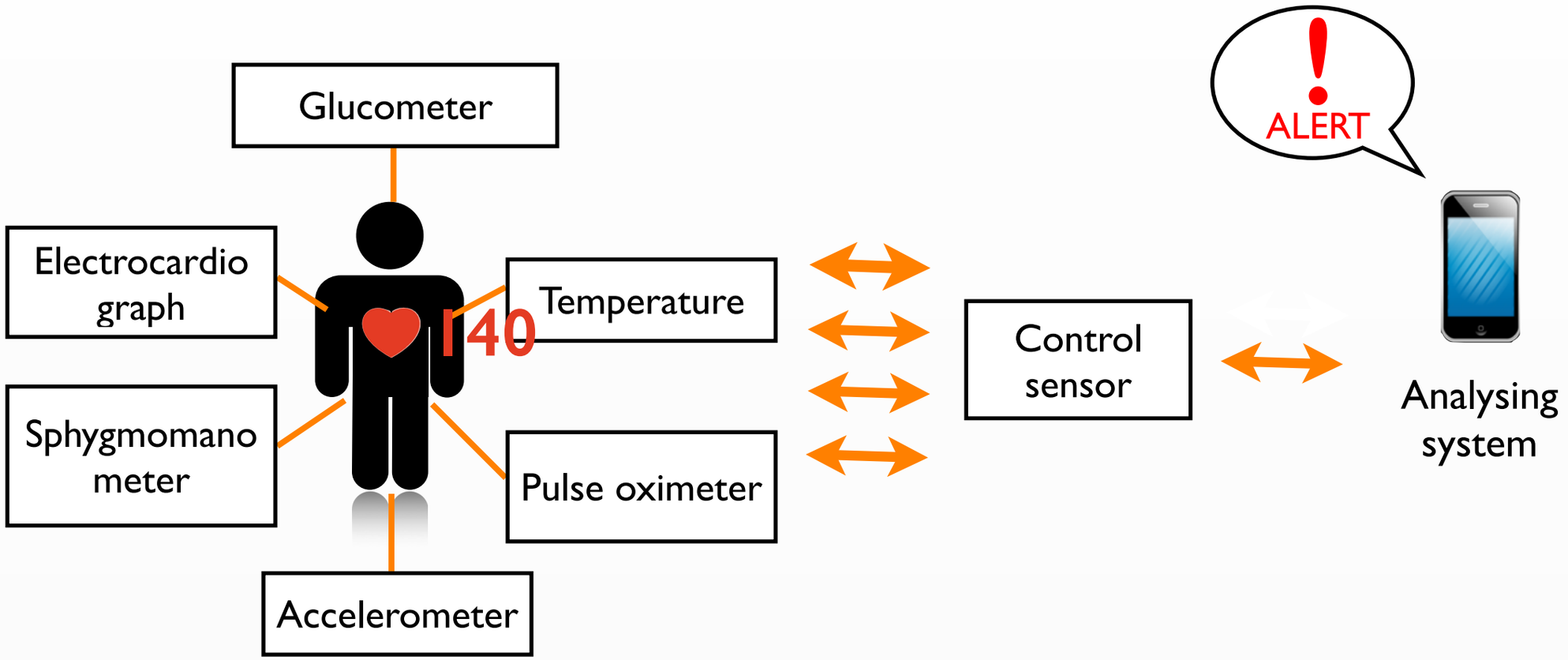
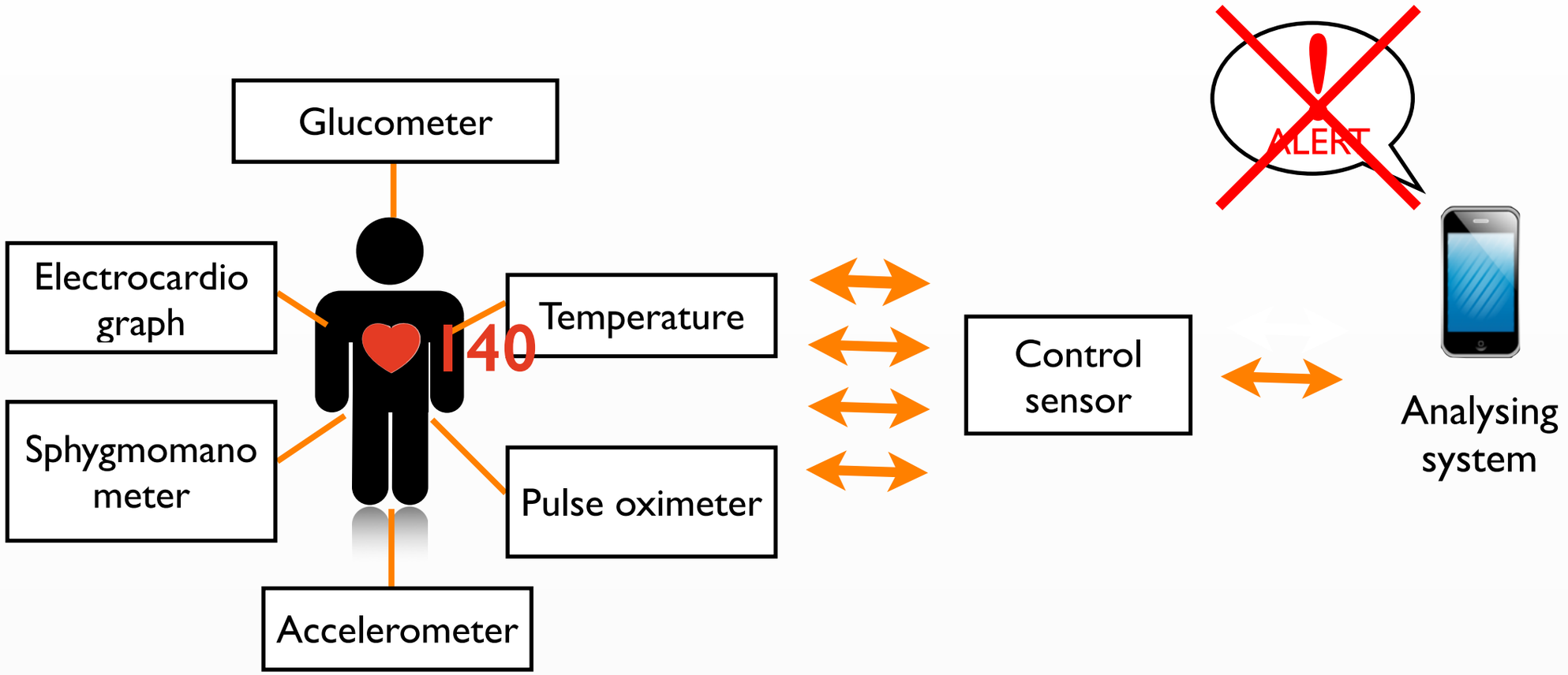
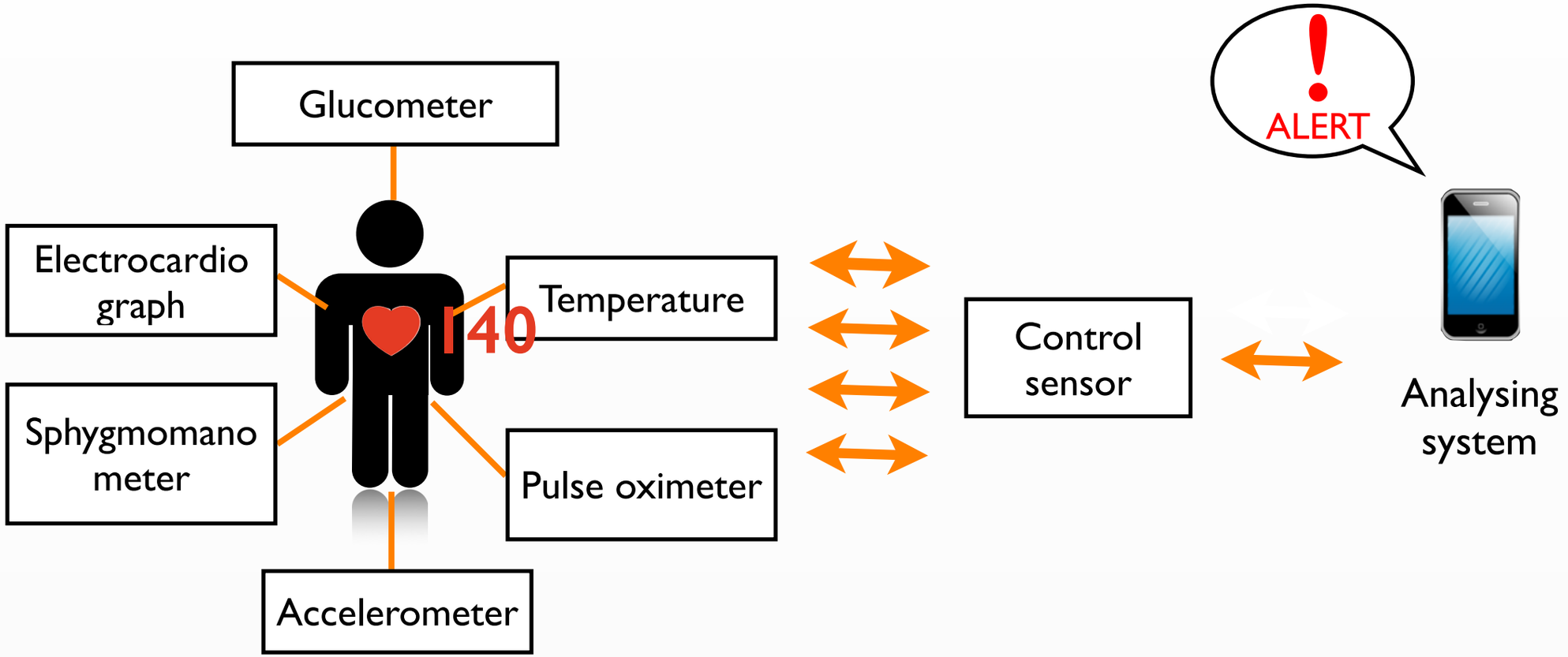
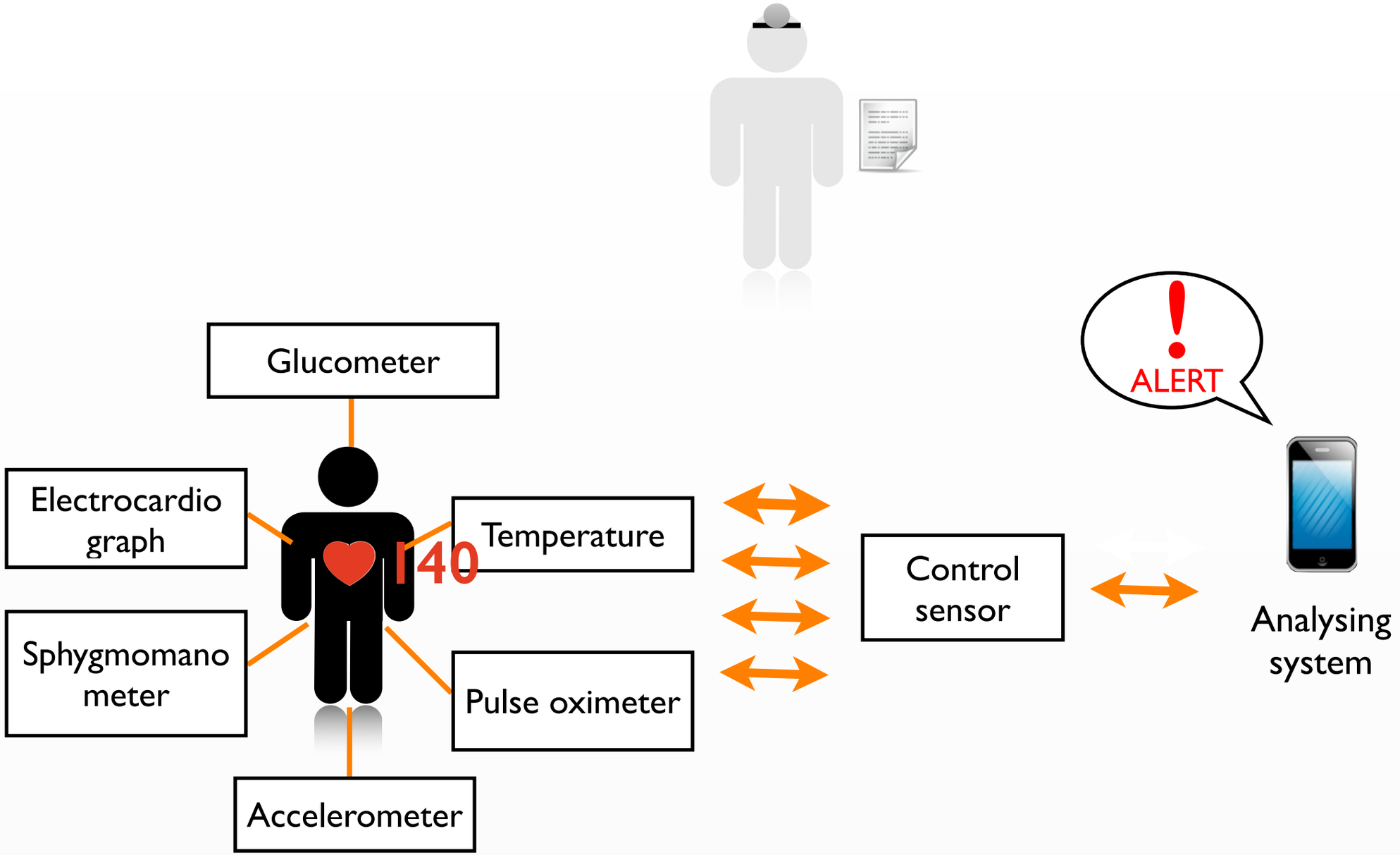

Glucometer
Electrocardio graph
Temperature
160
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
Analysing system

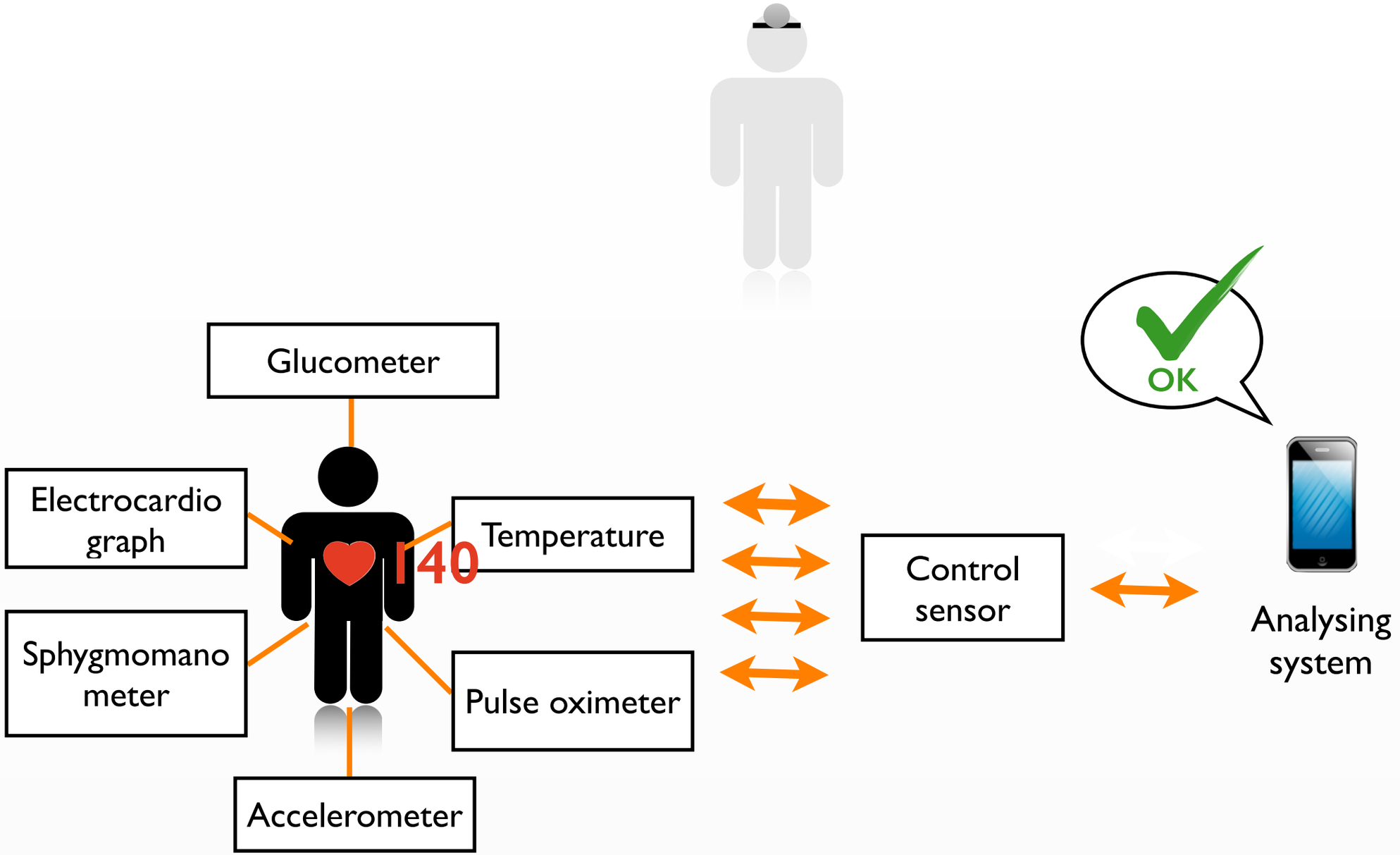

Glucometer
Electrocardio graph
Temperature
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
Analysing system

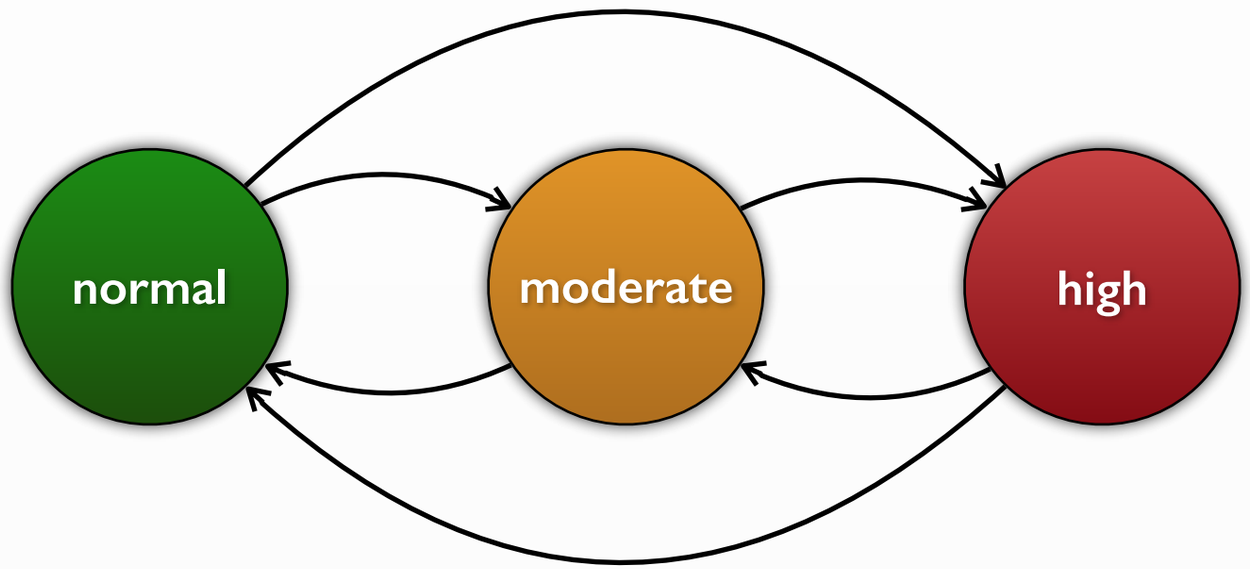

Glucometer
Electrocardio graph
Temperature
40
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
ALERT
Analysing system


Glucometer
Electrocardio graph
Temperature
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
ALERT
Analysing system


Glucometer
Electrocardio graph
Temperature
140
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
ALERT
Analysing system

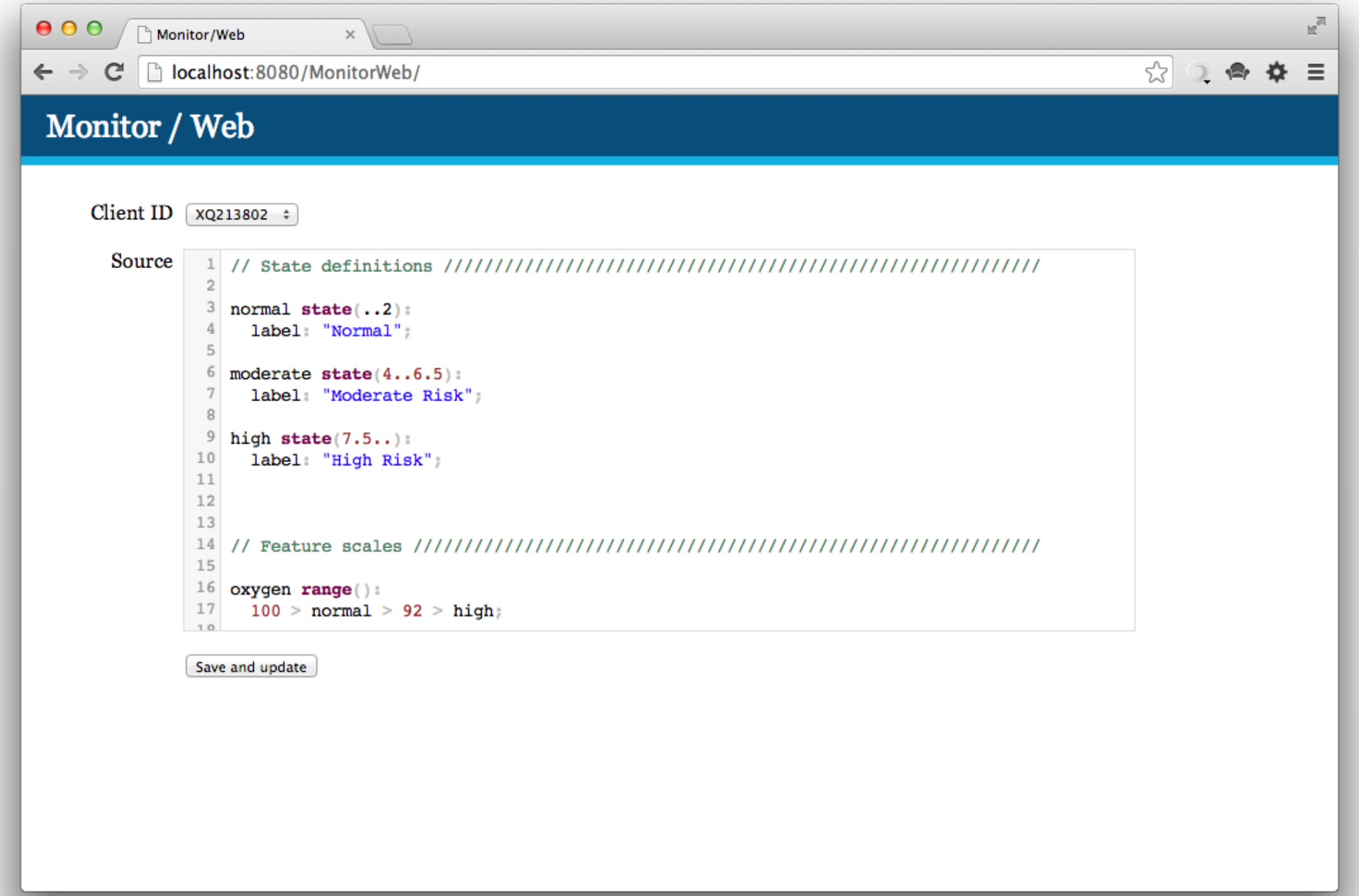

Glucometer
Electrocardio graph
Temperature
140
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
ALERT
Analysing system

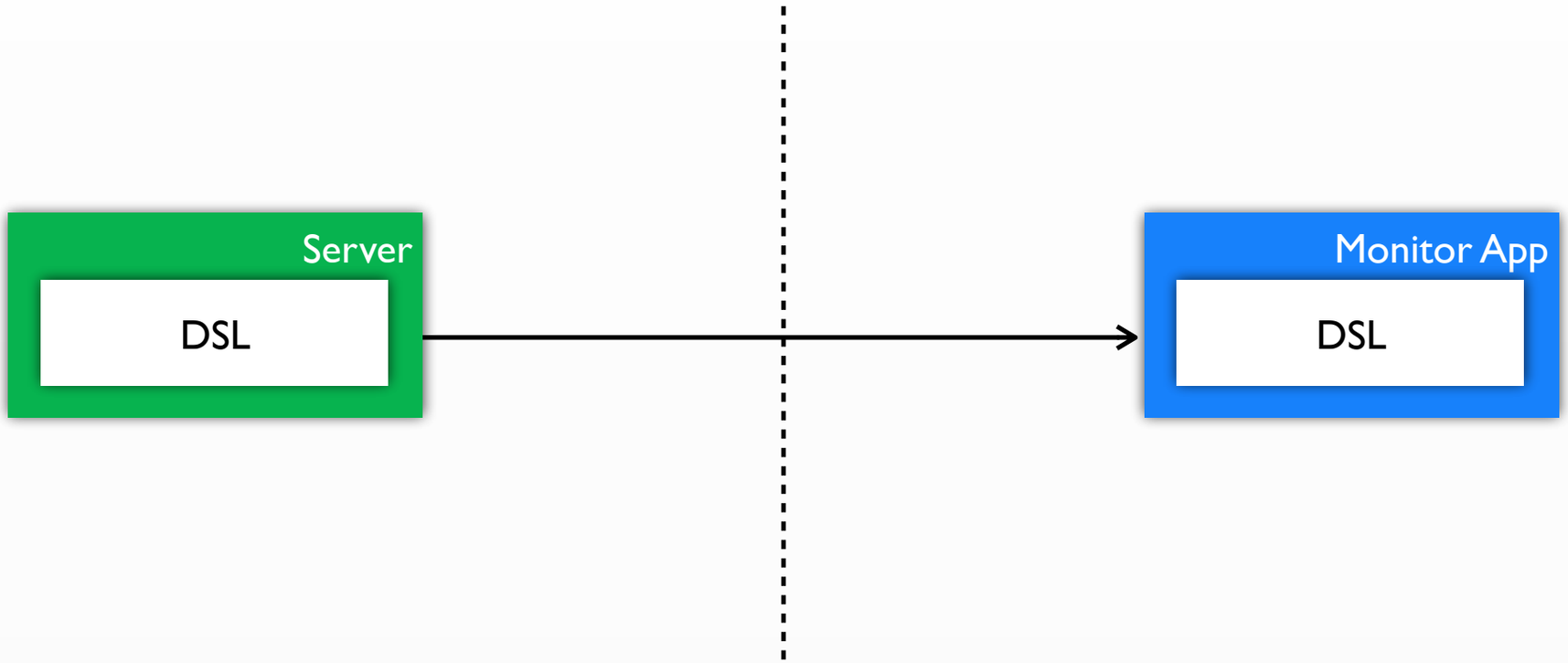

Glucometer
Electrocardio graph
Temperature
140
Sphygmomano meter
Pulse oximeter
Accelerometer
Control sensor
OK
Analysing system

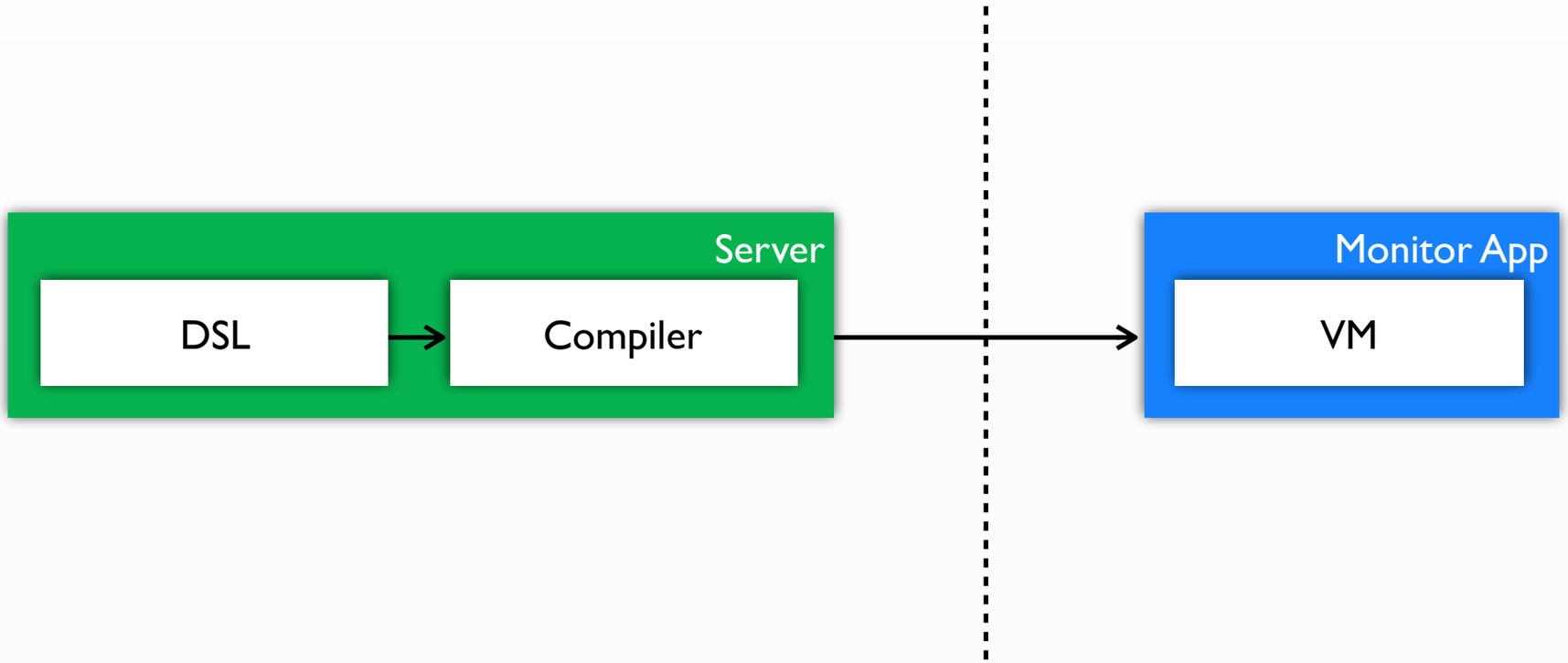

normal
moderate
high

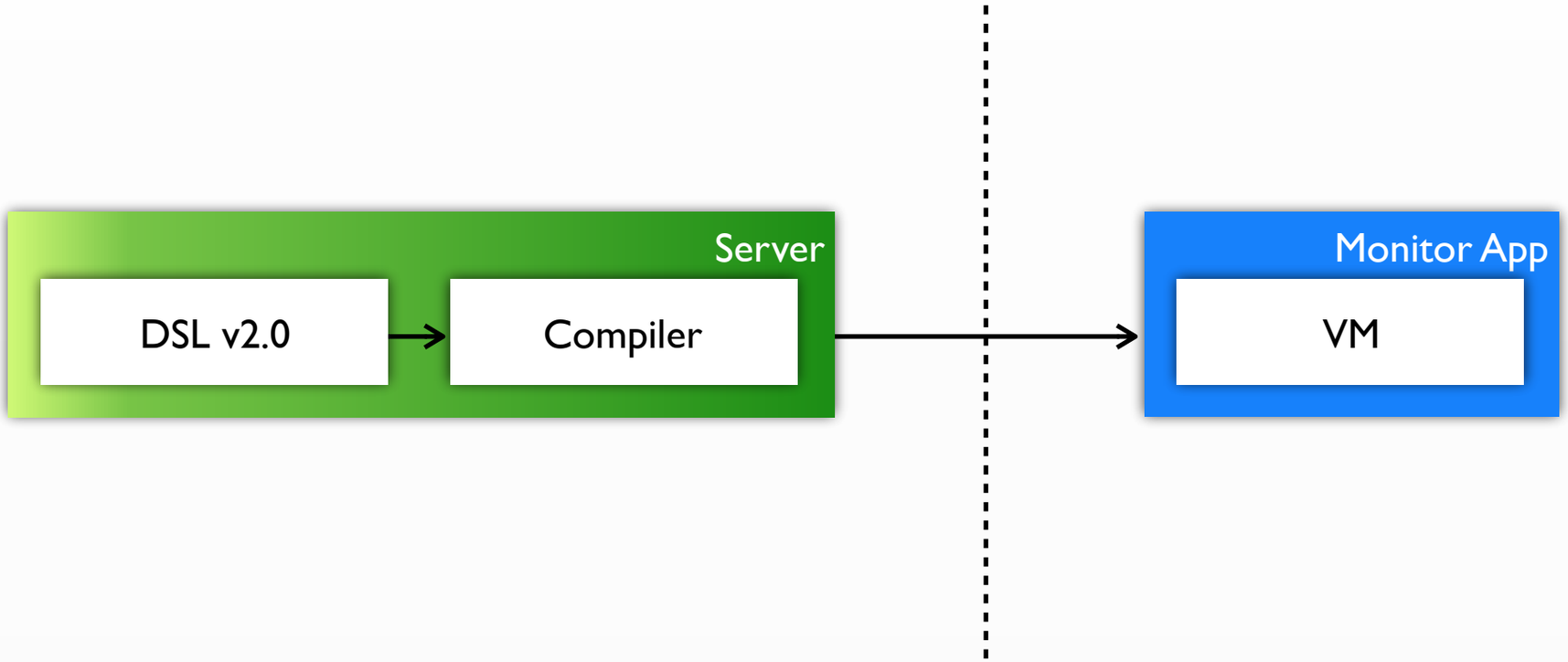
```
// State definitions ////////////////////////////////////////////////////

normal state(..2):
  label: "Normal";

moderate state(4..6.5):
  label: "Moderate Risk";

high state(7.5..):
  label: "High Risk";
```

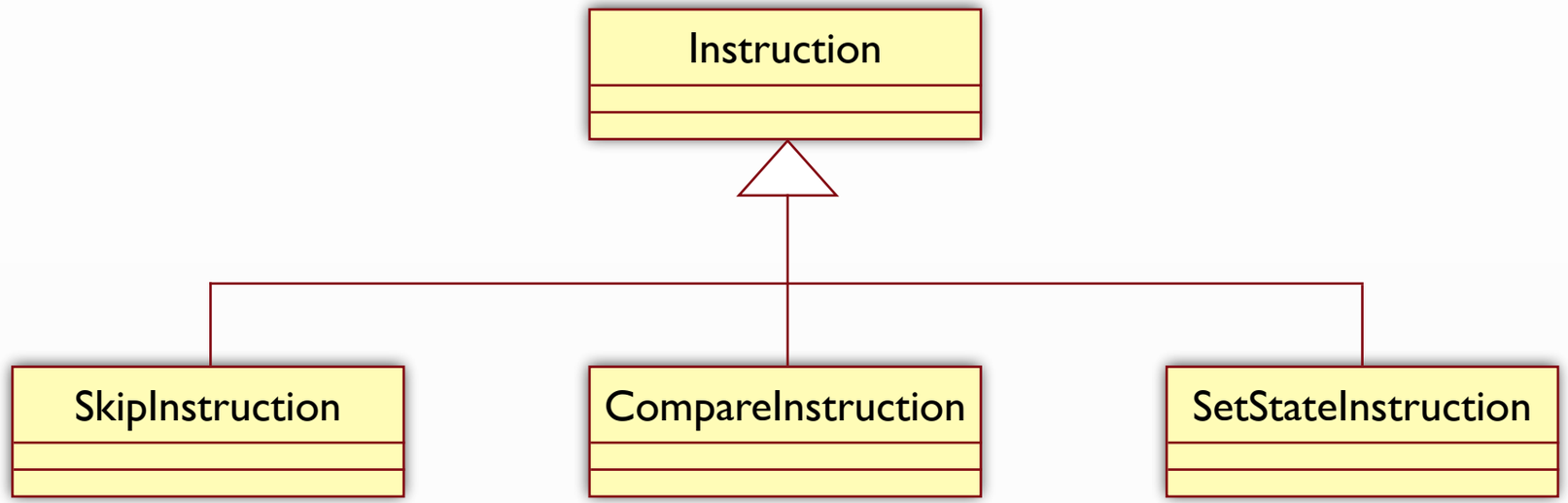
```
// Feature scales ///////////////////////////////////////////////////////

oxygen range():
  100 > normal > 92 > high;

pulse range():
  200 > high > 150 > normal > 50 > high;

temperature range():
  50.0 > high > 38.5 > moderate > 37.5 > normal > 35.0 > moderate > 30.0 > high;
```

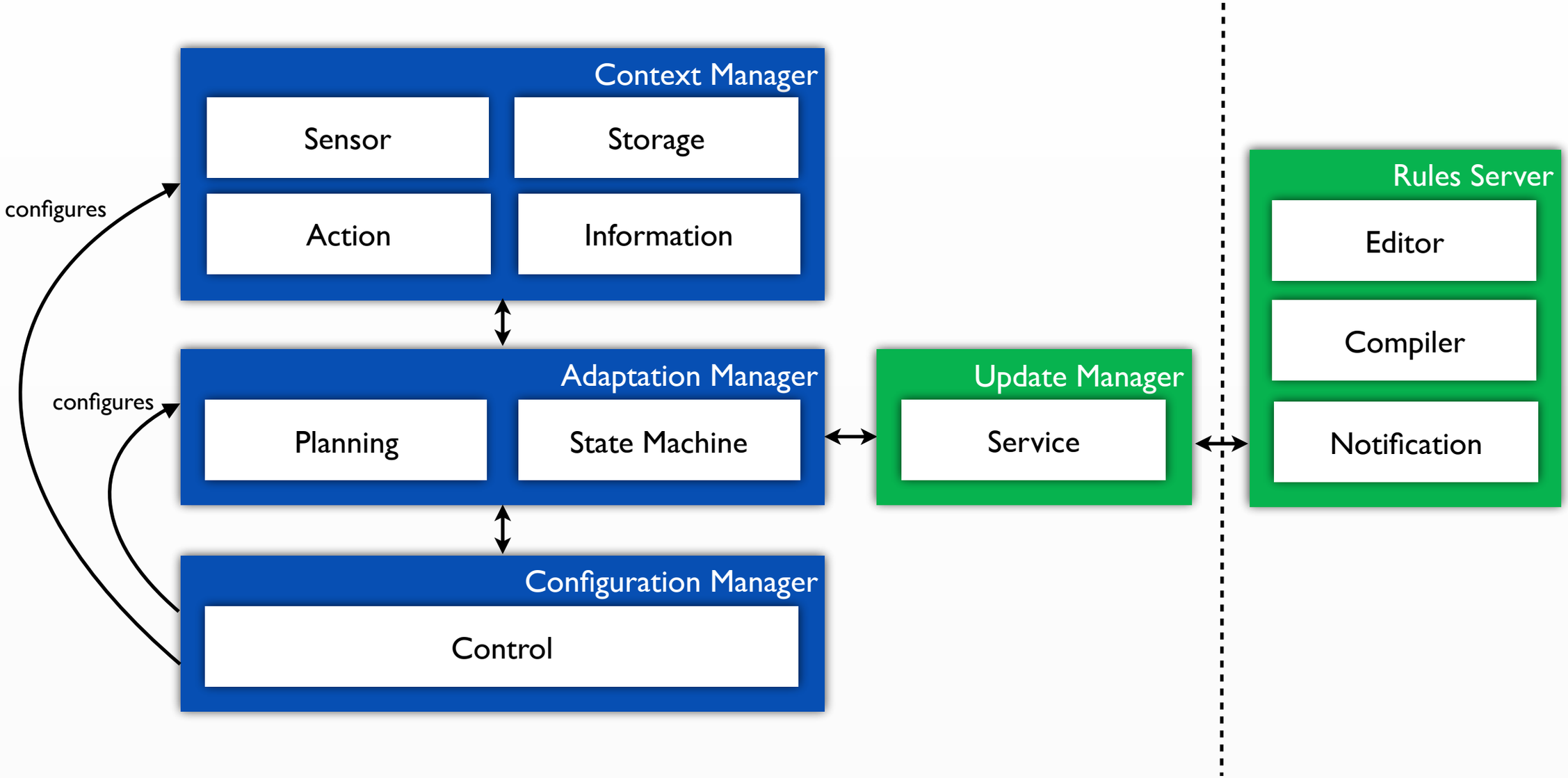

Monitor/Web
localhost:8080/MonitorWeb/
Monitor / Web
Client ID
XQ213802
Source
// State definitions //
normal state(..2):
label: "Normal";
moderate state(4..6.5):
label: "Moderate Risk";
high state(7.5..):
label: "High Risk";
// Feature scales ///
oxygen range():
100 > normal > 92 > high;
Save and update

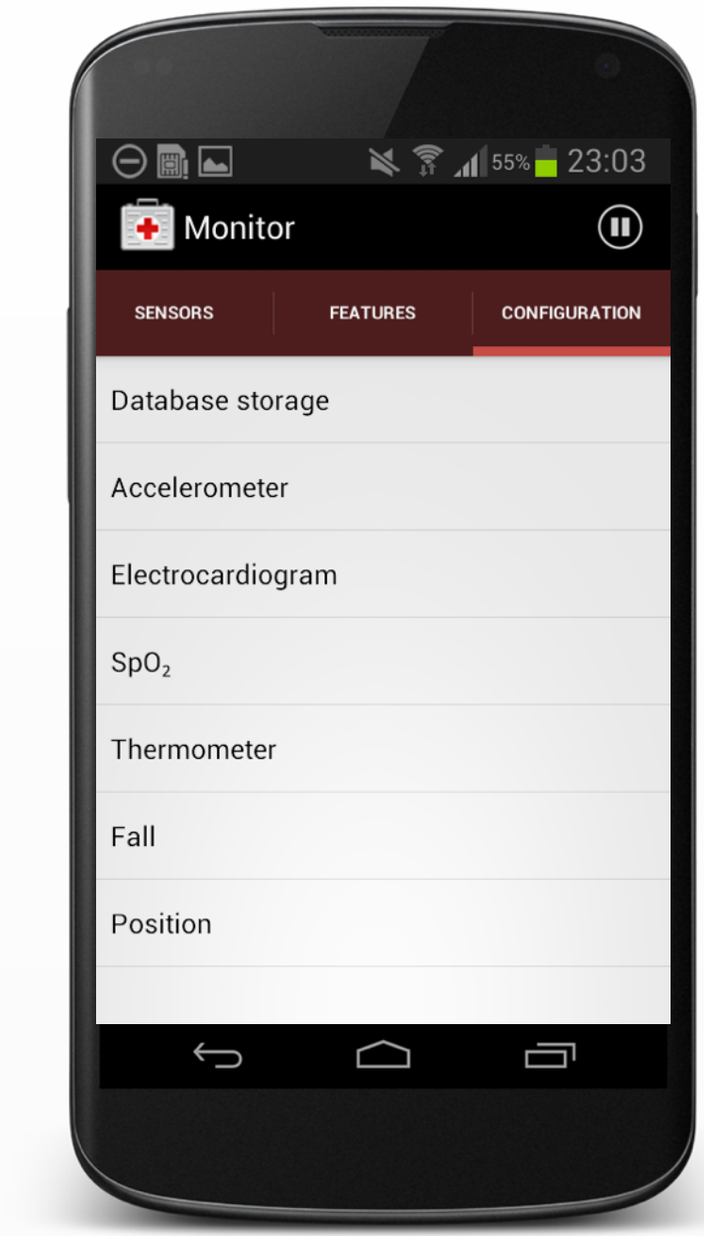

Server
DSL
Monitor App
DSL


Server
DSL
Compiler
Monitor App
VM


Server
DSL v2.0
Compiler
Monitor App
VM


Instruction
SkipInstruction
CompareInstruction
SetStateInstruction


Context Manager
Sensor
Storage
Action
Information
configures
configures
Adaptation Manager
Planning
State Machine
Configuration Manager
Control
Update Manager
Service
Rules Server
Editor
Compiler
Notification



Challenges

- Use of real sensors
  - Sensors capable of being turned on/off
- Adding new sensors on-the-fly
  - New app support
  - Reliability of unforeseen configurations