SMART BRACELETS PROJECT

Alfredo Landi 10586178

Emanuele Diasco 10862705

REPORT

Following the project rules, the first phase to implement is the “Pairing Phase”: at the beginning of the simulation, the first step is to send broadcast messages so that every single mote finds which other mote has its own same key (the random key is composed of 20 digits.); the “sendBroadcastMessage()” function serves this purpose. When each mote has found the other one with the same key, a special message is transmitted (in unicast) to the source device, so the variable special\_code is set to 1. This task is done with the “sendSpecialMessage()” function.

In our simulation, the couples, defined by the TOS\_NODE\_ID, are (1,2) and (3,4), with the odd numbers representing the Parents, while the even ones representing the Childs.

In the “AMSend.sendDone()” function, the operations related to the Pairing Phase are controlled by a mechanism involving the transmission of ACKs, every time a message is sent. When the ACK is received, we allow the program to go to the next step. The “paired” variable is used to control in which step of the “Pairing Phase” are we in: with paired =0, we are still in the Broadcasting step; with paired=1, we are in Special Message step; with paired=2, the motes are successfully coupled and the “Pairing Phase” has ended.

Now we are able to pass to the “Operation Mode”: in this phase the Parent listens on the radio the messages coming from the child. These messages contain the position of the child and the kinematic status. The statuses are mapped as follows: 0-STANDING 1-WALKING 2-RUNNING 3-FALLING. To respect the rules about the probability distribution we use Random.rand16() and then use module-10, while the x and y coordinates are obtained with the Random-rand16() divided by 100, so that we obtain smaller numbers (at most 3 digits number).

Upon the reception of a message containing the FALLING status the program begins the “Alert Mode”: in this mode the Parent sends a FALL ALARM, containing the position of the Child, while, in case the Parent’s bracelet does not receive any message from the Child after one minute from the last received message, a MISSING alarm is sent reporting the last position received. In the “Receive.receive()” function the “ParentMilliTimer “controls this last aspect.

**\*Note**: Due to the congestion on the channel caused by the great number of broadcast messages, it may happen that the running simulation on COOJA results in an infinite loop of an erroneous communication between two motes during the “Pairing Phase”. It’s very rare, but in case it happens, please select the option “reload with new random seed” on COOJA and restart the simulation.

**\*\*Used IOT-Tools**: TINYOS/COOJA/NODE-RED