Machine Learning for IoT - Homework 01

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Exercise 1 - Data Collection, Communication, and Storage

For the aim to collect data, it is more useful implement a MQTT protocol (instead of a REST one), for many reasons: the main one is that it works on publish/subscribe model, so it's an asynchronous type of communication: it removes the dependencies between producer and consumer (we don't need to send a request for *every* collection). This is particularly useful for sampling from sensors, since the communication is based on topics; it follows that it has less complexity. Moreover the message size generated is less as it uses binary format (instead of ASCII like REST protocol), and finally its header size is of 2 bytes (instead of 8). We also used the default *QoS* parameter configuration (which is 0 if omitted) in order to obtain a further lower latency. In the end, when directly compared MQTT vs REST for the same data transfer, MQTT consumes 20% lesser power, so it's faster and slighter, in fact MQTT data transfer can transfer data at a rate 20 to 25 times faster than REST calls.

Exercise 2 - Data Management & Visualization

Method	**Endpoint**	**Description**
GET	/devices	Retrieve the list of MAC addresses of the monitored devices.
GET	/device/{mac_address}	Retrieve battery status information of the device with the specified MAC address in the specified time range.
DELETE	/device/{mac_address}	Delete the time-series associated to the specified MAC address.

- GET */devices*:
  We decide to use the GET operation for this endpoint since we simply want to retrieve and visualize an available resource on our server. In this case the list of MAC addresses.
- GET */device/{mac_address}*:
  A GET operation is used for this request as well. The main reason behind is that we don't want to update or create any resource, but only have a visualization of the data. Furthermore, the length of the data sent to the server is less than 2048 characters, and ASCII encoded. In addition, data sent are not security sensible. For the reasons above, the most appropriate method is GET rather than POST.
- DELETE */device/{mac_address}*:
  Eventually, for the last endpoint we opted for a DELETE operation because we are asked to delete the time-series associated to the specified MAC address (passed as query parameter as well).