

Report for Vietnamese students

LoRaWAN :

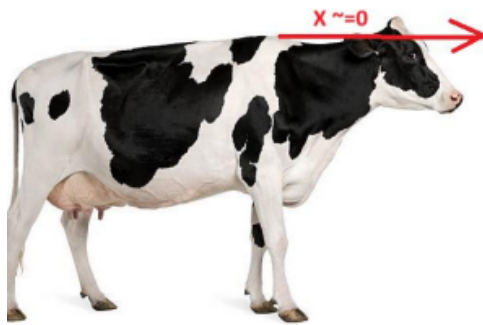
LoRaWAN is a network protocol allowing data exchange over a long distance, provided that the data is of low weight. The use of LoRaWAN in this project is therefore interesting because we only need to send data from the accelerometer to be able to analyze the behavior of the cow.

The LoRaWAN protocol requires 3 entities:

- A data emitting entity, in our case it is the UCA Board 21 card, it is the one which will transmit the data on the LoRaWAN network.
- A gateway, these are antennas which will capture the various data present on the LoRaWAN network. In Danang City, there are 15 gateways.
- A server, in our case Chirpstack capable of retrieving the data sent, storing it and making it available via an API.

As stated previously, our data transmitter card is the UCA Board 21 card, for which you can find more specifications in detail by following this link: <https://github.com/FabienFerrero/UCA21>. To this card, we connected an MPU6050 accelerometer (<https://nshopvn.com/product/cam-bien-gia-toc-gy-521-6dof-imu-mpu6050/>) capable of detecting the movements of the cow according to three X, Y, Z axes. The X value determines whether the cow is eating or not, while the Y value determines whether the cow is moving or not.

Once this various data has been retrieved, it is sent to the DNIIT ChirpStack server to be stored there.



Use of data:

Once the data has arrived and stored on the ChirpStack servers, it is possible to retrieve it via an API. If you don't know what an API is, imagine a restaurant:

- The restaurant is the server on which the data is present
- The API corresponding to the employees who bring you the food (data)
- The clients correspond to different applications which will request this data in order to be able to process it subsequently

In our case, we, the clients, are represented via a Python Script which will request the latest sent to chirpstack every minute. From this data, we will deduce:

- Cow behavior
- Its approximate GPS position based on the intensity of the RSSI signal



RSSI (Received Signal Strength Indicator) is a measurement of the power level that a receiving device perceives from a signal, typically in wireless communication systems. It represents how strong or weak the signal is when it reaches the receiver's antenna. Thanks to this signal, we can triangulate the GPS position of the cow and thus try to estimate its GPS position.

This data will then be made available to Grafana which is free open-source software via which data can be viewed in different forms.

