

CENTRO DE ASTROFÍSICA Y TECNOLOGÍAS AFINES

# GRADIAN

Grain Recognition and Analysis Device with InstAnt Notification

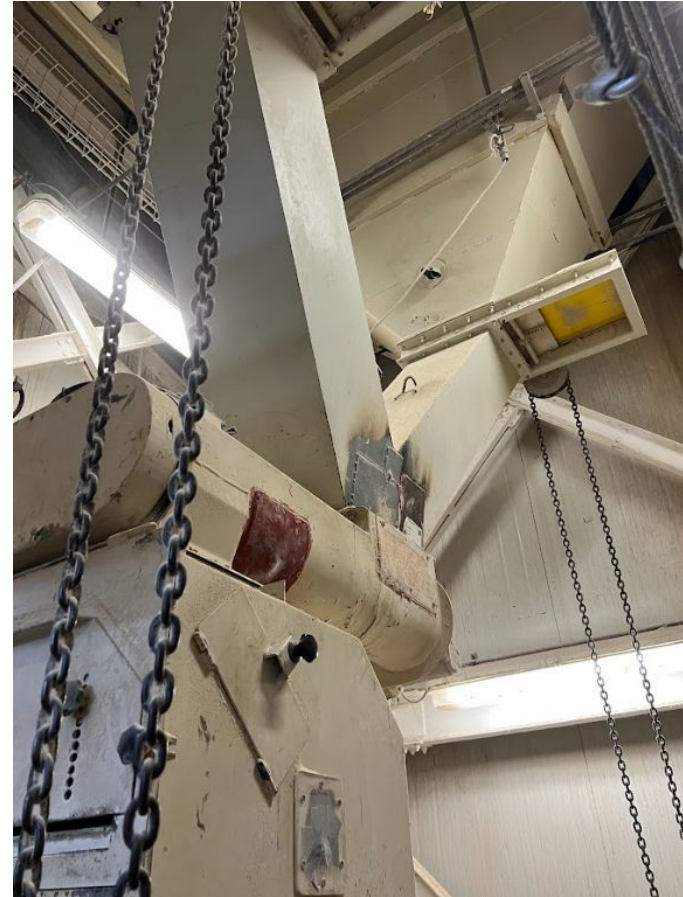


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# Problem

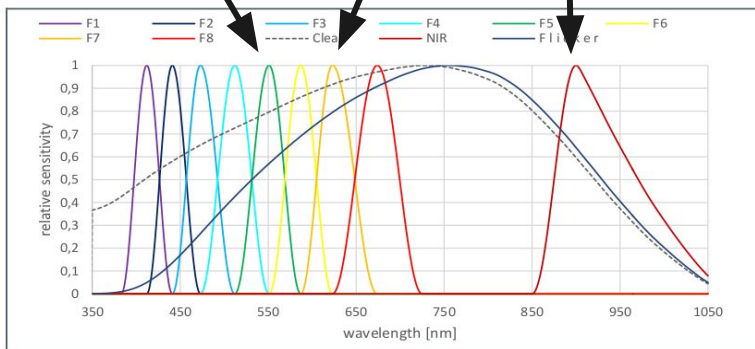
- Undesired mix of grain products such as soy, bean, corn and wheat in food industries
- This causes an inefficient growth of the animal and may cause health problems



Wheat

Bean

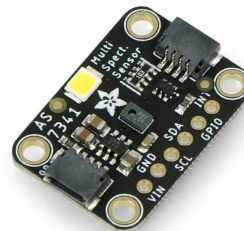
Corn



Tipo de Grano:  
Maiz

# Solution: Spectroscopy

Spectral Sensor



Camera





# Solution: Custom Sensor

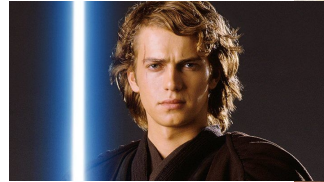
- We built a sensor that contains the spectral sensor and camera, as well as the microcontroller
- The sensor is installed in strategic position so it constantly takes data of the food products



# Sensors



LUKE



ANAKIN



LEIA

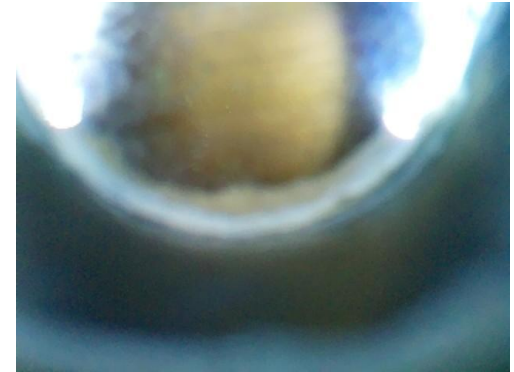
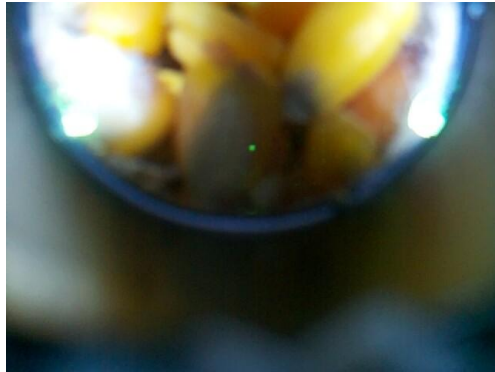


PADME



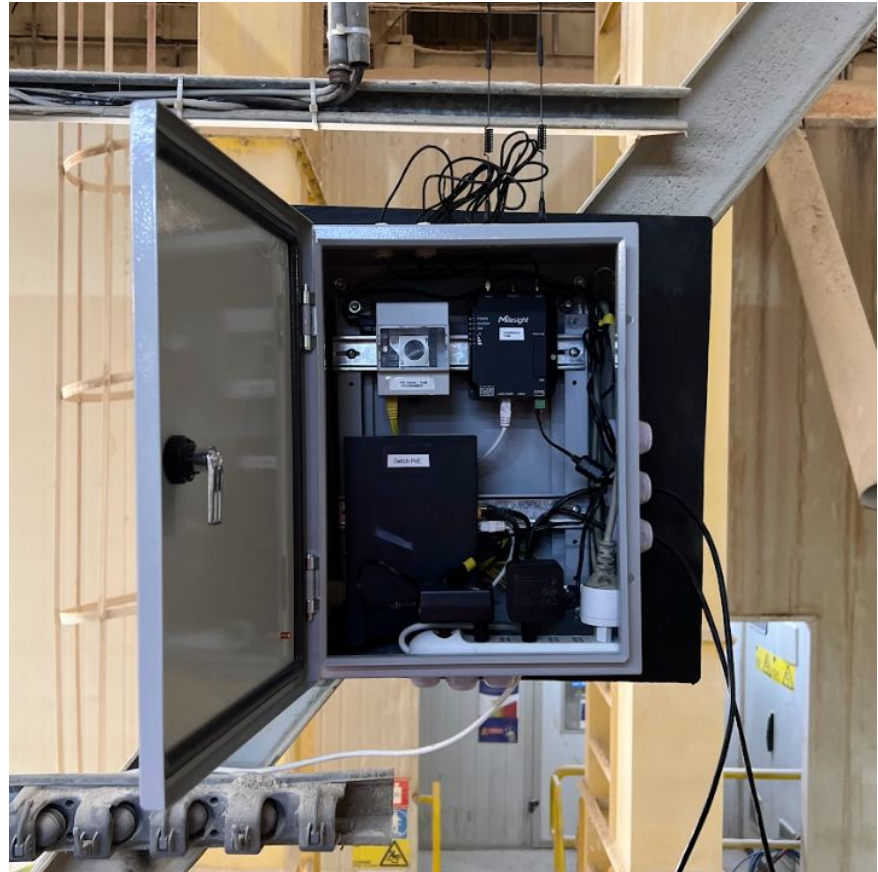
# Sensors

- 4 sensors installed in the Agrosuper Casablanca Food Plant
- By alerting in real time it can tell via a Telegram Bot, the LED configuration or sending a message, what is the sensor currently looking to

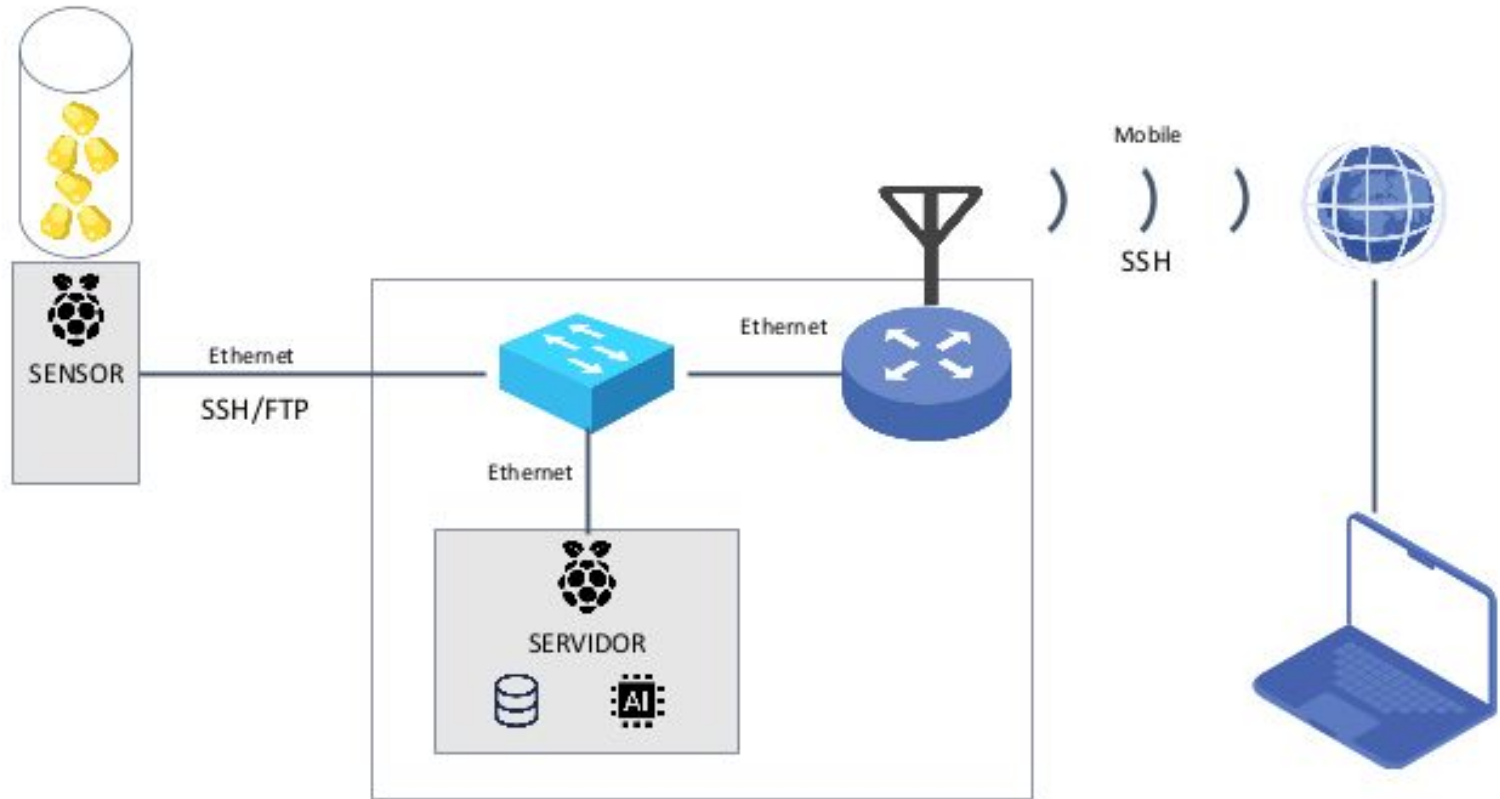


# Server

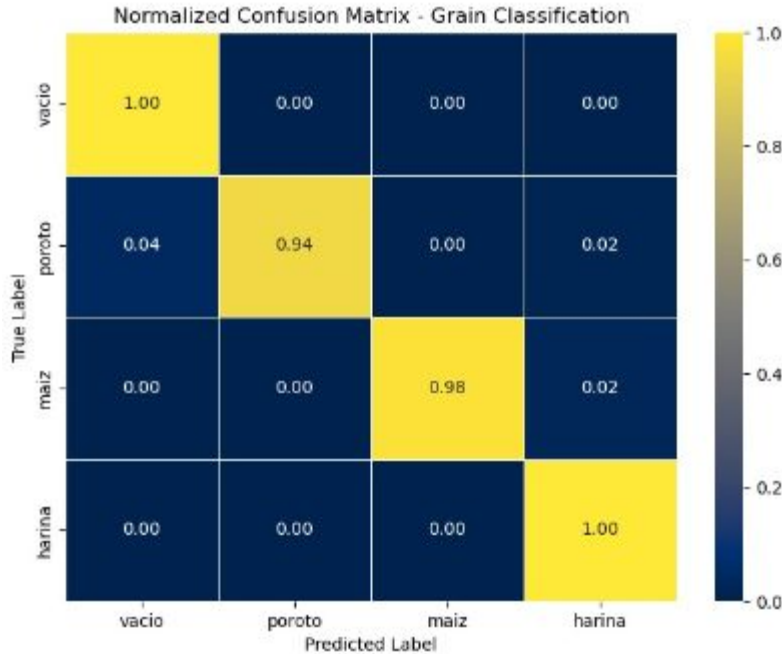
- The sensors communicate and are powered with a PoE system
- The server contains another microcontroller that receives and processes the data of the sensors
- It also contains a switch PoE and an industrial router, so it is possible to access to the server and to the sensors



# Sensors - Server communication



# Sensor Classification Algorithm



98.52% of Precision

- We use several simple classification algorithms in order to make a stacking prediction algorithm
- The classification algorithm is still under tests and development
- In the laboratory as well as in the production plant we achieved relevant and same scores

# Team



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