

# Livestock Behavioural Analysis

The goal of the Livestock Behavioural Analysis Use Case is to implement and demonstrate a system, which assists livestock farmers in monitoring their animals. During a visit to the ATLAS pilot farms located in Lower Saxony in late 2019, we discussed limitations and requirements of an automated livestock monitoring system with the end users.

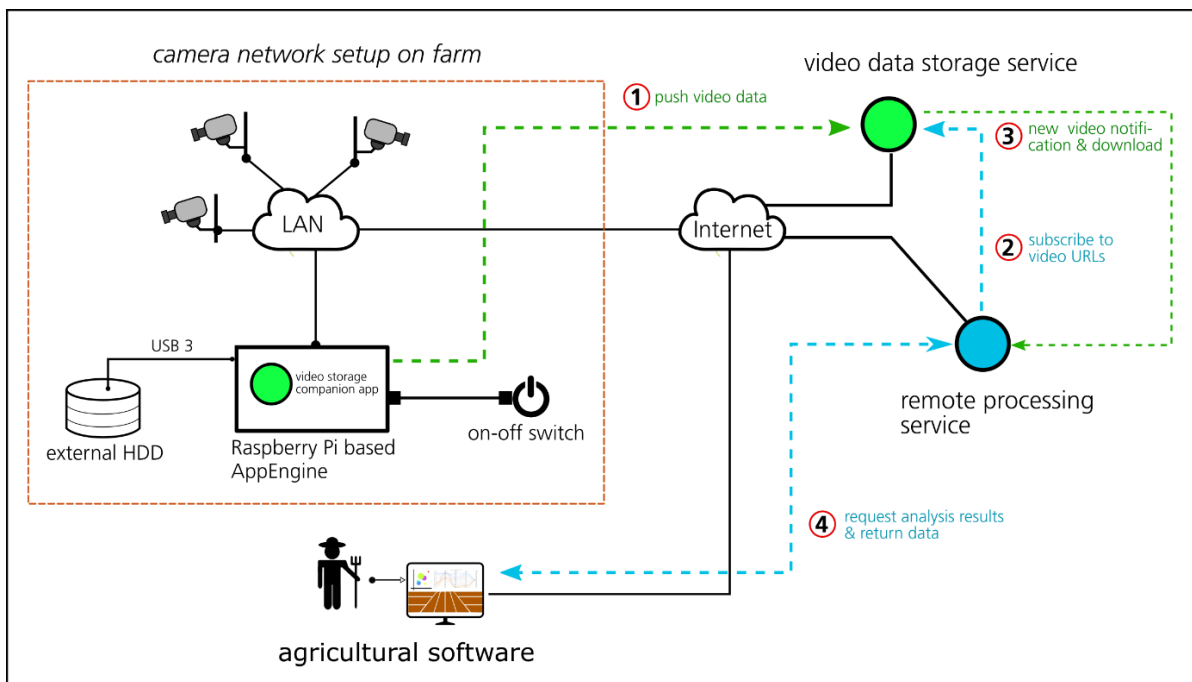


Figure 1: schematic overview of the system setup. Cameras and edge-computing equipment (AppEngine) is installed in the barn. The recorded video data is sent to the corresponding storage service. A remote processing service is paired with the storage service and gets notified when new data is available. The analysis result data can be requested from the remote processing service through a standardized API.

During the last months, we have been developing a video recording system, which consists of a Raspberry Pi 4 connected to a Hard Drive, safely enclosed in a protective casing. In order to respect the end user's privacy, this system also includes an On-Off switch to halt the video recording at any time. For the first demonstrator, we are building three of these systems, which will connect to one camera each, located in the poultry, cattle, and pig farms at our pilot sites in Lower Saxony.



Figure 2: edge computing system in a protective casing to be installed in the barn.

Recorded Videos will be saved locally and then send to a storage server at Fraunhofer IAIS for further analysis. For the first iteration, we are going to use a Dense Optical Flow algorithm in order to compute the activity of the animals and then visualize the results on a graph. We have also started training Convolutional Neural Networks for livestock detection, using a combination of publicly available datasets and already collected data from the ATLAS pilot test sites, with promising results. We plan to create our own datasets from the collected video data in order to improve the detection network.

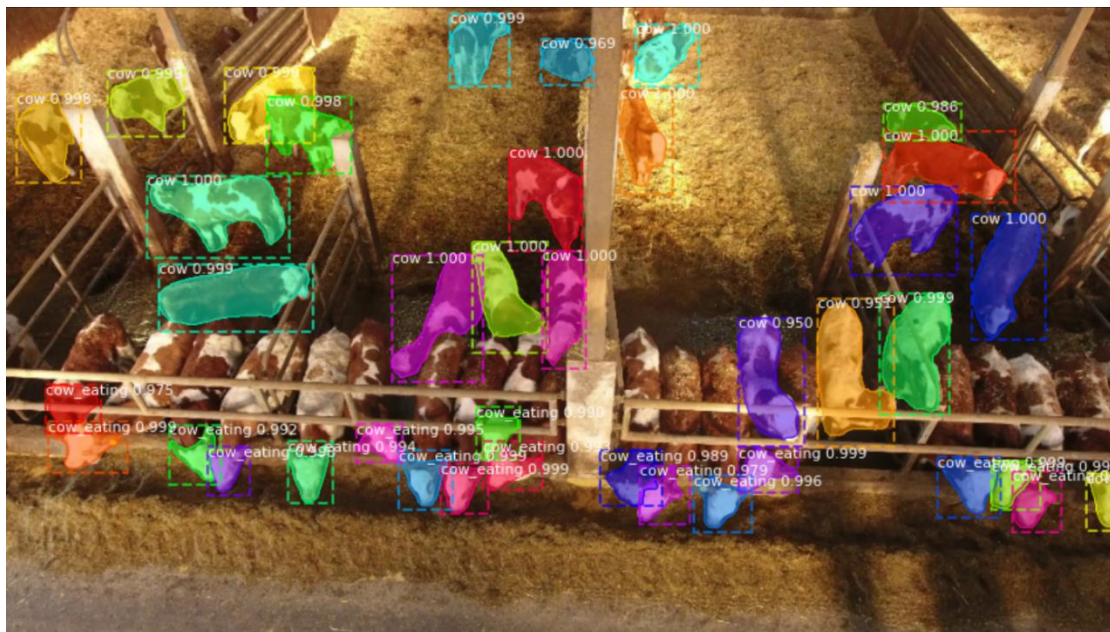


Figure 3: results of the detection of bulls based on a Mask R-CNN