

Title: Analysis of dairy cow rumen fill using 3D-image data from iToF-sensors

Company/Institution: SLU & Sony

Supervisor: Niclas Högberg, SLU; Marc Ahlse, Sony

Background: In our research project, we examine how computer vision tools can be used to continuously assess dairy cow welfare in a barn setting. One parameter used to evaluate a cow's health is rumen fill scoring, which can be used to monitor feed intake of the cow. The rumen is the cows largest stomach compartment.



The overall aims of the research project are:

- To develop vision based tools for assessing defined welfare measures in dairy cows
- To assess farmer views on the use of vision based assessment in general and welfare assessment in particular
- To explore decision-support tools for improving management strategies in connection to animal welfare

The research project is a collaboration between Swedish University of Agricultural Sciences in Uppsala, Sony, RISE, Växa Sverige and Högskolan Dalarna. Six senior researchers, 6 employees at Sony, one postdoc and one PhD student are currently involved in the project.

Goals: We would like the students of this project in scientific computing to investigate the possibilities of using iToF/3D-camera data to assess rumen fill of dairy cows from a volumetric perspective. The students should focus on finding an approach that allows monitoring of volume estimates of the defined area on the cow. If time permits, the students will also explore how the volume differs throughout a certain time series. The students will be provided raw 3D-data from an existing set-up at the Swedish Livestock Research Centre in Uppsala. The setup records a 3D image of the cow when it passes an iToF camera that is mounted at 3.2 m height, looking straight down. There are no restrictions on what programming language etc. to use when implementing the tools.