Tools and Techniques for Image-Based Cow Identification

Thesis structure

* Abstract
* Introduction
  + Currently running research project concerning methods for ensuring cattle health (?)
  + Part of it, accurate identification of individual cows (for more detailed health history?)
  + Current / recent research indicates that less “intrusive” and more accurate methods for identification are possible (less intrusive meaning no permanent markings / tags)
  + Research Question: This Thesis aims to explore and evaluate different types of image recognition algorithms for cow identification based on immutable features of cattle.
* Existing Research and Technology
  + Different strategies have been explored so far, features like body patterns and muzzle prints seem accepted as best options
    - Certain options are out of discussion because it is impossible for me to get proper image data.
  + Research is spares and very recent, earliest research only dates to 2016
  + Advances in machine learning and image analysis allow for good quantity of algorithms (detection, extraction, matching) to choose from
* Methodology
  + Since research in this field is spares, an agile approach was taken to adjust development process and research direction easily
  + Beginning with evaluation of available research, the most promising approaches were looked at closer
  + Easing into the topic by using synthetic image data and visualizing results
  + Later, testing on real-world footage under optimal conditions
* Implementation
  + Development started with building a small tool for generating synthetic cow body patterns, so that initial testing could be carried out as soon as possible
  + After picking MATLAB as development environment, started to test their computer vision toolkit
* Experiments
  + Synthetic data and over-simplification
  + Real-world data and over-training
* Results
* Conclusion
* Discussion