Evaluation of Cow Feed Mass by Photogrammetry

Victor Bloch, Harel Levit, Ilan Halachmi
Volcani Agricultural Research Organization
Israel

Fifth DairyCare Conference, Thessaloniki, March 19th and 20th 2018
Existing Systems

GrowSafe, Canada  C-Lock, South Dakota  Hokofarm, the Netherlands

Volcani ARO, Halachmi, 1998

Price ~7000$ for station

Pro: immediate mass measuring

Cons: station for each of ~100 cows => price, infrastructure, farm routines
Special conditions or high-cost sensor
Photogrammetry

Finding common features and triangulation

Needed:
RGB camera
software
Image Processing

Images from different angles to point cloud

Point cloud

16 images

Ready for integration
Laboratory Conditions

8MP manual camera
Cowshed Conditions

5MP security camera
Mass Volume Dependence

**Laboratory**

Error = 0.3 kg

$R^2 = 0.994$

**Cowshed**

Error = 3 kg

$R^2 = 0.916$

3σ error 4% 20%
Feed Density Measuring

Low cost scales, visual cow recognition, automatic cleaning
Conclusions

1. Error limit is 0.3kg
2. Actual conditions are tough but the equipment can be improved
3. No change in cowshed infrastructure and routines
4. Integrated system: cow recognition, feeding area separation, …

{victorc, harelle, halachmi}@volcani.agri.gov.il