

First validation of a prototype of multi-spectral camera to quantify skin lesions in pigs

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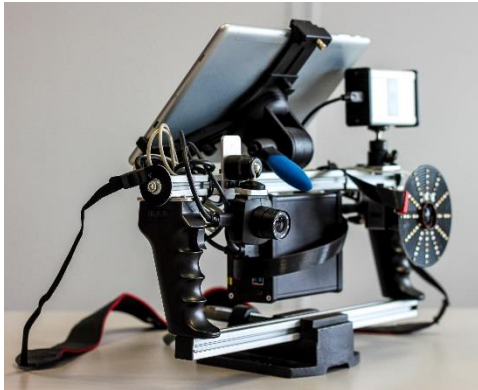


Introduction

Automatic quantification of skin lesions in pigs would **replace visual counting of skin lesions** which is time consuming and may lack of reliability.

It would be very useful for:

- Research purposes to compare the effects of various treatments on welfare and aggressiveness
- Genetic selection against damaging behaviours
- For welfare labelling as an animal-based measure on farm or at the slaughter-house on live animals or on carcasses



Principles of the quantification system

- ❑ Six images acquired by a camera with projection of light characterized by 6 different wavelengths
- ❑ Wavelengths chosen so that haemoglobin could be specifically absorbed, and hence detected, at least by one length
- ❑ Images taken successively in a short interval of time (130 ms) to be well superposed
- ❑ Digital tablet linked to a camera and 6 led lamps
- ❑ Unique prototype developed by 3D-Ouest



Principle of the quantification system

Images analysed by a software to

- ❑ Detect the area corresponding to the pig
- ❑ Detect the presence of haemoglobin
- ❑ Calculate the percentage of pixels with haemoglobin

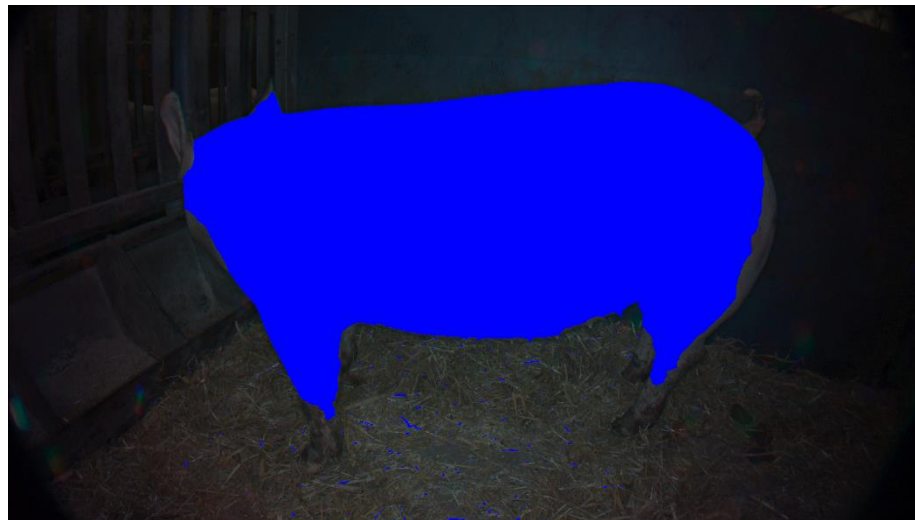
The software make corrections for “small” differences in

- ❑ image superposition due to pig movements
- ❑ Levels of illumination

Principles of the quantification system



Pig with
blood
detected
in blue



Area of the pig
used for blood
detection =
“reference area

Principles of the quantification system

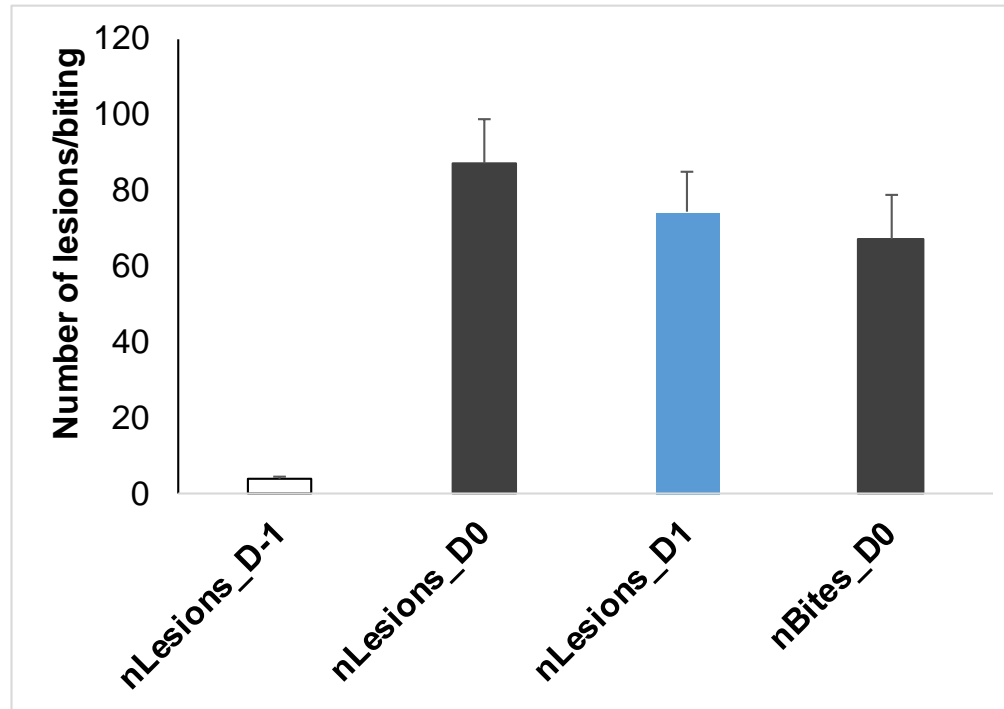
blood detected in blue



First validation live growing pigs

- ❑ 4 pens of 6 growing pigs (~ 5 months) reared on solid floor covered each morning with fresh straw
- ❑ 3 pigs from one pen exchanged with 3 pigs of another pen for 3 hours
- ❑ Counting of fresh lesions (fresh blood or a continuous flood scar) the day before, 2, 24, 48 hours after mixing. Pigs moved in an individual pen for that purpose
- ❑ Shooting with the camera 24 hours after mixing during lesion counting, images with movements were discarded
- ❑ Continuous behavioural observation during mixing: knocks and bites, given and received

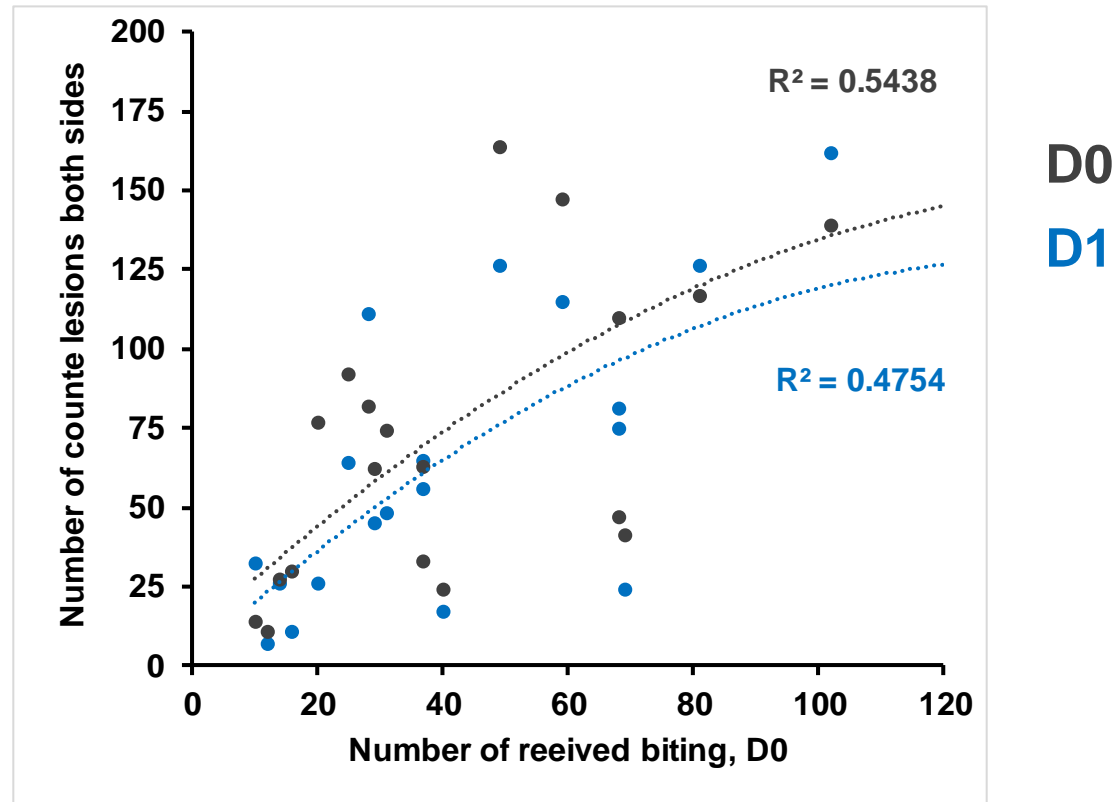
First validation on live growing pigs



Very few skin lesions before grouping

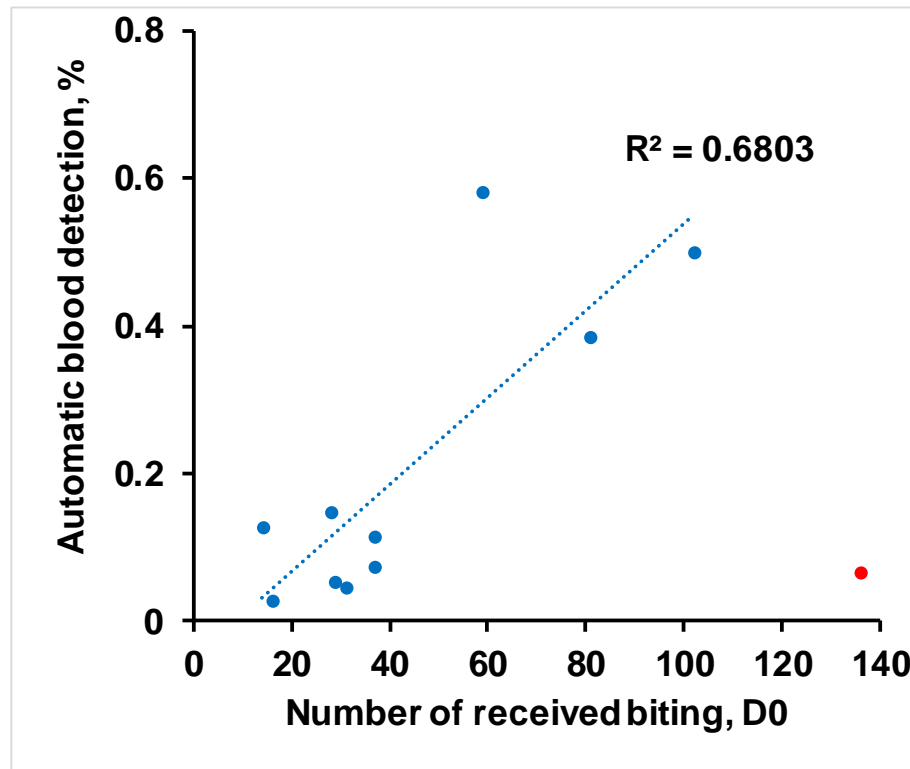
Similar number of skin lesions on D0 and D1

First validation on live growing pigs



Good correlations between number of lesions counted on D0 and D1 and number of received bites (D0)

First validation on live growing pigs



Good correlation between number of bites received on D0 and percentage of blood measured on D1 with one outlier removed (few animals with both-side measures for blood)

Conclusion

Promising method BUT

- ❑ Improvement still required for problems due to movements of the pigs and differences in illumination (parts in shadow may give rise to false positives)
- ❑ One solution: reduce the time interval between images
- ❑ In addition: improve the software

Many thanks to

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