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Augmented Reality for operator assistance

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AIM

Augmented Reality (AR) is an emerging technology for backing of industrial service and maintenance operations. We present applications to the meat industry, extending the potentialities mentioned above: an assistance tool for the production and quality inspection crew.

A range of platforms (channels) are available for the AR technology to communicate the augmented information to the user, including tablets, smart phones, video monitors, smart glasses and projectors. A range that provides different aspects of the potentialities: Interactive, updated information, concealed details, hands-free assistance and dynamic updated data.

Quality inspection often includes identification of subtle details and corrective procedures. Application of AR for such tasks has been benchmarked in a simulated trial environment and the most promising channel has been demonstrated in an experimental meat production operation.

METHODS

Four different candidates for an AR channel have been benchmarked for speed/capacity and precision by 48 novice operators. The projector based channel is found superior and thus used to communicate cutting procedures and corrective measures to an operator in a simulated cellular and a paceline production setup. Both operations utilize a vision sensor to provide the necessary augmentation details (product size and contaminant position) for the operator. The identification of individual product and tracking of information to the correct position on each product is made using proprietary tracking software and a second vision system together with a standard projector. The colours indicate the sequence of cutting: red before green.

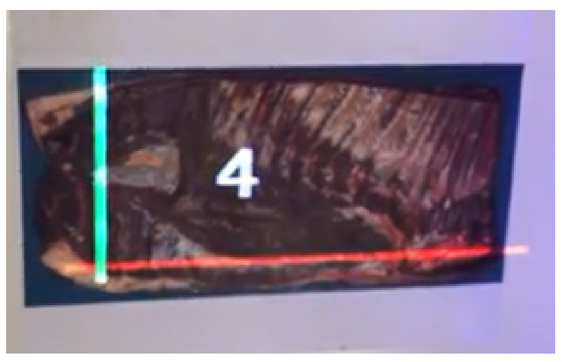
RESULTS

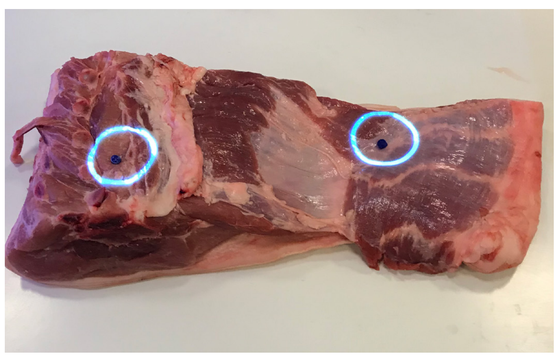
The potential of using AR technology is demonstrated here using a pilot scale production setup. The vision DynaCQ sensor gives the absolute size (length and width) of the meat products and detects any surface contamination. The product in the pilot experiment has to meet specific size requirements. By comparing to the actual measured size, a cutting recipe in form of a set of cutting lines can be calculated for each product.

From a small sample from the production of one specific belly product the difference between the two cutting sequences (red before green vs. green before red) may shift more than 20% of the total weight between the two by-products.

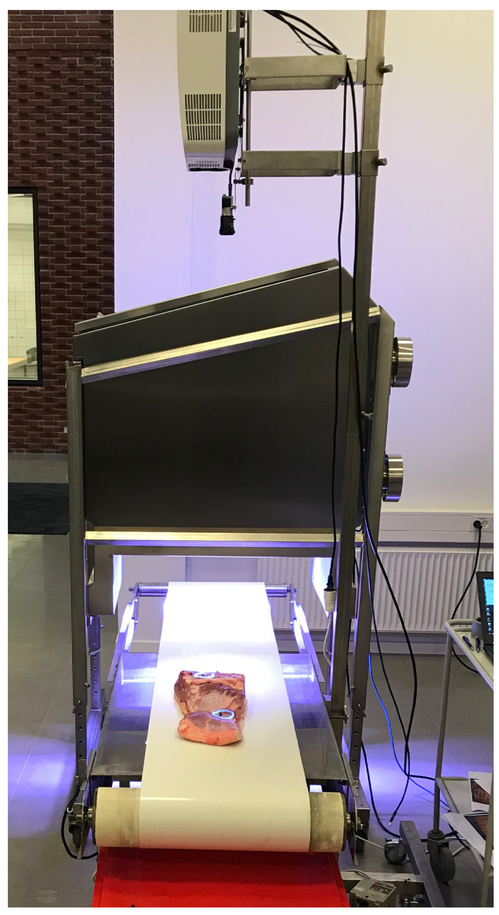
CONCLUSION

The best performing AR system includes off-the-shelf commercial available products. Even tracking software platforms are available from different vendors and the potential indicated in this experiment aligns with previous demonstrated yield improvement of fresh meat production. The commercial benefit for a AR assisted cutting to size of a specific belly product may shift more than 20% weight between the two by-products.





The pilot setup assists the operator in producing an optimized yield of the raw material (right) by cutting along the projected lines in a specific order (green before red) and performing a corrective action by removing blue polymer fragments detected as surface contamination (left). Videos will be presented at the conference.



The pilot setup including DynaCQ sensor, projector and RGB camera

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