FONDAZIONE BRUNO KESSLER
MAGAZINE

Artificial vision applied to the food industry: RaspGrade is here

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Researchers at FBK, in collaboration with the berries company Sant'Orsola di Pergine in Trentino, have developed a system that can automatically classify—non-invasively and in real time—the ripeness level of raspberries. The project was officially presented on June 18 in Valencia.

RaspGrade is more than just a dataset. What sets it apart in the landscape of fruit quality control tools is its ability to assess the ripeness of individual berries directly on the processing lines and even inside the baskets, using artificial vision. The system classifies raspberries into five different quality levels based on ripeness, mirroring actual visual inspections. Importantly, **images are captured as the baskets move along a conveyor belt**, introducing a degree of realistic variability not present in static datasets . All collected raspberry data is **publicly accessible and freely available.**

The project was developed by the **Center for Digital Industry** **at Fondazione Bruno Kessler**, in collaboration with **Sant'Orsola Sca**, as part of the AgileHand **project**, supported by the European Union's Horizon Europe program.

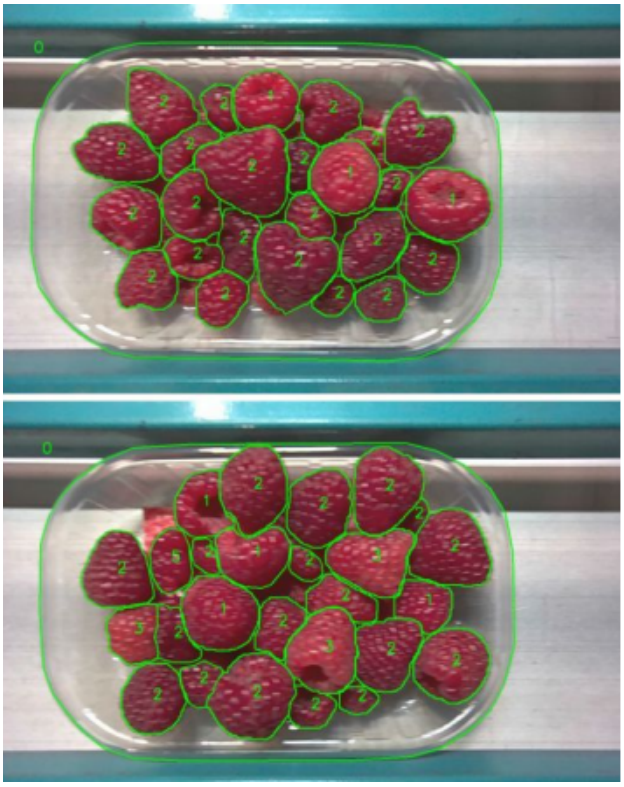
FBK plays a key role within AgileHand. In addition to raspberries, its research in the agri-food sector has extended to quality control systems for oranges, fish, and meat.

"*The collaboration with Sant'Orsola was crucial to the creation of RaspGrade*," said **Paul Chippendale, researcher at FBK's Center for Digital Industry** and coordinator of the AgileHand project. "It *allowed us to merge our scientific expertise with their deep industrial knowledge. Sant'Orsola's experts, with their experience in berries, played a vital role in defining real-world needs, guiding data collection with targeted input, and offering valuable feedback for continuous improvement.*"

The working group faced both logistical and technical challenges. "*Identifying the optimal detection technology to accurately classify the ripeness of raspberries in situ was the most interesting challenge*," explained **Mohamed Lamine Mekhalfi,** who led the research

within **FBK**'s Technologies of **Vision (TeV) Unit** and managed data collection. "*We tested several options extensively before finding a solution that was robust, non-invasive, and capable of handling the variability of conveyor belt assessments while maintaining production efficiency.*"

Looking ahead to the use of RaspGrade's *deep learning* models in real-world production environments, the research team is highly optimistic. Once data collection is finalized, the model will be ready for deployment not only in raspberry processing but also in broader industrial applications. .



Class	Training	Validation
Punnet	160	40
OK (Grade 1)	773	205
Dark (Grade 2)	2879	724
Light (Grade 3)	262	44
Second (Grade 4)	50	12
Waste (Grade 5)	78	16
All	4202	1041

Per quanto riguarda il futuro impiego dei modelli di *deep learning* addestrati su RaspGrade in ambienti di produzione reali, il gruppo di ricerca è molto ottimista: una volta completata la raccolta dei dati, il modello sarà pronto all'impiego in questo e in altri scenari industriali.

PERMALINK

https://magazine.fbk.eu/en/news/artificial-vision-applied-to-the-food-industry-raspgrade-is-here/

TAGS

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- #deep learning
- #industriadigitale
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- #tev
- #visione artificiale

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- Link al paper: https://arxiv.org/abs/2505.08537

- Link alla dataset repository: https://huggingface.co/datasets/FBK-TeV/RaspGrade

AUTHORS

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