Detection of perished apples on conveyer lane

Project summary:

Apples go through many steps of production and delivering processes before appearing on our tables. One of the key parts is checking the quality of fruits and discarding inappropriate ones. In many plants this process is done by humans that follows by corresponding expenditures on salaries and employee's infrastructure and dependencies on contingency of people's lives. But this approach is simple and straightforward even it would be natural to exploit automatic systems. However, development of modern society follows by increasing of value of human work and elevating of salaries. So, we are in the point when deploying automatic systems becomes cheaper and more efficient comparing with old manual approaches.

In case of apple production, it means that quality checking can be done by appropriate ML algorithm which can be integrated in conveyer system. General workflow can be represented in the following way:

1. In real-time video cameras transfer picture to the corresponding computational machine.
2. Detecting algorithm which is running on this machine finds apples on the video snapshots and emphasizes regions for further classification.
3. Classification algorithm evaluates the quality of the apple and raise an alarm if quality requirements are not met.
4. This alarm passes to manipulation system on the conveyer line (which is integrated with computational machine via some API) to remove the apple.

It can be easy to draw the process for the conveyer where apples come one-by-one.

P.s. The ides can be spread on any conveyer lines where quality estimation should be done, however, in the beginning it's better to focus on a small niche and satisfy customer requirements than to pursue every possible application.

Project target audience:

Apple plants with conveyer lines where quality checking is conducted by humans.

Project scope:

Developing an MVP which can detect apple on conveyer lines represented by a static picture and provide corresponding emphasized picture of the apple as an output. If there is no apple, algorithm should notify a user. Passing real-time videos, classification problem and integrating with any possible manipulation systems are out of scope.

Project goal:

MVP of detecting system which can find an apple on a static picture and provide an interested region as an output. MVP should be encapsulated in Docker container and be able to interact with other applications by http protocol. MVP should have an API – handler to upload a picture.

Ps. The real deployment can depend on customer requirements and for production plants local small server can be a better solution than cloud infrastructure. Many considerations should be investigated first

– internet speed, computational resources required for running application, costs for deploying, data security – to name some of them.