

SUMMARY

As a result of the thesis, it is possible to state that computer vision supplemented with machine learning algorithms is viable for automated optical inspection of dispensed thermal paste. Method of quality assurance is not supervised, implying that it can be used on-time for any manufacturing line with the same putty dispensing application if appropriate parameters are assigned.

The current iteration of the solution does not contain functionality to pass the camera frame with a recipe object to the beginning of the AOI pipeline. However, there is no drastic difference between the real time frame capturing and image used during the development, because the product's image used in the thesis was also taken from the same camera.

Taking into consideration sections in the main body, the main bottleneck of the current implementation is the inaccuracy of the values inside the recipe file. Unfortunately, the creation of a recipe is not in the scope of the thesis, but a different project. Thus, time is required to get images with new specification files. Due to the emergency situation in the country on a moment of writing the thesis, integration of camera and recipes with precise values is postponed.

The current solution provides very high accuracy during the testing of the image with different sub-recipes, which have considered almost all possible situations of occurring errors. Error data is stored and perfectly visualized for further investigation in case of any problems.

Despite the low quality of bosses' source images from 1920x1080 robot's camera, it was possible to resize the image to the resolution sufficient for the clustering for an image. Dominant colors determined through this algorithm helps to extract blue thermal paste from the area.

It is always possible to build on top of the solution. Probably, after getting too much data from analyzed products, it would be possible to apply DL for smarter and more complicated tasks. Right now, the solution is being integrated into the project designed for automatic putty dispense for on-time quality control.

To sum up, Computer Vision and Machine Learning are suitable tools for the AOI pipeline, which can be integrated into a real manufacturing environment in the nearest future. Approximate cost for the introduction of this approach was described in the Economic Overview paragraph.