

SUMMARY

Industrial Robotics market is growing every year enormously – most of the manufacturing facilities in the majority of countries will feel the impact of this growth. The equipment of Industrial automation is being adopted because of its productivity potential in different applications. Most of the times, high complexity tasks are done by Industrial Robots. Especially powerful Industrial Robot systems are the ones with the Machine Vision technology, which are guided by different types of cameras. However, the camera research needs to be done carefully to know what type of camera is appropriate for particular application and what type of software and/or Operation System it needs to operate properly.

The first step of the development process was to make a full research to investigate camera solutions used with Industrial Robots. Development procedure continued with the camera research: three different types of cameras have been reviewed. Each of them has their own software and they operate in a different way. However, data processing mechanism for all of three cameras was ROS Kinetic. This procedure was followed by YOLO Object Detection algorithm implementation into the ROS Kinetic. The coordinate system was also chosen specifically for the project. The algorithm was modified to show the bounding box on the object's picture and print out the coordinates of it. In the end, the output data had to be sent to the Yaskawa Robot System through the ROS-Industrial program.

The project can be extended and finished fully, to use it for different purposes later. New camera models can be integrated into the system and real time object detection system can be also implemented, which would make the procedure of sending information to the robot faster and more convenient. It requires more powerful resources such as better great graphic card, which supports CUDA software and ROS-Industrial, and higher quality cameras. This thesis project was about testing different examples and assuming which camera system, algorithm and software would fit the most to the Yaskawa Robot System. Three different camera setup systems are working for the thesis project. Also, there is a modified YOLO Object Detection algorithm up and running, which detects different objects and prints out the coordinates of the bounding box, which can be later sent to the ROS-Industrial. The communication mechanism is also set up – ROS Kinetic. Sending the information Yaskawa Motoman GP8 was not managed fully as the ROS-Industrial system could not operate in the computer lab without appropriate graphic card.

As a conclusion, it should be stated that the project can improve the machine vision technology for the Yaskawa Robot System and it can be expanded to add new features, tools and camera systems to make the robot guidance procedure faster and more user friendly.