

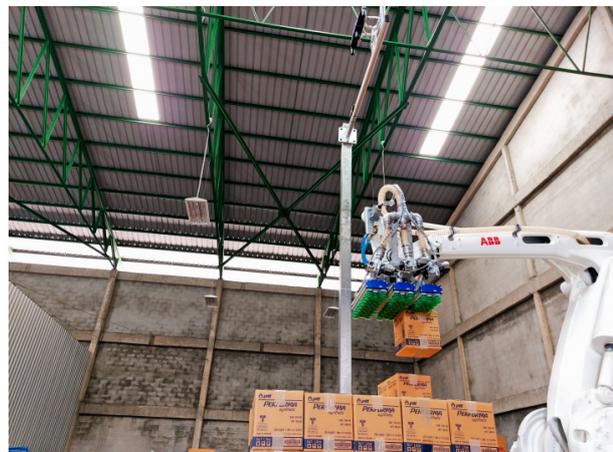
Automated 3D depalletising solution with integrated image processing

Palletising is one of the most demanding applications in intralogistics. Efficiency is required when stacking cartons, sacks or packages of bottles on pallets in the last step before shipping. The same applies to depalletising in the goods receiving area of the recipient. Automated palletising solutions, whether conventional or robot-supported, offer considerable increases in productivity and efficiency. The industry is constantly on the lookout for innovations that allow maximum flexibility of pallet patterns, low cycle times and minimal space requirements. In this context, palletising robot systems are becoming increasingly important. They offer exactly this flexibility and at the same time are easily adaptable to changing needs and products. This means that they often offer considerable savings potential. Robot palletising significantly increases the throughput when handling different packs.

However, classic palletising and depalletising by robots is often rigid and time-consuming in the setup, especially since they work "blindly" and cannot cope with shifted or deformed goods. To enable these robots to operate with their eyes open, the Bangkok-based company Speed Solution Group Ltd. has developed an automated 3D palletising vision solution in cooperation with ABB Robot, Thailand. Using an Ensenso 3D camera from IDS, robots from ABB depalletise goods of different sizes and shapes fully automatically, with high accuracy and reliability.

Application

The fully automatic depalletising robot is used in an unmanned warehouse. The most important requirement is that the robot must be able to accurately identify and precisely handle a wide variety of available product models or cartons on the pallets to be unloaded. The problem is solved with the help of an Ensenso 3D camera. The X36 model is predestined for this task. It is suitable for working distances of up to 5 meters and for the detection of standing objects with volumes of several cubic meters and quickly delivers a precise image result, which in turn enables faster operating speeds and thus a higher throughput.



With their help, the robot detects the exact position of the respective boxes in a wide range of model variants. Ensenso 3D cameras work on the principle of Stereo Vision, which is based on human vision. Two cameras acquire images of the same object from two different positions. Although the cameras see the same scene content, there are different object positions according to the cameras projection rays. Since the distance and viewing angle of the cameras as well as the focal length of the optics are known, the Ensenso software can determine the 3D coordinates of the object point for each individual image pixel. The result is a 3D point cloud, which is the foundation for further applications based on 3D object information.



The 3D Vision software determines box positions on the pallet with millimeter accuracy using the point cloud image

In this case it is an exact point cloud image of the palette. Using the image information contained in the point cloud, the system finds the crate position with millimetre accuracy and sends all crate positions to the ABB robot using NX software from the Speed Solution Group. The powerful 3D Vision System software, developed in close cooperation with ABB Robot, makes the system fast and stable and enables the robot to pick up the respective crates with the highest precision and thus without damage.

The system is designed to be closely coordinated by the ABB controller: The ABB robot software starts the vision system to acquire and deliver the position via the Gigabit Ethernet connection (TCP/IP a group of network protocols). The ABB robot software also sets the robot's parameters. This enables the system to determine not only the exact position of the goods, but also the order in which the goods are picked up. In this way, the travel path covered by the robot arm is optimised and the robot can operate at maximum speed and efficiency.

Athapol Tantisantikorn, Sales Manager of SSG Ltd. is convinced: "Thanks to Ensenso's 3D vision technology and our 3D Vision System and stable NX software, the system offers an extremely flexible and fast solution. The system can simultaneously handle different sizes and shapes of goods". The software was developed together with ABB (Thailand) and works very successfully in the outgoing goods warehouse.

Camera

The task is perfect for the cameras from the Ensenso X series. Each Ensenso X36 3D camera system with [FlexView2 technology](#) consists of the projector unit, two GigE cameras with either 1.3 MP or 5 MP sensors (CMOS, monochrome), mounting and adjustment angles, three lenses, as well as sync and patch cables to connect the cameras to the projector unit. By means of the setup wizard integrated in the software, focusing and calibration is easy to set up and operate.

The FlexView2 technology ensures an even better spatial resolution as well as a very high robustness of the system for dark or reflective surfaces. 3D object detection, localisation and classification, robot applications, such as bin picking and object detection up to 8m³, such as the described pallets, are among the key features of this 3D camera. Therefore it is predestined for the field of logistics automation, e.g. by (de-)palletising and automatic storage systems.



Ensenso X36 CP 5MP with FlexView 2 technology

This also convinced Athapol Tantisantikorn, SSG Sales Manager. The GigE interface, the 5MP CMOS sensor, the data volume to be processed and the size of the camera, which is easy to integrate, were also decisive in the choice of the right camera model for this specific solution.

Conclusion

The advantages of the system are obvious:

“Easy configuration, good SDK with stable API, flexibility.

— ATHAPOL TANTISANTIKORN, SALES MANAGER OF SSG —

The depalletising robot works more efficiently than humans can ever do, and with high accuracy, while at the same time employees do not have to handle heavy packages, injuries or accidents with personal injuries are minimised, and in unmanned warehouses they are completely avoided. Highest availability and investment security as well as production flexibility with low personnel deployment ensure long-term success. The automated 3D palletizing solution with integrated image processing consisting of one Ensenso X36 3D camera system each is not only compatible with ABB robots, but can also be integrated into any other robot.

Ensenso X36: 3D-vision with the modular 3D camera systems



- ✔ Interface: GigE
- ✔ Model: [Ensenso X36](#)
- ✔ Sensor type: CMOS
- ✔ FlexView: 2
- ✔ Projector power: 100 W
- ✔ Baselines: variable
- ✔ Trigger & flash
- ✔ Protection code: IP 65/67
- ✔ Applications: 3D object recognition, classification & localization, 3D object reconstruction, Robot applications, e.g. bin picking, Capture of objects up to 8 m³, e.g. entire rooms, pallets, Logistics automation, e.g. (De-)Palletizing, Factory automation, Automatic storage systems

Client

Speed Solution Group Ltd, Thailand was founded in 2005. Distribution and import of industrial products for customers in the industrial production sector are an important driving force for the Thai economy. Speed Solution Group has an engineering team that advises customers on new equipment and technologies that are best suited and effective for their diverse, individual applications. "We are committed to helping the industry grow simultaneously and sustainably through our services".

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