

Slam dunk for 3D vision?

The advances in CMOS image sensor technology, processing power and software development make machine vision one of the most dynamic of the enabling industrial technologies. With more and more emphasis on Industry 4.0, it is clear that vision is going to have an important role to play in the factories of the future. One area of vision technology that has now effectively become a core component is that of 3D vision, which has roles in quality inspection, robotics and depth perception. 3D imaging is also a good example of how we are seeing an increasing crossover between machine vision technologies; in this case 3D and embedded vision.

The 3D revolution

3D imaging has been around for many years, but it is only comparatively recently that it has become both affordable and practical to use in a factory environment, thanks to software and PC processing developments that allow the huge amounts of data produced by 3D cameras to be processed in real time. But much more recently we have seen the emergence of 'smart' 3D cameras, where all of the 3D processing is carried out within the camera without the need for a separate PC. There are a number of 3D imaging techniques such as laser line triangulation, 3D stereo, time of flight and structured light imaging, greatly extending the range of potential applications. Not only that, we have seen the introduction of low cost high speed embedded stereo cameras capable of delivering depth maps for consumer applications.

The robot connection

One very important application of 3D vision system is vision guided robotics which further helps with the automation of industrial processes. 3D vision systems can be used to act as the 'eyes' for the robot by identifying the precise location of the object. These coordinates must be transferred to the robot and massive strides have been made in vision-robot interfaces which makes this process much easier. Vision guided robots are used in applications such as pick and place, or to guide a robot for executable tasks such as in an assembly process. The automation of manufacturing processes is a fundamental requirement for Industry 4.0, so continued integration of 3D vision and robotics will undoubtedly form one of the essential building blocks as the technology matures. Also we are seeing the application of consumer 3D cameras in robotics, where the depth maps they produce can help robots understand their location in a specific environment so that they can move from location to location, avoiding any obstacles. This is Simultaneous Localisation and Mapping (SLAM), where the position and orientation (localisation) of a sensor is determined with respect to its surroundings, as well as simultaneously building a map of the surrounding environment.

A chance to find out more

3D vision is a key component of the Conference programme for the UKIVA Machine Vision Conference and Exhibition which will be held on Thursday 6th June at the Marshall Arena, Milton Keynes. There will be an entire technical presentation theatre devoted to 3D vision technology and another dedicated to vision in robotics. In fact more than 25% of the 57 presentations scheduled for the day involve some aspect of 3D vision. In addition, there is a chance to find out more about SLAM as a keynote presentation is entitled “Visual SLAM in the Wild’. This will be delivered by Dr Luca Benedetti from Kudan. Kudan is accelerating the evolution of Virtuality (AR/MR/VR) and Robotics (automobile/drone/robot) by developing computer software algorithms classified as Artificial Perception (AP). Kudan’s AP algorithms are the machine equivalent of human eyes. Dr. Benedetti’s presentation will describe the real-world challenges of deploying a SLAM system across a variety of applications as well as designing a SLAM system that’s versatile both in terms of hardware and software. Not only does this event provide a great opportunity to find out more about 3D vision, but there will also be plenty of examples of 3D vision systems in action at the co-located exhibition.

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Approx. 660 words