

Basler Cameras Are at the Heart of an Automatic Fish Sorting and Identification System

Customer

- Bern University of Applied Sciences, Institute for Mechatronic Systems (ifms)
- Burgdorf, Switzerland
- R&D projects involving innovations in piezo actuation, vibration control, or image processing. Our typical industrial partners are working in the fields of semiconductor technology and machine technology.
- Year of project realization: 2009

Application

In Frutigen, located in the Swiss Alps, warm water drained by the Lötschberg railway base tunnel is used for the sustainable production of sturgeon. To achieve optimal growth conditions, the fish must be periodically sorted. Also, the sturgeon must be individually identified based on their caviar production.

The first goal of the project was to develop a device that automatically sorts sturgeon while they are swimming naturally through an underwater monitoring channel. Compared to conventional manual sorting methods, this saves costs, is stress-free for the fish, and reduces the risk of injuries.

The second goal was to investigate the possibility of individually identifying sturgeon based on biometric features. In the future, this could replace the use of RFID chips.

Solution and Benefits

The fish must be sorted according to their body mass. Since body mass cannot be directly determined under water, correlations between body mass and silhouette geometry must be used. A Basler scA1400-17gc camera mounted in a waterproof housing above the channel is used to acquire images of the fish silhouette. An illumination panel located in the background provides the necessary image contrast. With a sensor size of 1.4 megapixels, a resolution of approximately 1 pixel per millimeter at the object level can be reached (channel length is 1 meter). This allows an accurate estimation of the fish body mass. After measuring a fish, the system directs the fish to the appropriate exit.



An individual identification system requires the existence of a measurable, finger-print-like feature on the sturgeon. The patterns on the sturgeon's forehead and nose are considered to have the required individual characteristics. Therefore, a second vision system consisting of a Basler piA2400-17gc camera and an LED illumination panel was built up and mounted in a waterproof housing. The high resolution of five megapixels is required for capturing the fine structure within the forehead and nose patterns. The development of appropriate image processing algorithms for individual identification will need additional work.

The Gigabit Ethernet connections on both camera models provide high flexibility in placing the image processing computer. The computer is typically located at a 20 meter distance from the water.

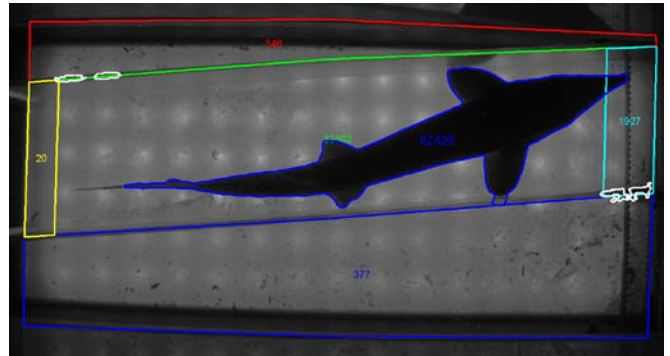
Technologies Used

- Cameras: A Basler scA1400-17gc as a silhouette camera and a Basler piA2400-17gc as a pattern camera
- Illumination (internal development): 90 LEDs (1W) for the silhouette camera and 40 LEDs (5W) for the pattern camera
- Lenses: A Tamron TAM 219-HB/8 for the silhouette camera and a Fujinon FJN HF12.5SA-1/1.4 for the pattern camera
- Software: Internal development based on the pylon SDK
- PC: Industrial PC with MS Windows XP

More Information

<http://labs.ti.bfh.ch/ifms>

www.tropenhaus-frutigen.ch



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