

Professional bikefitting with USB 3.0 industrial camera

Less pain, greater performance! Bikefitting is the magic word in the world of cycling. Its purpose is to determine the optimal riding position for every cyclist. To do this, fitters pinpoint any problem areas, which may sooner or later lead to discomfort or pain in the back, legs or hands, and make sure that the bike and rider are in perfect unison. Video analysis plays an important role in this.

GeBioM mbH Münster has embraced this issue under its gebioMized brand. The GP BikeView system has been specially developed to analyze body posture and pedaling motions. To do this, the rider pedals on a fixed bike in the usual way and two 1.3 MP IDS cameras record the cyclist from the front and side. The camera at the front is intended to identify knee displacements, while the camera at the side highlights poor back posture.

Application

The video material is analyzed, taking any physical requirements into account, such as pre-existing or orthopedic conditions. The proprietary software developed by gebioMized for this purpose allows you to show analysis modules directly on the video. Thus, for example, you can add grids, plumb lines or (segment) angles to the image. This makes it much easier to interpret the respective body positions and joint angles. Poor posture in the leg axis or shoe-pedal adjustment are visualized.



It is also possible to zoom in on the image or to adjust the video speed. The option to show up to four videos or individual images at the same time allows you to compare different perspectives or adjustments.

Based on the results, the fitter adjusts the height and tilt of the saddle and/or handlebars until the optimal ergonomical seating position is found. Individual bike components are also replaced by more suitable models, if necessary. Once the fitting process is completed, all the data from the analysis is summarized and documented in a report. Relevant body angles and joint axes can also be shown, such as grids and reference lines, for better visualization of the vital facts.

Anyone wishing to build a new bike can also use the gebioMized bikefitting system. Fit bikes are used for this, which enable you to find the biomechanically optimal seating position without the limitations set by the

bike frame or components. This opens up enormous advantages, for example, in competitive sports or in the field of rehabilitation.

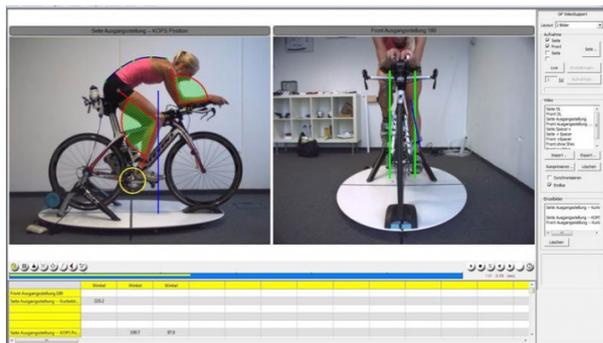
gebioMized customers are primarily sports centers, as well as sports retailers or large medical supply stores. "It is a growing market and our products are constantly developing to match this growth", says Dieter Schulte, production manager at gebioMized, adding, "this is why it is important to find reliable components that can be used flexibly. With the USB 3 uEye LE from IDS, we have found the perfect industrial camera. It is straightforward to operate and the camera was extremely easy to integrate into our system. Using the IDS software package, even switching interfaces wasn't a problem."



Fit Bike - gebioMized Bikefitting System

Some time ago, gebioMized had made the switch from a USB 2.0 uEye camera to a more powerful model with a USB 3.0 interface in order to improve the overall system performance through higher data transfer rates. A further reason for the switch was the rising demand from abroad. American customers in particular are increasingly opting for the USB 3.0 standard.

Software



Analysis tools, such as grids, plumb lines and angles, make it easier to interpret the posture when pedaling.

The software package, which is identical for all IDS cameras, was a key factor in the smooth model transition. The free [IDS Software Suite](#) allows both mixed operation and switching between cameras within the entire IDS model range, even across different interfaces – regardless of whether they have a USB 2.0, USB 3.0 or Gigabit Ethernet connection. All necessary drivers are only loaded into the camera after it has been connected to the computer. As a result, functionality can be extended at any time by software updates.

Demo programs are also available for camera integration and image acquisition with source code in C, C++ and VB. The customer can use these for programming and adapt them as required. The IDS software package also includes interfaces for many popular machine vision libraries, such as HALCON, MERLIC, Common Vision Blox, or LabVIEW.

Camera

Determining factors for geBioMized in selecting the right camera, besides high data transfer rates, were the size, price and long-term availability. The USB 3 uEye LE series from IDS meets all these criteria. The cost and space-saving project cameras are suitable for a broad range of uses, not least thanks to their C/CS-mount lens mount, which also allows the use of wide-angle lenses.

The USB 3 uEye 3240LE model used by gebioMized is a particularly powerful industrial camera, equipped with a 1.3 megapixel CMOS sensor from e2v. This sensor is one of the most sensitive sensors in the IDS product portfolio, delivering 60 fps at full resolution. Additional functions, including up to four areas of interest (AOI), complete the range of features. They enable the user either to check several features simultaneously or to capture AOIs in a sequence of exposures using a wide range of different parameters.

Optimizing a rider's posture can achieve decisive performance improvements, particularly in competitive sports, and can make all the difference between success and failure. The targeted use of specially adapted training bikes also promises greater chances of recovery in rehabilitation. In short: Less pain thanks to more favorable starting conditions means higher performance and greater success both in terms of sports and therapy. It's so easy!

USB 3 uEye LE - cost-effective and space-saving project camera



- ✔ Interface: USB 3.0
- ✔ Name: [UI-3240LE-C-HQ](#)
- ✔ Sensor type: CMOS Color
- ✔ Manufacturer: e2v
- ✔ Frame rate: 60 fps
- ✔ Resolution: 1280 x 1024 px
- ✔ Shutter: Global-Shutter / Rolling-Shutter / Global-Start-Shutter
- ✔ Optical class: 1/1.8"
- ✔ Dimensions: 47.0 x 46.0 x 26.3 mm
- ✔ Weight: 39 g
- ✔ Interface connector: USB 3.0 micro-B, screwable

Client

gebioMized is a trademark of GeBioM and stands for individual cycling products. The brand name came about from a combination of the company's name "GeBioM" and "customized". GeBioM has been active in the field of biomechanics for more than ten years. Originating from the School of Sports Science of Münster University, GeBioM is a competent partner for sports science and orthopedic issues. A wealth of experience in biomechanics and scientific findings from more than 10 years of cycling research have been incorporated into the development of gebioMized products.

www.gebiomized.de/en

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