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CAN FREQUENCY INVERTER

Cloud solutions in times of IIoT and Industry 4.0

The combination of hardware from electrical engineering and cloud-based software has resulted in all-in-one solutions at Knestel in recent years. This includes applications in agriculture or the fitness sector, for example.



Knestel develops cloud solutions for the requirements in times of IIoT and Industry 4.0 (Source: Knestel)

While the consumer market has been literally flooded with IoT (Internet of Things) products in recent years, a rather slow development towards IIoT (Industrial Internet of Things) solutions is observable in the industrial environment. But even here, there is a need for networked solutions, whether in predictive maintenance or for machine learning. The world of electronics development has been transformed by IoT in recent years, and the new opportunities presented by the Internet of Things are challenging industry players to integrate connectivity into new solutions, said the company. Sensor technologies, for example, can thus be used to automate processes when values are no longer just collected in a data pool but processed through cloud platforms.

Knestel Technologie und Elektronik from Hopferbach in the Allgäu region of Germany, has been combining this with the skills for hybrid IoT projects in the field of electronic hardware and software for several years. In addition to the development and production of electronic components, the company thus also supplies solutions for central, Internet-based data evaluation via software applications.

Fitness-sector solution with CAN frequency inverter

The following project from the fitness sector shows that there is potential for the symbiosis of electrical engineering and IoT in a variety of industries. The objective was to develop a compact, portable, battery-powered performance diagnostics system for measuring CO₂, O₂, humidity, pressure, and temperature in breathing gas, explained the company. The measurements are automatically evaluated and the result serves as the basis for a training and nutrition recommendation for the athlete. The performance diagnostics system communicates via radio to a smartphone app that offers trainer and comparison functions. The performance diagnostics in this case had to be fast, continuous, and flexible (indoor and outdoor) and also possible without medical expertise, the company added.

With regard to training optimization, Knestel Resistance Control was also developed. The focus here was on the dynamic torque control of a permanent magnet excited synchronous motor in fitness equipment for circuit training (e.g. rowing trainers, back trainers, etc.). The frequency inverter has a CAN interface, an STO function (safe torque off), an on-board switching power supply 24 V / 3 A for supplying external electronics, and also offers the option of connecting a braking resistor. The device is operated via an Android app and is supplemented by individual training recommendations. The technology thus enables eccentric training with faster training results in strength development and less strenuous training, said the company.

Another project realization combining electronic and IoT expertise has been carried out in the development of an efficient and cloud-based irrigation control system for food cultivation, explained the company. On the hardware side, an energy-saving field module was developed that controls actuators and enables the connection of local sensors in the field. Thanks to energy-saving electronics, the field module can be operated self-sufficiently with a battery and a solar module. Using Lora technology, any number of field modules can communicate wirelessly with an edge controller (EC).

Equipped with an LTE module, the cloud-based backend is accessed via the central module using the Internet. For system security, upcoming sequences are stored in the central module so that irrigation works even without a connection to the backend. The

backend is the heart of the project, where algorithms are working that enable a cost-saving irrigation, said the company. Redundant server systems guarantee availability close to 100%, they added.

The frontend is realized via a progressive webapp. Through this webapp the automated irrigation can be planned, controlled and managed. In case of an error, whether it is a defective valve or a sensor that exceeds a limit value, the user is informed via push notification and can react directly even if they are not on site at the installation. The system gives the farmer more flexibility, and by connecting the sensors, the control system benefits directly from daily updated data, thus avoiding over-irrigation and conserving resources through lower water consumption.

The Industry 4.0 era is increasing the demand for smart devices. IoT is also changing the requirements for electronics and the development of solutions must always take into account the networked approach. New devices do not always have to be developed, but existing ones can also be retrofitted with IoT solutions to keep investments smaller and meet sustainability requirements.

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