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DEVELOPMENT OF ANALOG AND DIGITAL INPUT OUTPUT DATA AND ETHERNET NETWORK INTERFACE DEVICE

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Over the past few decades, the internet has grown to become one of the pioneering information providers for the entire globe. Currently, it serves the visual, auditory and mental needs of millions of its users by hosting videos, audios and online text. In addition, it offers a widely expanded and well established computer network platform to communicate data from sensors to monitor processes and send signals to control such processes. Until the recent past, such ideas were not considered attractive because of issues in network reliability, real-time delivery and hardware accessibility.

While the first two issues have been addressed by various researchers and an ample amount of solutions have been developed and installed, this paper presents an approach from scratch carried out at undergraduate level to interface sensors and actuators to Ethernet physical layer and hence address the hardware accessibility problem. The designed and implemented electronic hardware consists of analog and digital signal interfaces to a stand-alone network connectible hardware unit. The unit consisting of two interfaces can be configured, controlled and used for communication from a remote server in the computer network.

The design of this hardware unit opens up new opportunities in the industry and extends its current capabilities in the factory floor level, which enables a single protocol covering distributed control systems, maintenance and monitoring of processes and system administration.

Even though the capability of the Ethernet for time critical applications has been proved both theoretically and experimentally, due to market monopoly maintained by well established vendors, it is still difficult to convince the potential to many real-time industry applications. However, a less exhaustive approach would be to introduce the Ethernet through an Analog and Digital Input Output Data unit presented here for non-time critical applications. An area of very high potential would be building management systems, where the network backbone is inherently the Ethernet.