Visualization of Human Posture Based on Accelerometer Data

Evgeny Tsvetkov

Petrozavodsk State Univercity

Petrozavodsk, Russia

cvetkov@cs.karelia.ru

Abstract

Determine the position of man and identify some features of its movements may be necessary in some cases. This feature can be used in medicine. Knowing the position of the patient's body can be judged on his or her physical activity. In the case of establishing the fact of man's fall, immediately to help.

Of course the device having such capabilities exist. For example, many models of mobile phones have an accelerometer. But, such devices are not designed for fixing on the human body. Their position may change. And the ability of accelerometers may not satisfy our goals.

The device must be fixed on the human body and must have sufficient characteristics to identify the various special features human movement.

In the course of this work was developed a prototype device to determine the position in space. Also written software for data processing and transmission to a computer for subsequent visualization.

The prototype device consists of a microcontroller ATmega and MEMS sensor LSM303. The transfer of data between them is carried out through the I2C interface. The microcontroller processes the data and transmits them to the interface UART. The receiver in this case can be COM-port on the computer, converter RS-232 to USB or Bluetooth module. The last two options on the PC side will create a Virtual COM-port. Thus, software that will render the data, receive data from the COM-port, and do not depend on the method of physical connection. We use Python scripts for data visualization.

ATmega running at a frequency of 8 MHz internal clock. In the current version of the data is read from the accelerometer 20 times per second. The speed UART 9600 bps. The device is powered by usb, but it can be powered by batteries, such as li-ion 3,7V.

In the future we plan to record a typical accelerometer data fall of man and on the basis of their ability to develop automatic detection of such situations.

Index Terms: ATmega, MEMS, LSM303, I2C, UART.