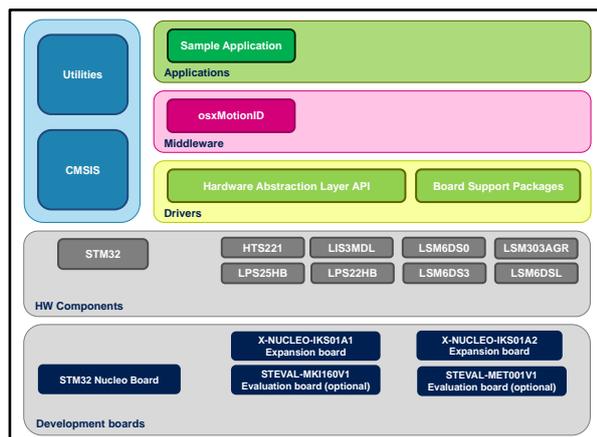


Real-time motion intensity detection software expansion for STM32Cube

Data brief



Features

- Real-time motion intensity detection algorithm (under OpenSoftwareX license) based on accelerometer data only, designed for wrist applications.
- Complete middleware to build applications on top of X-CUBE-MEMS1.
- Libraries for ARM Cortex-M3 and ARM Cortex-M4 MCU cores.
- Easy portability across different MCU families, thanks to STM32Cube.
- PC-based Windows application to log data.
- Sample implementations available on X-NUCLEO-IKS01A2 and X-NUCLEO-IKS01A1 (with optional STEVAL-MKI160V1) expansion boards, mounted on a NUCLEO-F401RE or NUCLEO-L476RG development board.

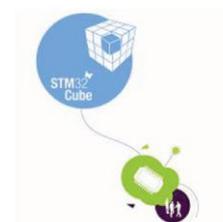
Description

osxMotionID is an add-on software package for X-CUBE-MEMS1. The software runs on STM32 and includes drivers that recognize ST inertial sensors LSM6DS0, LSM6DS3 or LSM6DSL.

By outputting an intensity value in the range [0:10] (i.e., from doing nothing to sprinting), this library may be used for real-time evaluation of activities for the accurate calculation of calories or to distinguish between active and non-active stationary status.

The algorithm manages the data acquired exclusively from the accelerometer at the low sampling frequency of 16 Hz to reduce the power consumption of the hosting platform.

The software comes with sample implementations of the drivers, exploiting STM32Cube software technology and running on X-NUCLEO-IKS01A2 or X-NUCLEO-IKS01A1 expansion boards with optional STEVAL-MKI160V1, mounted on a NUCLEO-F401RE or NUCLEO-L476RG development board.



What is STM32Cube?

STM32Cube™ represents the STMicroelectronics initiative to make developers' lives easier by reducing development effort, time and cost. STM32Cube covers the STM32 portfolio.

STM32Cube version 1.x includes:

- STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.
- A comprehensive embedded software platform specific to each series (such as the STM32CubeF4 for the STM32F4 series), which includes:
 - the STM32Cube HAL embedded abstraction-layer software, ensuring maximized portability across the STM32 portfolio
 - a consistent set of middleware components such as RTOS, USB, TCP/IP and graphics
 - all embedded software utilities with a full set of examples

How does this software complement STM32Cube?

osxMotionID is an add-on software package for X-CUBE-MEMS1, based on the STM32CubeHAL hardware abstraction layer for the STM32 microcontroller. X-CUBE-MEMS1 extends STM32Cube by providing a board support package (BSP) for the sensor expansion boards and some middleware components for serial communication with a PC.

The osxMotionID real-time software is designed for wrist devices, whereby acquired accelerometer data is used to determine the intensity of the activity carried out by the user.

The software can be used in conjunction with other wrist motion recognition algorithms like osxMotionAW to significantly improve user experience in advanced motion-based applications in the consumer, computer, industrial and medical fields.

Since the motion intensity detection for wrist is specifically for wearable applications, the exclusive use of the accelerometer in osxMotionID facilitates the implementation of the low power consumption strategies suitable for this application segment.

The osxMotionID package includes a sample application that developers can use to experiment with the code. Once the intensity has been recognized, the relative code and an associated time tag are logged in the MCU memory. The complete acquisition may be then transferred to a PC with a specific GUI for further offline analysis.

Alternatively, the sample application may work in GUI-driven mode, i.e. acquired sensors data and detected pose may be shown in real-time by means of the same GUI.

Revision history

Table 1: Document revision history

Date	Version	Changes
09-Nov-2016	1	Initial release.

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