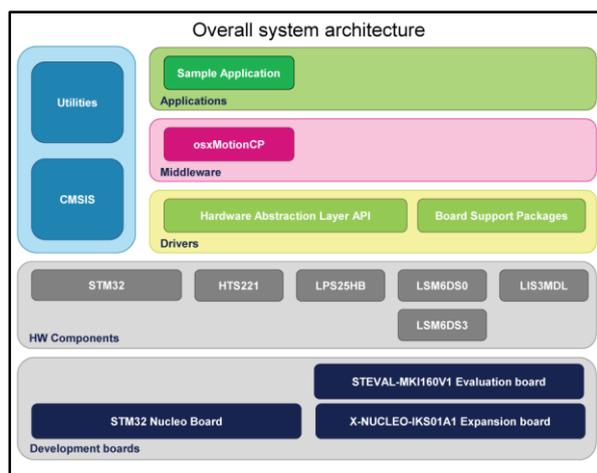


Real-time carrying position software expansion for STM32Cube

Data brief



Description

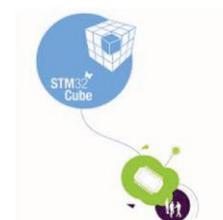
osxMotionCP is an add-on software package for X-CUBE-MEMS1. The software runs on the STM32 and includes drivers that recognize inertial sensor LSM6DS0 or LSM6DS3. It provides real-time information regarding the position of the board (e.g. on a desk, in the hand, near the head, in a shirt pocket, a trouser pocket, as well as information associated with movement such as the arm swing typical of mobile phone carrying positions).

The algorithm manages only the data acquired from the accelerometer at 50 Hz sampling frequency, contributing to the reduction of power consumption in the hosting platform.

The software comes with examples of implementation of the drivers, exploiting STM32Cube software technology and running on the X-NUCLEO-IKS01A1 when connected to the STEVAL-MKI160V1, mounted on top of the NUCLEO-F401RE or NUCLEO-L476RG.

Features

- Real-time carrying position algorithm (under OpenSoftwareX license) based only on accelerometer data
- Complete middleware to build applications on top of X-CUBE-MEMS1
- Libraries for Cortex-M3 and Cortex-M4 MCU cores.
- Easy portability across different MCU families, thanks to STM32Cube
- Sample application to transmit real-time sensor data and carrying position detection data to a PC, or to log position data previously detected and stored
- Example implementation available on board X-NUCLEO-IKS01A1 (also plugged into STEVAL-MKI160V1), mounted on top of an NUCLEO-F401RE or NUCLEO-L476RG



What is STM32Cube?

STM32Cube™ represents an original initiative by STMicroelectronics to ease developers' life by reducing development efforts, time and cost. STM32Cube covers STM32 portfolio.

Version 1.x of STM32Cube includes:

- The STM32CubeMX, a graphical software configuration tool that allows to generate C initialization code using graphical wizards.
- A comprehensive embedded software platform, delivered per series (such as STM32CubeF4 for STM32F4 series)
 - The STM32Cube HAL, an STM32 abstraction layer embedded software, ensuring maximized portability across STM32 portfolio
 - A consistent set of middleware components such as RTOS, USB, TCP/IP, graphics
 - All embedded software utilities, including a full set of examples

How does this software complement STM32Cube?

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

The osxMotionCP is real-time software that acquires data from the accelerometer and recognizes where the board is positioned. The software can be also be joined with other human motion recognition algorithms to significantly improve user experience in advanced motion-based applications in the consumer, computer, industrial and medical fields. Since carrying position uses specific software for mobile and wearable applications, the exclusive use of the accelerometer in osxMotionCP facilitates the implementation of the low power consumption strategies suitable for these application segments. The osxMotionCP package includes a sample application that developers can use to experiment with the code. Two working modes are implemented. In stand-alone mode, once the position has been recognized, the relative data code and an associated time tag are logged in the MCU memory. The last recognized position may be displayed by means of a on-board LED, whose blinking rate varies according to the position. Moreover, the whole acquisition may be transferred to a PC with a specific GUI for further offline analysis. In GUI driven mode, the acquired sensor data and the position detected data are shown in real-time by means of the application GUI.

1 Revision history

Table 1: Document revision history

Date	Version	Changes
20-Oct-2015	1	Initial release.
18-Dec-2015	2	Updated cover page "Features" and "Description"
05-May-2016	3	Updated <i>Section "Features"</i> with Cortex-M3 support information.

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