



DT0047 Design tip

How to install and run the osxMotionAR Activity Recognition library

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Main components	
osxMotionAR	Real-time Activity Recognition software expansion for STM32Cube
X-NUCLEO-IKS01A1	Motion MEMS and environmental sensor expansion board for STM32 Nucleo
STEVAL-MKI160V1	LSM6DS3 adapter board for a standard DIL24 socket
NUCLEO-F401RE	STM32 Nucleo-64 development board with STM32F401RET6 MCU, supports Arduino and ST morpho connectivity

How to install the osxMotionAR Activity Recognition SW library

The osxMotionAR is an add-on software package for X-CUBE-MEMS1. The software runs on STM32 MCU and includes drivers that recognize the ST inertial sensors, LSM6DS0 and LSM6DS3. It provides real-time information on user activity (stationary, walking, fast walking, jogging, biking and driving).

The following steps are necessary to correctly install the osxMotionAR Activity Recognition library on the NUCLEO-F401RE evaluation board:

1. Plug the X-NUCLEO-IKS01A1 expansion board into the Nucleo-F401 board (if the STEVAL-MKI160V1 board is available, plug it into the X-NUCLEO-IKS01A1 expansion board).
2. Connect the Nucleo-F401 board to the PC through a mini-USB cable. Drivers will be automatically installed.
3. If the X-CUBE-MEMS1 package is already installed on the PC to go step 4, if not
 - Download the X-CUBE-MEMS1 package from st.com
 - Unzip the file (suggested location: "C:\Program Files (x86)\STMicroelectronics\OpenSoftwareX").
4. Download and install the package, osxMotionAR from st.com. Note: the default installation will create a folder named "Workspace" in the folder "C:\Program Files (x86)\STMicroelectronics\OpenSoftwareX". This will also install the OSX LicenseWizard. Note: the default



installation will create a folder names "OSX LicenseWizard" in the folder "C:\Program Files (x86)\STMicroelectronics\OpenSoftwareX"

5. From the osxMotionAR package, copy the folder STM32_OSX_MotionAR_Library (in "\Middlewares\ST") into the X-CUBE-MEMS1 package in the folder "\Middlewares\ST". Note: if the path "\Middlewares\ST" is not present in the X-CUBE-MEMS1, create it.
6. From the osxMotionAR package, copy the folder DataLogActivity (in "Projects\STM32F4xx-Nucleo\Applications") into the X-CUBE-MEMS1 package in the folder "Projects\Multi\Examples".
7. Open the OSX LicenseWizard:
 - Select "MotionAR" library in the "Select the library to be activated..." button.
 - Click on "Identify STM32 Nucleo board".
 - Generate a license request.
 - Send the license request. An automatic mail will be sent from open.mems@st.com with a node-locked license number.
8. To compile the application example there are available three different IDEs: IAR Embedded Workbench, KEIL, and System Workbench for STM32. Taking as a reference IAR, open the project DataLogActivity in the folder "Projects\Multi\Examples\DataLogActivity\EWARM"
 - Copy and paste the license number obtained in step 7 into the file *osx_license.h* in the folder "\Middlewares\ST\STM32_OSX_MotionAR_Library"
 - Compile the project and download into the target Nucleo-F401RE board.

How to run the Activity Recognition demo

The steps in table below are necessary to run the reference example demo embedding the osxMotionAR library.

NOTE 1: PC GUI is the executable "Sensors_DataLog.exe" located in the X-CUBE-MEMS1 package in the folder "\Utilities\PC_software\Sensors_DataLog"

NOTE 2: If connected to a PC with a mini-B USB cable, then steps 2 and 3 have to be done without the PC GUI open.

Step	What to do	Output
1) Power on the board	Connect to Nucleo board: <ol style="list-style-type: none"> a. either the external battery and close the jumper JP1 on the Nucleo board b. or the mini-B USB cable to PC 	LD3 ON
2) Run the algorithm	Press the B1 button	LD2 blinking fast
3) Stop the algorithm	Press the B1 button a second time	LD2 blinking with code as in Table2 "LED LD2 activity codes" in UM1936



4) Connect to the PC GUI application	a. If battery is connected, disconnect battery and plug Nucleo board into PC with a mini-B USB cable and then start the application b. Start the application	the "Upload AR" button is enabled in the GUI
5) Collect data	Press "Upload AR" button in the GUI	Data shown in the PC GUI
6) Save data log	Press button "Save AR" in the GUI	.csv file saved in the folder " <code>\\Utilities\\PC_software\\Sensors_DataLog\\SensorsDataLog</code> "

Support material

Related design support material
Product Evaluation boards: X-NUCLEO-IKS01A1 STEVAL-MKI160V1 NUCLEO-F401RE
Development kits: osxMotionAR: Real-time Activity Recognition software expansion for STM32Cube X-CUBE-MEMS1
Documentation
Data brief: DB2613: Real-time activity-recognition software expansion for STM32Cube
User manual: UM1936: Getting started with osxMotionAR activity recognition library for X-CUBE-MEMS1 expansion for STM32Cube

Revision history

Date	Version	Changes
04-Dec-2015	1	Initial release