Level 1 – Get inspired and Try



Get inspired

MLC examples are available online at the dedicated **GitHub project for Machine Learning Core**



- Consumer
 - 6D position recognition, Activity recognition, Gym activity recognition, Head gestures
- Industrial
 - 6D position recognition, Motion intensity, Vibration monitoring
- Automotive
 - Vehicle stationary detection

... and more to come!



github.com/STMicroelectronics/STMems_Machine_Learning_Core



Choose your MLC demo from GitHub

Open <u>GitHub MLC page</u> in your mobile device

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№ 1 - Introduction

This repository is intended to provide information on the **Machine Learning Core** feature available in some **MEMS sensors**.

Machine Learning processing allows



Select sensor

Choose MLC algorithm

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Explore the folder

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Desktop version

3



<u>Watch a video</u> showing this demo on Microsoft Stream.

Header file – standard header file to be included in C project UCF – configuration file for ST tools (ST BLE app, Unico)



Download MLC configuration

Open UCF file & long press on Raw button

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life.augmented

Download UCF file to your phone



Read README.md file with description

	 0 = vibration1 (no vibration) 1 = vibration2 (low)
	vibration)
	 2 = vibration3 (high
	vibration)
-	onfiguration generates an
C	ornigulation generates an
c rr	upt (pulsed) on INT1 pin every he register MLC0_SRC (70h) is

http://www.st.com

Copyright © 2019

STMicroelectronics

You will need this later on

4

SensorTile.box

Your entry point to ST MEMS sensors





Barometer and Temp/Humidity



Pedometer (step counter)



Data recorder (on SD card)



Vibration monitoring and Training



Baby crying detection

Compass &

Sensor Fusion

(quaternions)

Level





MLC based

5







STWIN



BlueTile

Sensor data reception over BLE Data plot and log, publish to cloud

app for Android and iOS

ST BLE Sensor

SensorTile



WESU1

BlueCoin



STM32Nucleo + MEMS + BLE expansion





Support multiple platforms and STM32Cube Function Packs through **BlueST-SDK** protocol

Application for SensorTile.box

creation & upload







Create new MLC App

Select MLC as Input source

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SET INPUT

Start ST BLE Sensor app & opt to Create new App * 📲 🚟 🐋 🖬 85% 🛢 14:18 ST BLE Sensor CONNECT TO A DEVICE Create a new App **ATI** ST BLE Sensor Open BLE Toolbox About ST BLE Sensor Version:4.6.4 © 2019 STMicroelectronics

Scroll down & go to EXPERT view

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Create new App



Run your MLC!

Configure INPUT, set OUTPUT to Bluetooth

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New App		← Input options
		MLC VIRTUAL SENSOR
2		CONFIGURATION FILE
INPUT		LSM6DSOX_VIBRATION_MONITORING.UCF
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		DECTREE1 DT1
		OUTPUT LABEL
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Choose a function		2 High vibration
		=+
		DECTREE2 DT2
OUTPUT		· · · · · · · · · · · · · · · · · · ·
Stream to Bluetooth	\$	✓ SAVE CONFIG
		Output values are described
		in README file on github.
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Upload (PLAY) the program to your SensorTile.box

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Switch to MLC view & see your results

Machine L START LOGGING :	
Decision Tree: 0 - DT1 Value: High vibration (0x2)	
Decision Tree: 1 Value: 0x0	
Decision Tree: 2 Value: 0x0	
Decision Tree: 3 Value: 0x0	
Decision Tree: 4 Value: 0x0	
Decision Tree: 5 Value: 0x0	
Decision Tree: 6 Value: 0x0	
Decision Tree: 7 Value: 0x0	



Select UCF file to be used &

label outputs