

# LSM6DSOX

## iNEMO<sup>®</sup> 6-axis inertial module with Machine Learning core



### Motion Sensor with machine learning for High-Accuracy, Battery-Friendly activity tracking

The LSM6DSOX is a system-in-package IMU featuring a 3D digital accelerometer and a 3D digital gyroscope boosting performance and enabling always-on low-power features for an optimal motion estimation and user experience.

The LSM6DSOX contains a decision-tree and a machine-learning core to classify motion data based on known patterns. Relieving this first stage of activity tracking from the main processor saves energy and accelerates motion-based apps such as fitness logging, wellness monitoring, personal navigation and fall detection.

The LSM6DSOX fully supports EIS and OIS applications and closed-control loops: this core function can be configured from the primary interface (SPI / I<sup>2</sup>C & MIPI I3CSM) or from the dedicated auxiliary SPI bus.

#### KEY FEATURES

- Machine Learning Core (MLC) for advanced Motion Recognition and Classification
- Finite State Machine (FSM) for up to 16 custom movement recognition in low power mode
- Dedicated OIS or control core with Aux Interface
- I3C interface
- Data acquisition from up to 4 external sensors (Sensor hub)
- High accuracy, HW configurable, step counter 2.0
- Up to 9kB FIFO sensor data in compressed mode (3.5kB uncompressed)

## ADVANCED FEATURES

The machine-learning core works in conjunction with the integrated finite-state machine logic to handle motion pattern recognition or vibration detection. Customers creating activity-tracking products with the LSM6DSOX can train the core for classification using Weka, an open-source PC-based application, to generate settings and limits from sample data such as acceleration, speed, and magnetic angle that characterize the types of movements to be detected.

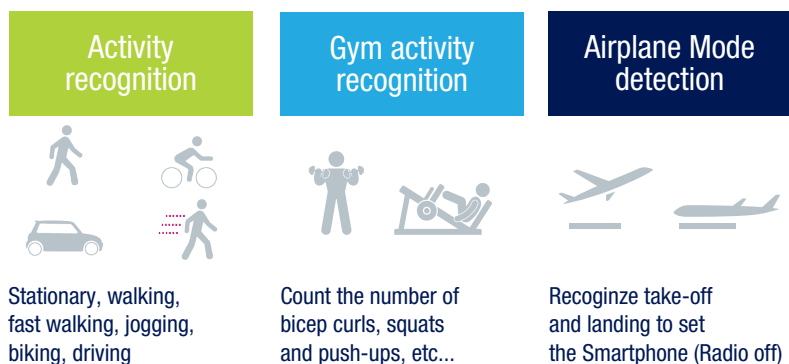
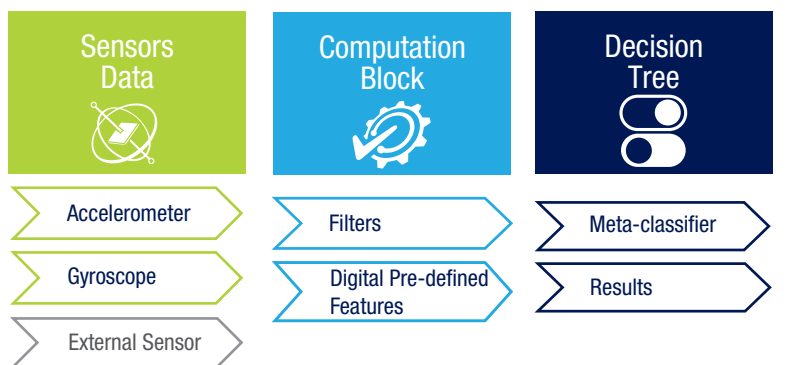
The support for native free-fall, wakeup, 6D/4D orientation, click and double-click interrupts allows a wide variety of applications such as user-interface management and laptop protection in addition to activity tracking.

The auxiliary output interface and configuration options also simplify the use in optical image stabilization (OIS/EIS) applications and when closing fast control loops.

## KEY APPLICATIONS

- Motion tracking and gesture detection
- Sensor hub
- Indoor navigation
- IoT and connected devices
- Smart power saving for battery-operated devices
- EIS and OIS for camera applications:
  - Forklift/Robots and machine control
  - Vibration monitoring and compensation

## MACHINE LEARNING CORE



## EVALUATION TOOLS

Part number	Description
STEVAL-MKI109V3	Professional MEMS tools board
STEVAL-MKI197V1	LSM6DSOX Adapter board
X-NUCLEO-IKS01A2	Motion MEMS and environmental sensor expansion board for STM32 Nucleo
AlgoBuilder	Application for the graphical design of algorithms

For further information please visit <http://www.st.com/inemo>



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