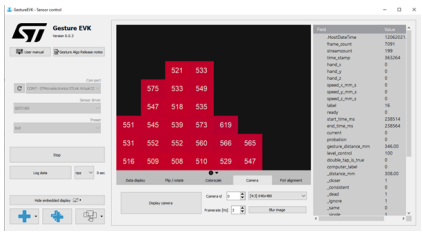
STSW-IMG035

Data brief

Turnkey gesture recognition solution based on VL53L5CX multizone Time-of-Flight ranging sensor



Product status link
STSW-IMG035

Features

- Gesture recognition, based on ST's Time-of-Flight (ToF) technology:
  - Hand tracking: accurate real-time position of the user hand in cartesian coordinate system (X, Y, and Z)
  - Tap and double tap
  - Left and right swipe
  - Level control
  - Additional gestures may be enabled
- Ready to use solution allowing easy integration:
  - Complete application example for STM32F401 microcontroller showing the library integration in an MCU project and including the VL53L5CX configuration and crosstalk calibration example
  - Turnkey gesture library on several Arm® Cortex® microcontroller units
- Intuitive GUI to discover the gesture recognition:
  - Multiple graphical widgets (gesture recognition, hand tracker, photo viewer, slide show control, and more)
  - Data logging function to replay and debug
- Benefits of gesture recognition, based on FlightSense technology:
  - Full privacy, no image, no camera module
  - Independent of target reflectance. Gesture recognition performs well even when wearing gloves
  - "All-in-one sensor" easy to integrate, and can be hidden behind a dark cover glass
  - Low power consumption and ease of integration in any architecture

Application

- Home appliances and home automation:
  - Kitchen appliances (such as coffee machine, cooking plate, oven)
  - Smart home (thermostats, control panels, and so on)
  - Smart lighting
- Personal electronics:
  - Laptops
  - AR/VR headsets
  - Tablets and smartphones
  - Smart speakers
- Multiple other applications:
  - Robotics (service and educational robots)
  - Sanitary devices
  - Vending machines
  - Industrial robots
  - Elevator call buttons
  - Toys

Description

Based on the VL53L5CX Time-of-Flight 8x8 multizone ranging sensor with wide field of view, the STSW-IMG035 is a simple and robust gesture recognition solution. The software includes a complete development ecosystem with ready-to-use example code an intuitive GUI for reduced design times.

The VL53L5CX gesture recognition algorithms can detect multiple motions: tap, double tap, left and right swipe, as well as level control.

The application can run on microcontrollers based on Cortex® M0+ and M4-based microcontrollers, thanks to the libraries available in the package. The package includes: the GUI executable, example code for the NUCLEO-F401RE board, libraries for supported Cortex® cores, and an easy-to-read user manual.

To run the GUI, a VL53L5CX Nucleo expansion board (X-NUCLEO-53L5A1) is required with a NUCLEO-F401RE Nucleo board. These two boards are also available as a kit under P-NUCLEO-53L5A1. You can also use the breakout boards (VL53L5CX-SATEL) connected to the STM32 Nucleo board as described in the application note AN5717.

One major advantage of this gesture solution is that it provides full privacy thanks to the VL53L5CX computing distance information (no image, no camera). The performances are independent of target reflectance. The solution works even with gloves or in low light conditions, unlike camera-based solutions.

The gesture recognition mode can be combined with the distance measurement mode of the VL53L5CX sensor, allowing user detection and system activation use-cases. The small size of the sensor makes it easy to integrate, and it can be hidden behind a dark cover window.

Gesture recognition can be used to enhance numerous applications and end-products. It perfectly fits to home appliances devices like coffee machines, cooking plates or ovens. In public places, it could control vending machines, elevator call buttons, and more. Personal electronics can also benefit from gesture recognition: especially in smart speakers, laptops, tablets, or AR/VR headsets.

The VL53L5CX allows multi-zone distance measurements with up to 8x8 real time native zones and a wide 63° diagonal field of view. Each zone of the sensor can measure the distance to a target at up to 4 meters with a maximum frequency of 60 Hz. With ST's patented histogram algorithms, the VL53L5CX is able to detect multiple objects within the FoV and ensures immunity to cover glass crosstalk beyond 60 cm.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
07-Apr-2022	1	Initial release