The BME280 is designed with 2 communication interfaces, SPI and I2C, configurable via the shared 4 pins, CSB, SDI, SCK, and SDO [datasheet]. Although the STM32F103CBT6 microcontroller has 2 SPIs, both are reserved for other modules. Moreover, while the number of slaves on each SPI bus is limited by only the number of GPIO pins as SS pins, having multiple devices on the same bus introduces higher current consumption, thus lower communication effectiveness, particularly in low-power applications. The increased power consumption issue by more slaves also exists for I2C buses, but it would be much lower since this interface addresses the slaves by software [https://www.wevolver.com/article/spi-vs-i2c-vs-uart-in-depth-comparison]. As a result, the I2C interface is utilised for BME280 in this thesis.

According to [datasheet], the BME280 is put into I2C mode by keeping the CSB pin “HIGH” at VDDIO; while the SDO pin is pulled either “HIGH” or “LOW” by direct wirings to VDDIO or GND respectively to set the I2C address to 0x77 or 0x76. Since the Arduino library for BME280 [BME280 library by Ladyada] chooses 0x76 as the default I2C address for the sensor, this thesis designs the hardware as such.