1. Introduction

WIMA is an API designed to support image transmission over Wirelles Sensor Networks (WSN), it provides a collection of classes to facilitate the implementation and experimentation of visual systems over WSN. This work is a practical extension of an image transmission research, the design is based on the main techniques found on the literature. The API design aims to support the simulation process, it is ready to use Contiki-ng/Cooja which is a popular academic OS and simulator tool for Internet Og Things applications.

The API has the fundamental characteristic the ease of adaptation and extension for using in IoT applications, tailored for experimentation of various identified scenarios. Due WSN technical constraints, compression, change detection and optimized transmission algorithms are explored on the literature to overcome the WSN technology limitations.

2. WIMA

The API is divided in the following components :

- Image components: Represents the image data information to be transmitted over the network, they are named **tImage** and **tImageDB,** defined in figure 2. The **tImage** component means an image data while **tImageDB** a ready to use database of images, taking advantage of the simulator.

- Image Slicing: Normally an image represents a large block of data to be handled, in a WSN environment the computational power is limited to solve heavy mathematical algorithms, then researchers slice the image into small fragments to solve such problems. Slicing is also necessary to transmit a large block of data on the network, it has a maximum size of data that can be transmitted at once. If the size of the transmitted data block is greater than a frame of the network, the fragmentation into smaller parts is required.

- Application Protocol: There are not specialized protocols to transmit large amount of data for WSN, the design of optimized protocols between transmitter and receiver is a mandatory component in API, its coordinate the transmission of data between the sender and receiver parts, AppProtocol components are presented in figure 4 and 5.

- Network: An entity to interface the transport layer, in which the data will actually be transmitted, considering WSN built with constrained device, UDP is the recommended protocol, Wima implements **TransferUDP** component for networking process, defined in figure 6.

- **Image compression:** Compression is the main technique to reduce amount of data to be transferred in a constrained wireless network, **Compression** represents the image while t**CompressedData** represents the compressed data when it exists.

- Change Detection : Change detection techniques detect the parts changed in a sequence of messages, in this way only the changed areas needs to be transmitted, **ChangeDetection** is a component to implement the change detection algorithm. Similarly the compression component, change detection is an optional implementation.

3. Components relationship

Considering two elements of the network, one to send (client) and another to receive (server), the possible relationships between the API components, their attributes and methods, on the client and server parts are described in the figure 1.

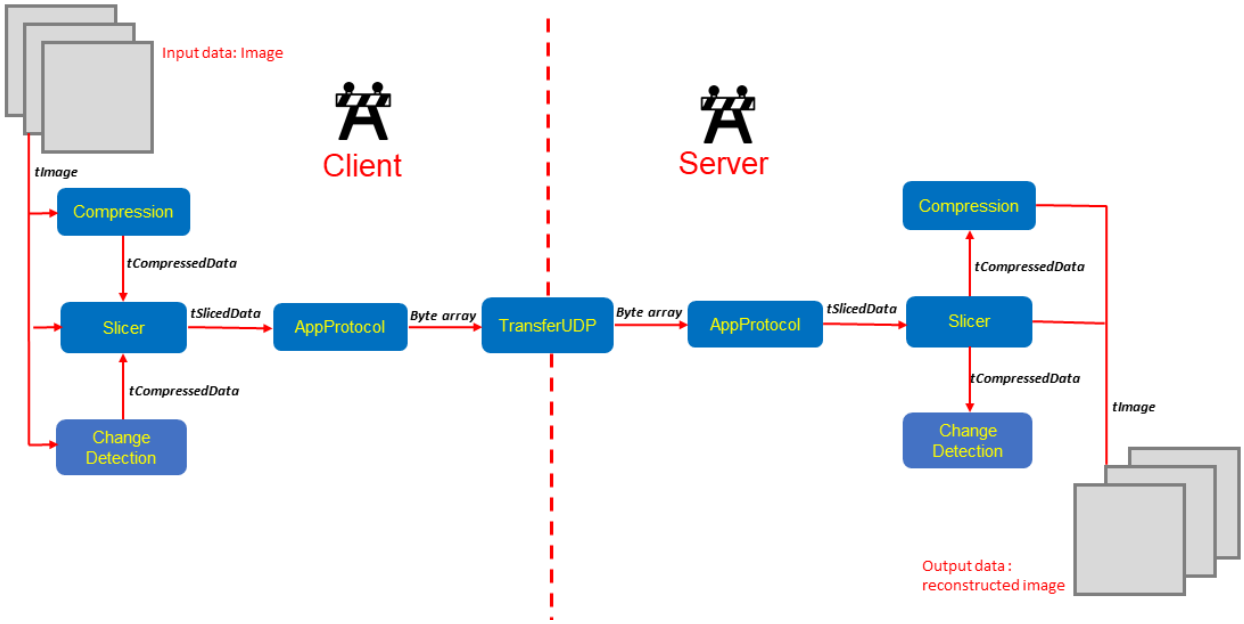

Figure 1: WIMA components behavior

3. WIMA API UML Classes

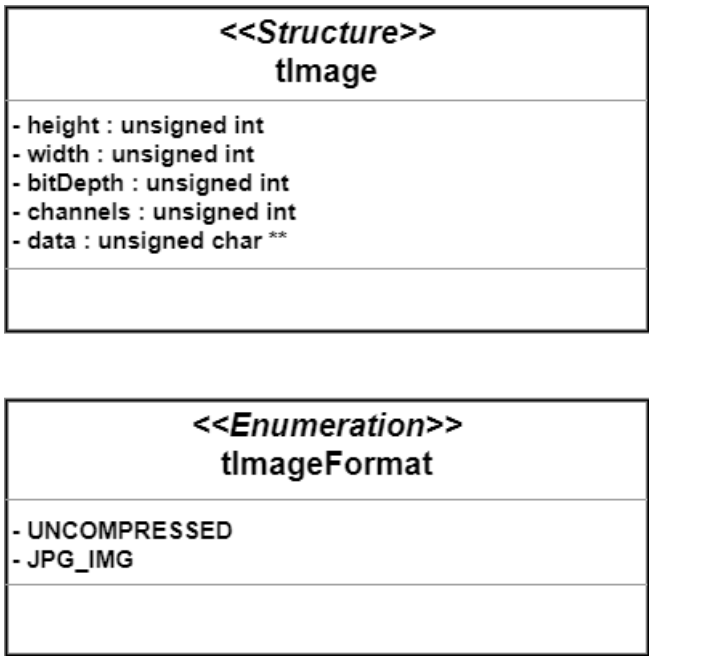

Figure 2: tImage and tImageDB UML classes

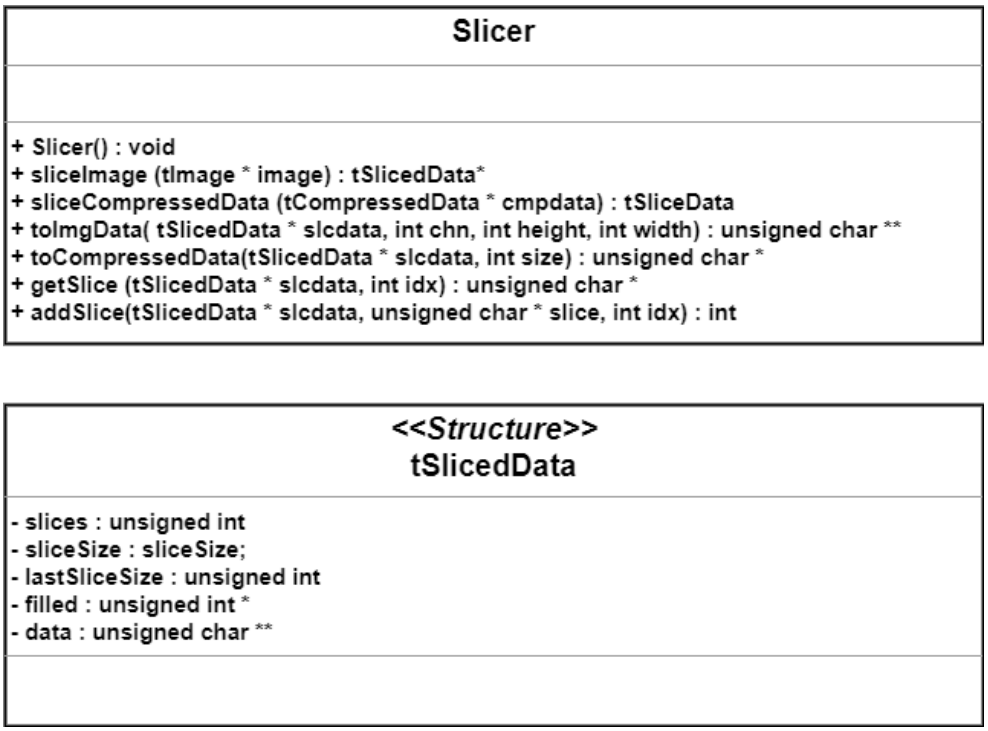

Figure 3 : Slicer UML classes

Figure 4 : AppProtocol UML classes part 1

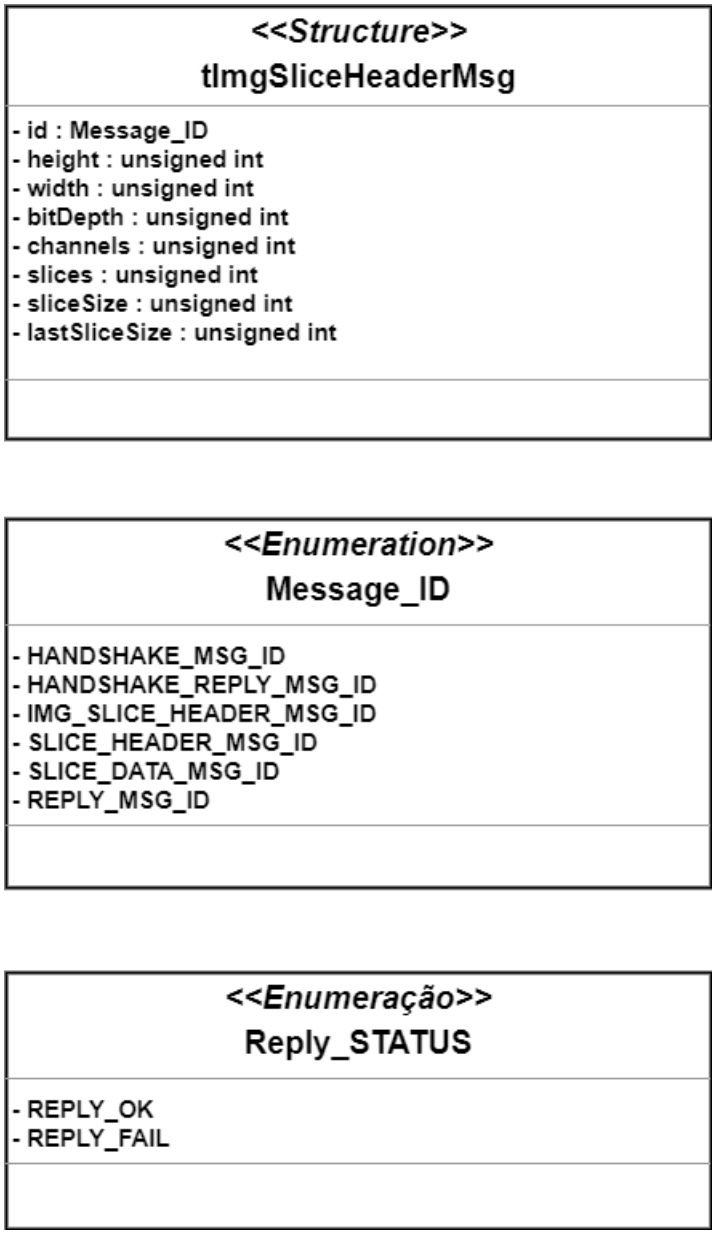

Figure 5 : AppProtocol UML classes part 2

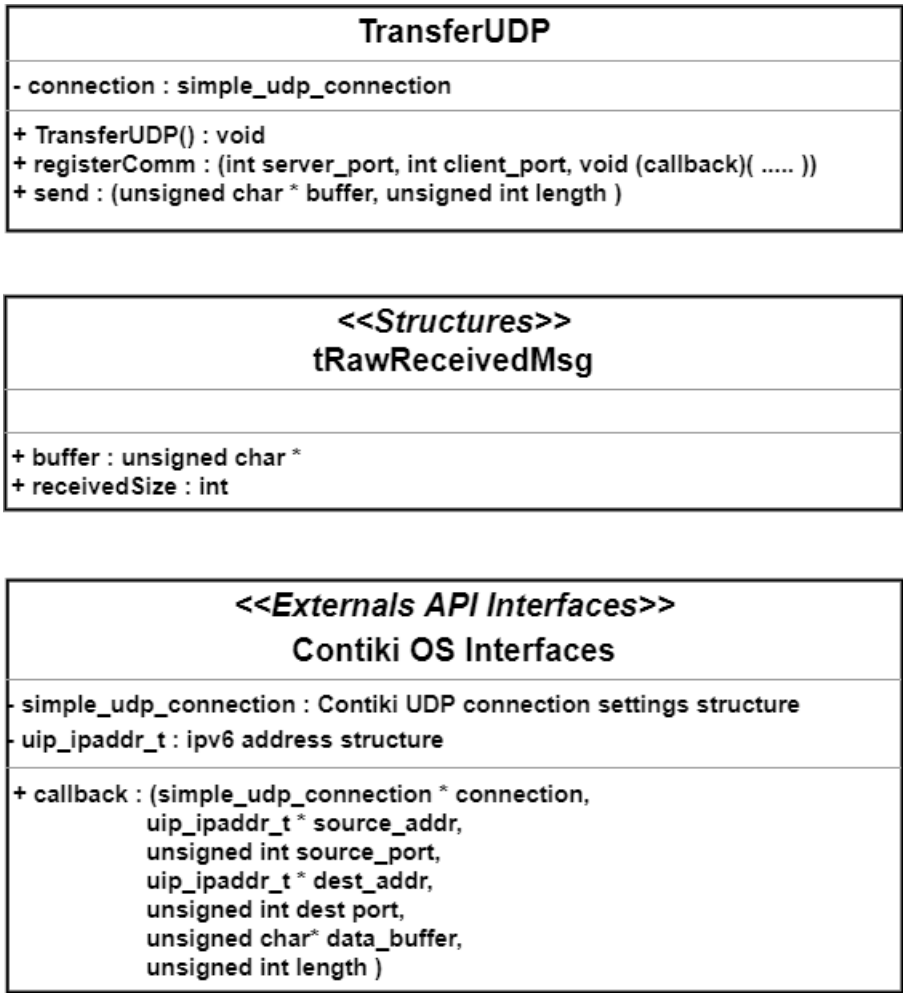

Figure 6 : TransferUDP UML classes part 2

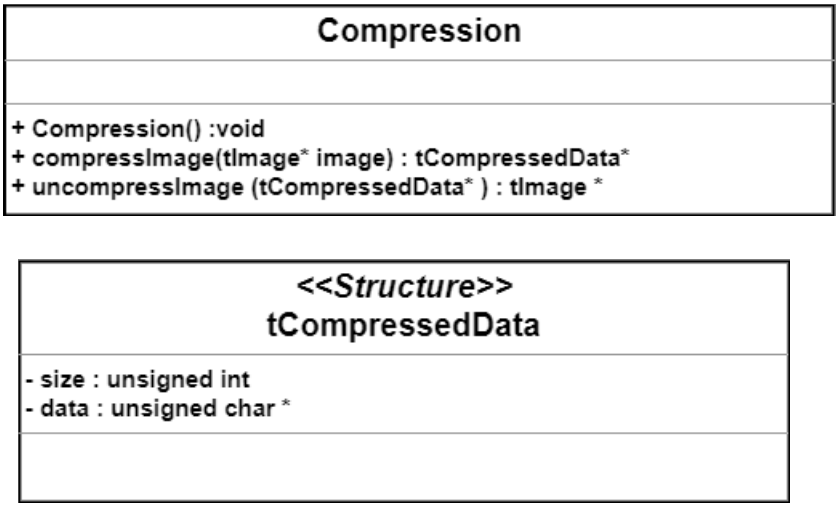

Figure 7 : Compression UML classes part 2

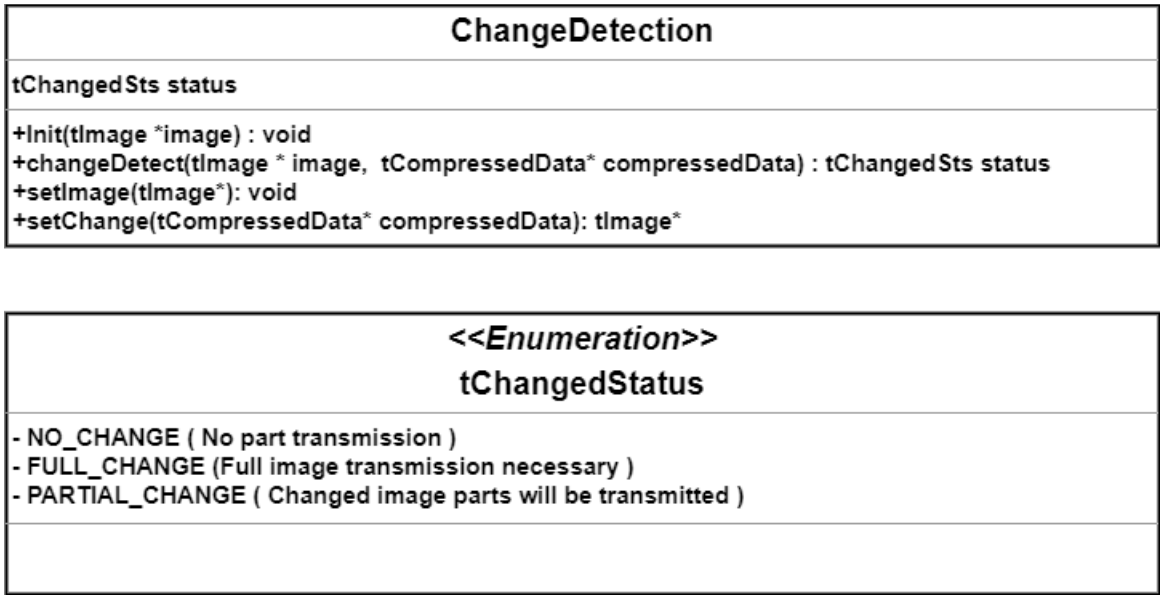

Figure 8 : ChangeDetection UML classes part 2