

# Portable augmentative and alternative communication device with pictogram recognition functionality for speech

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## Abstract

PictoBar is a next generation handheld electronic device for alternative and augmentative communication (AAC). It is used in rehabilitation therapies for speech-impaired people. PictoBar will include smart image processing capabilities to offer new possibilities to train the users and to let them express in a more intuitive and interactive manner.

## The PictoBar device



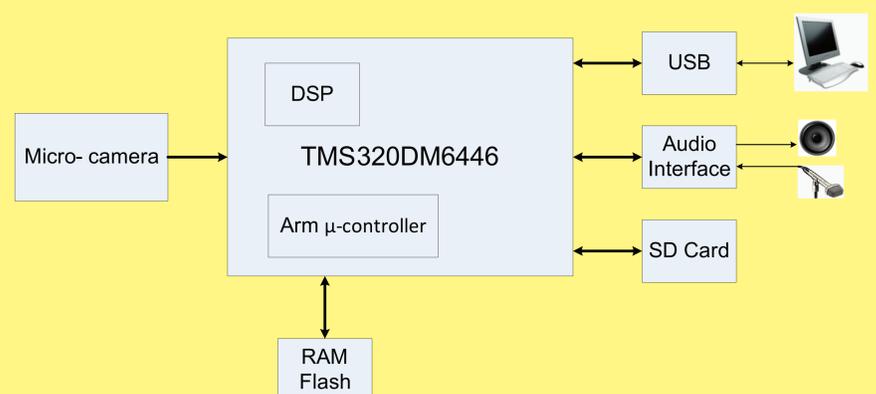
The user acquires an image with PictoBar (pictogram, picture or barcode). The device recognizes the image and plays its corresponding pre-recorded speech message.

Pictobar is intended to be used by language re-education professionals and specialized educators in the treatment of people affected by pathologies such as aphasia, autism, trisomy or mental handicaps. Beyond the rehabilitation domain, the system could be used in education, e.g. to teach foreign languages.

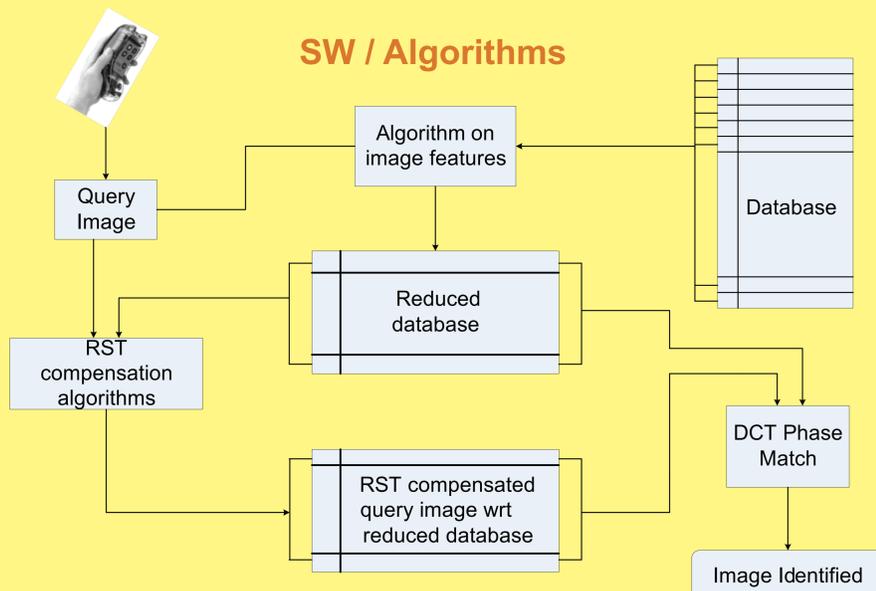


## HW Platform

- Micro-camera block with a CCD-module, fixed-focus optics and basic image processing (lighting, contrast, and white balance).
- TMS320DM6446 System-on-chip
  - Fixed point Digital Signal Processor (DSP)
  - Arm based micro-controller
- Interfaces : Audio I/O, USB, SD card



## SW / Algorithms



### For device

Algorithms, adapted to the application, for pictograms and picture recognition, as well as barcode identification

- => **Robustness to rotation, scaling, translation**
- => **Large database (about 1000 - 5000 pictograms)**
- => **Recognition time is less than 1 second**
- => **2 stage search to reduce complexity**
- => **Implementation on low-power portable device**

### For PC

Device configuration, User Interface, ...