Identify two embedded systems that are sold on the market today and analyze their interfaces.

Cameras that we use today are smart and have a lot of features that were not present in early cameras all because of the embedded system used in them. A digital camera has basically three functions, to capture an image which we call data, to store image data, and to represent this data. There is no need for the film for storing images. This feature has increased the storage capacity and made it easy to transfer images. In digital cameras, the first image is captured and converted to digital form.

Home security systems are used largely today. These systems have several features just as checking for fire or gas leakages, and detecting if someone suspicious tries to enter the house. A microcontroller is used for controlling all the operations. Sensors give data and if something wrong happens than safety alarms get activated.

Describe all inputs to each system and outputs from each system.

Components of a smart camera include image sensor that may be a CCD (Charge Coupled Device) or a CMOS (Complementary metal-oxide-semiconductor), Analog to digital converter (A2D), image processor, lens, LED, communication interface. The first image is captured and converted to digital form.

Sensors used in home security system include gas sensors, smoke sensors, temperature sensors, IR sensors, etc. Also, a keypad is included in such systems for entering a password at the gate. The output is received from alarms or some display. The output can also be sent to some distant location. The home automation system is also one of the examples of embedded systems as a home security system.

Classify the inputs and outputs based on their mode of interaction:

-Visual - describing data carried by visible light

-Audio - describing data carried by sound

-Tactile - describing data carried by touch

-Electronic - describing data encoded in electrical signals

DIGITAL CAMERA
* visual - the image sensor
* audio - audio sensors
* tactile - image is being processed
* electronics - the image source is being processed into a digital signal.

HOME SECURITY SYSTEM
* visual - iris scanner is being used
*audio - voice commands are being used
*tactile - data is carried through the microprocessor
*electronics - then the data is checked and analyzed whether it is correct or not