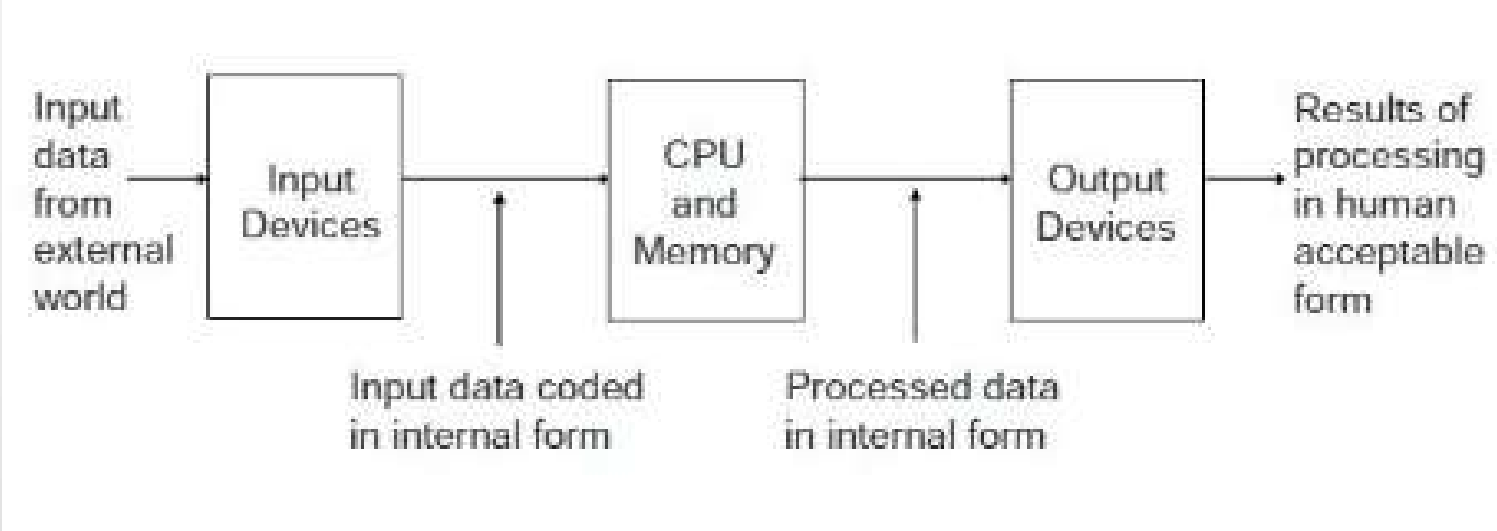
GLS UNIVERSITY

BCA101 COMPUTER FUNDAMENTALS & INFORMATION TECHNOLOGY.

UNIT– II

INTRODUCTION TO INPUT DEVICES

- Input is any data and instructions entered into the memory of a computer.
- Instructions entered into the computer can be in the form of programs, commands and user response.
  - program = series of instruction
  - command = perform specific action
  - user response = displays the answer
- Input devices are used to enter data from the outside world into primary storage.



TYPES OF INPUT DEVICES

- An input device is any hardware component that allows users to enter data and instructions into a computer.

KEYBOARD

KEYBOARD: A keyboard is an input device that contains keys users press to enter data into a computer.

Character keys

Enter and editing keys

Navigation keys

Numeric keypad

Modifier keys

System and GUI keys

Function keys

Lock keys

KEYBOARD

- Keyboard is the most common and very popular input device which helps in inputting data to the computer.
- Keyboards are of two sizes 84 keys or 101/102 keys, but now keyboards with 104 keys or 108 keys are also available.
- A gaming keyboard is designed specifically for users that enjoy playing games on the computer.

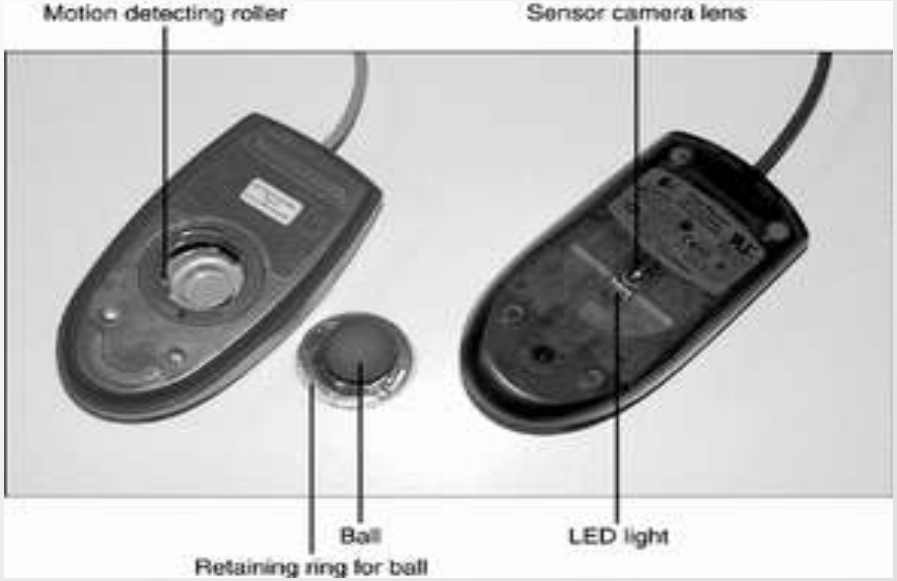
Keys	Description
Typing Keys	Include the letter keys (A-Z) and digit keys (0-9)
Numeric Keypad	Used to enter numeric data
Function Keys	The twelve function keys are present on the keyboard which are arranged in a row at the top of the keyboard. Each function key is used for some specific purpose.
Control keys	It includes four directional arrow keys. Control keys also include Home, End, Insert, Delete, Page Up, Page Down, Control(Ctrl), Alternate(Alt), Escape(Esc).
Special Purpose Keys/ Toggle Key	It also contains some special purpose keys such as Enter, Shift, Caps Lock, Num Lock, Space bar, Tab, and Print Screen.

MOUSE

- **MOUSE:** A mouse is a pointing device that fits under the palm of hand.
- It is a very famous cursor-control device having a small palm size box with a round ball at its base which senses the movement of mouse and sends corresponding signals to CPU when the mouse buttons are pressed.
- Generally it has two buttons called left and right button and a wheel is present between the buttons. Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the computer.

MOUSE

- **There are two types of mouse: 1. Mechanical Mouse & 2. Optical Mouse.**
- A mechanical mouse has a ball & rollers on the bottom which moves the pointer. An optical mouse has a light instead, and you don't even need a mouse pad to use it.
- Optical mouse uses LED (a diode) that emits the light and achieves sensitivity. The latter type is referred to as a laser mouse.
- Various operations like point, click, right click, double click, drag and drop, rotate wheel, etc. can be performed with mouse.



TOUCH SCREEN

- A **touchscreen** is a monitor or other flat surface with a sensitive panel directly on the screen that registers the touch of a finger as an input.
- A user can give input or control the information processing system through simple or multi-touch gestures by touching the screen with a special stylus and/or one or more fingers.
- It allows the user to interact with a device without a mouse or keyboard and is used with smartphones, tablets and computer screens.

TOUCH SCREEN

- A touch screen is a display device that allows the user to interact with a computer using their finger or stylus.
- They're a useful alternative to a mouse or keyboard for navigating a GUI (graphical user interface).
- Touch screens are used on a variety of devices, such as a computer and laptop displays, smartphones, tablets, cash registers, and information kiosks.

TOUCH PEN - Stylus

- In computing, a stylus is an instrument shaped like a pen, designed to be used with graphics tablets or devices that use touch screen input.
- It is used to write or draw on a screen, similar to how you would on a sheet of paper.
- Unlike a pen, styluses have a plastic or felt tip depending on its purpose and functionality.
- A stylus is a small basic plastic or steel device that is only used to input data. A digital pen resembles a stylus but is bigger and has its own capabilities.

TOUCH PEN - Stylus

- A stylus can come in two forms: passive (also known as a capacitive stylus) or active (also known as an active stylus or active pen).
- A passive stylus is not different than using your finger as far as the device is concerned.
- An active stylus has an electronic component that interfaces with the device's touch screen controller. They have a few distinct advantages: more accurate and finer lines, different levels of pressure sensitivity etc.

The stylus on the other end can let you write/draw on mobile phones, tablets and PDA.

Graphic Tablet

- A graphics tablet is a type of hardware input device. It is a way for artists to be able to do their work in digital form.
- Most graphics tablets have a pressure sensitive surface on which artist do their drawing work.
- The graphics tablet itself has to be connected to a computer or laptop in order to be fully utilized.
- Graphics tablets are used in combination with many different kinds of software, including graphics, animation, and sketching software.

Graphic Tablet

BIOMETRIC INPUT

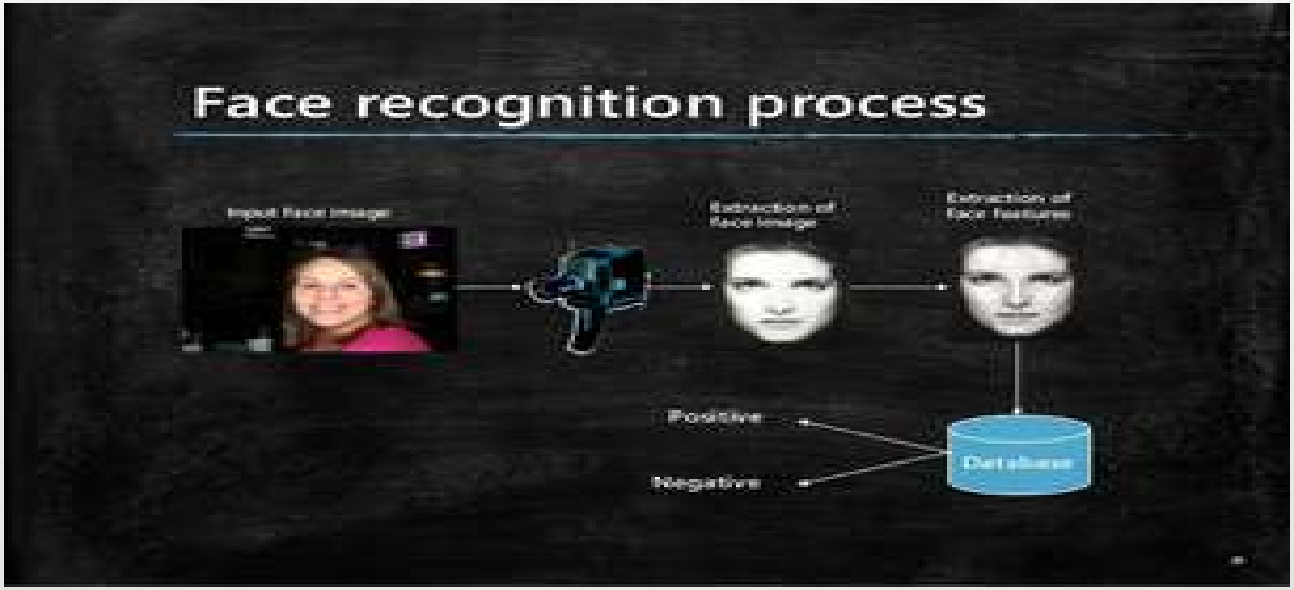
- **BIOMETRIC INPUT:** Biometrics is the technology of authenticating a person's identity by verifying a personal characteristics. Examples include fingerprints, hand geometry, facial features, voice, signatures and eye patterns.
- A biometric device translates a personal characteristics into a digital code that is compared with a digital code stored in the computer. If digital code is not matched then computer denies access to the individual.
- **The most widely used biometric device today is a Fingerprint scanner**.
- **Types of Biometric Input:**
  - Fingerprint Scanner
  - Face Recognition System
  - Hand Geometry
  - Voice Verification
  - Signature Verification
  - Iris Recognition System

BIOMETRIC INPUT

- It uses USB **Fingerprint Scanner** with Biometrics software for authentication, identification and verification functions that let your fingerprints act like digital passwords that cannot be lost, forgotten or stolen.
- **Uses**:
  - Websites via fingerprint instead of username and password.
  - In Grocery it is used a means of payment where customer's fingerprint is linked to a payment method.

BIOMETRIC INPUT

- **Face recognition system** captures a live face image and compares it with a stored image in database to determine if the person is known user.
- It analyzes the characteristics of a person's face images input through a digital video camera. It measures the overall facial structure, including distances between eyes, nose, mouth, and jaw edges. These measurements are retained in a database and used as a comparison when a user stands before the camera.
- **Uses**: It is widely used to recognize potential threats like whether terrorist, scam artist, or known criminal.

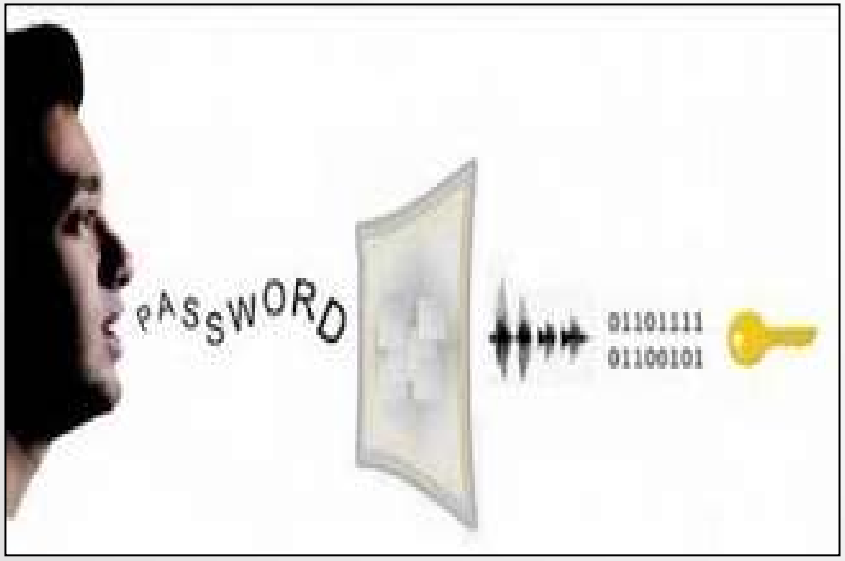


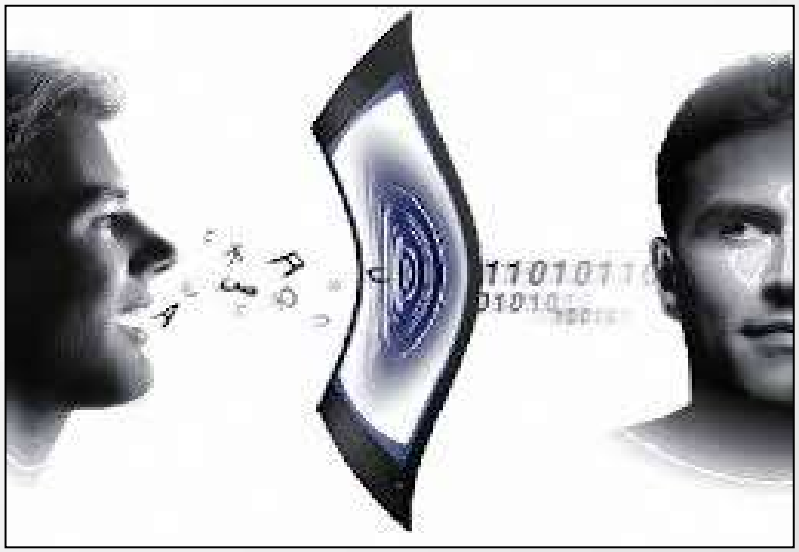
BIOMETRIC INPUT

- **Hand geometry** is a biometric that identifies users by the shape of their hands. Hand geometry readers measure a user's hand along many dimensions like measuring length, width, thickness, and surface area of an individual's hand and compare those measurements stored in a file.
- **Uses**: Attendance system, verify student's identity, hospitals and day-care uses them to verify parents to pick up their children.

BIOMETRIC INPUT

- **Voice Verification system** compares a person's live speech with their speech with their stored voice pattern.
- It is often used where voice is the only available biometric identifier, such as over the telephone.
- **Uses**: Time and attendance, to access sensitive files and networks, secure telephone banking transactions, etc.



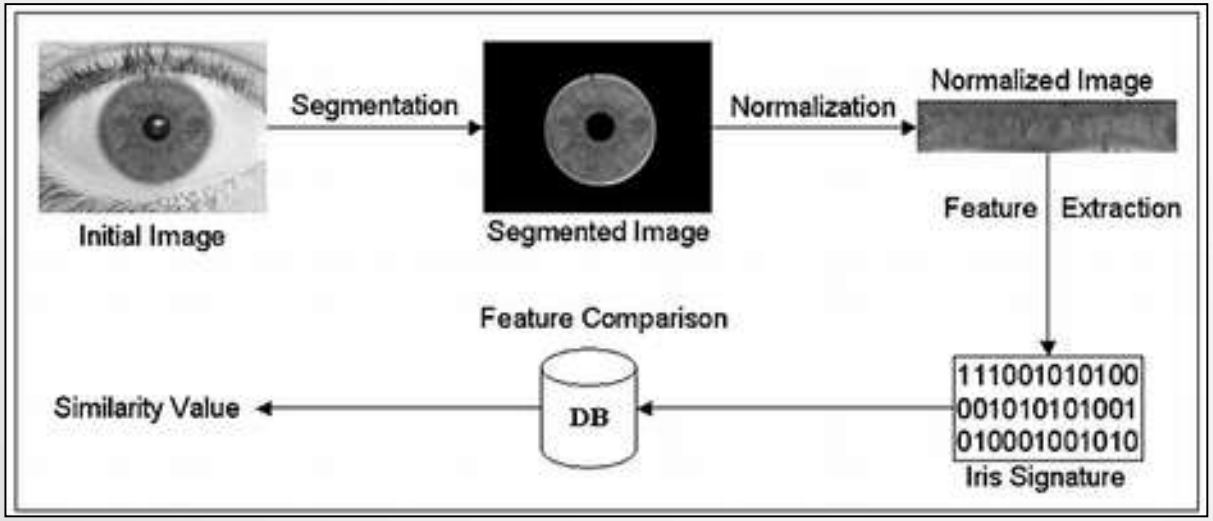


BIOMETRIC INPUT

- **Signature Verification System** recognizes the shape of your handwritten signature, as well as measures the pressure exerted and the motion used to write the signature. It uses special pen and tablet.
- An image of a signature or a direct signature is fed into the signature verification software and compared to the signature image on file.

BIOMETRIC INPUT

- **Iris recognition system** uses iris technology to read patterns in the iris of the eye.
- **Uses:** It is quite expensive and are used by government security organizations, the military and financial institutions.



GAME DEVICES

- Video games and computer games use a game controller as the input device that directs movements and actions of on-screen objects.
- **Game controllers include:**
  - Gamepads
  - Joysticks and wheels
  - Light guns
  - Dance Pads
  - Other variety of motion-sensing controllers

- A **gamepad** which is held with both hands, controls the movement and actions of player. User press buttons with their thumbs or move sticks.

GAME DEVICES

- **Joystick** is also a pointing device which is used to move cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The joystick can be moved in all four directions.
- The function of joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing(CAD) and playing computer games.
- Joystick use to control an airplane, vehicle or player.
- A **wheel** is a steering wheel- type input device. Users turn the wheel to simulate driving a car, truck, or other vehicle.

GAME DEVICES

- **Light Guns:** A light gun is used to shoot targets and moving objects after you pull the trigger on the weapon.
- Light guns work by detecting light.
- When user pulls the trigger, the screen send light which is received by a receptor in the barrel of the gun.

Digital Camera

- **A Digital Camera** allows users to take pictures and store the photographed images digitally.
- Once a picture has been taken, it can be downloaded to a computer system, and then manipulated with a graphics program and printed.
- Digital camera allows users to review and edit images while they are in the camera.
- Most camera can connect with a cable to a computer's USB port to access media in the camera.
- Studio Camera: Most expensive, highest quality.
- Field Camera: Portable camera with many lenses
- Point and shoot camera: lighweight and used for home/small business user.

POS Terminal

- A terminal consists of a keyboard, a monitor, a video card, and memory.
- A **point of sale terminal (POS terminal)** is an electronic device used to process card payments at retail locations where consumer pays for goods and services.
- Most retail stores use a POS terminal to record purchases, process credit or debit cards and update inventory.
- In grocery store, the POS terminal is a combination of an electronic cash register, baar code reader and printer.
- Many POS terminals have magstripe reader which reads credit/debit card data for payment.
- Some POS terminals may have fingerprint scanner which reads fingerprint which is linked to payment method for checking account.
- Also there is self-service POS terminal which allows consumers to perform all check-out related activities.

Interactive White Board

- **It is a presentation device that interfaces with a computer.**
- **An interactive whiteboard (IWB)** is a large interactive display that connects to a computer. A projector projects the computer's desktop onto the board's surface where users control the computer using a pen, finger, stylus, or other device.
- **Uses:**
  - Running software can be loaded onto the connected PC.
  - Saving notes written on whiteboard.
  - Capturing notes written on graphics tablet.
  - Controlling PC from the whiteboard using click and drag.

Wearable Input Devices

- Wearable smart devices, more commonly known as wearables
- Smartwatches like the Apple Watch are likely the best-known wearables, but many other kinds of wearables have emerged, and continue to emerge today.
- These devices not only perform many basic computing functions, akin to laptops and smartphones, but can also perform unique health-tracking services (such as calorie tracking and sleep monitoring) as a result of being in contact with the user’s body.

Wearable Input Devices

Smartwatches : Smartwatches are likely the most commonly-known and most commonly-used smart wearables in the workplace today. Connecting a smartwatch to a smartphone enables the wearer to read and send new messages from their watch, eliminating the need to hold and view one's phone.

Example :Apple's Apple Watch , Matrix PowerWatch Series 2

Smart Jewellery : Smart jewelry is the logical conclusion of ongoing research into how to include health-tracking capabilities in small smart wearables. The most prominent kind of smart jewelry (as of 2021) might be the smart ring.

Wearable Input Devices

Fitness Trackers : The modern successor to pedometers, fitness trackers are the next of the wearable technology examples. They monitor steps taken, heart rate, calories burned, and a range of other fitness metrics.

Smart Clothing : By making contact with a larger amount of one's body, smart clothing can provide deeper insights than other examples of modern wearable technology can, enabling advanced tracking for both medical care and lifestyle improvement.

Consumers can already purchase Siren Socks (smart socks that can detect developing foot ulcers), Nadi X smart pants by Wearable X (yoga pants that vibrate to improve form during yoga exercises), and Naviano smart swimsuits that provide alerts when the user should apply sunscreen

Wearable Input Devices

Head-Mounted Displays : head-mounted displays (HMDs) are a bit bulkier than most wearable computing devices. They go on the head and provide a display in the user's field of view, such that the user can use the device without needing to look down at a phone or smartwatch display.

Vufine produces smart glasses that allow users to view the video output of devices like drones in real-time. Another example are Google Cardboard , Oculus Quest 2.

Scanners

- A **scanner** is a device that captures images from photographic prints, posters, magazine pages, and similar sources for computer editing and display and also convert it into a digital file (either an image or a text file) so that it can stored.
- **Types of Scanners:**
  - **OCR**
  - **OMR**
  - **MICR**
  - **BCR**
  - **3D Scanner**
- **OCR: Optical Character Recognition or OCR**, is a technology that enables you to convert different types of documents, such as scanned paper documents, PDF files or images captured by a digital camera into editable and searchable data.
- OCR read text from paper and translating the images into a form that the computer can manipulate (for example, into ASCII codes).

Scanners

- **OMR: Optical mark recognition** (also called optical mark reading and OMR) is the process of capturing human-marked data from document forms such as surveys and tests.
- OMR allows for the processing of hundreds or thousands of physical documents per hour.
- OMR technology scans a printed form and reads predefined positions and records where marks are made on the form. This technology is useful for appl-ications in which large numbers of hand-filled forms need to be processed quickly and with great accuracy, such as surveys, reply cards, questionnaires and ballots.
- The error rate for OMR technology is less than 1%.

Scanners

- **MICR:** Magnetic Ink Character Recognition is a character recognition system that uses special ink and characters. When a document that contains this ink needs to be read, it passes through a machine, which magnetizes the ink and then translates the magnetic information into characters.
- MICR technology is used by banks. Numbers and characters found on the bottom of cheques (usually containing the check number, sort number, and account number) are printed using Magnetic Ink. It can be read by a special machine called a Magnetic Ink Character reader (MICR).
- The MICR will only recognise numbers printed in a standard font using the magnetic ink. This provides a high level of security because any attempt to alter the magnetic ink printout with normal ink by writing over it will be ignored.

Scanners

- **BCR:** A **barcode reader (BCR)or scanner, also known as a point of sale (POS)** scanner is a hardware input device used to capture and read information contained in a barcode.
- A bar-code reader consists of a a lens, light source and a light sensor which translates optical impulses into electrical ones.
- It can also print out the details of the product or log information about that product into a database.
- A perfect example of a barcode reader is a super market barcode scanner that reads and logs the price of a product. In the picture is an example of a Barcode reader

Scanners

- **3D Scanner:** A 3D scanner is a device that analyses a real-world object or environment to collect data on its shape and possibly its appearance (e.g. colour). The collected data can then be used to construct digital three-dimensional models.
- 3D scanning can capture data of very small objects all the way up to full size aircraft and buildings.
- 3-D scanners are used for creating life-like images and animation in movies, video games, architectural and industrial modeling, medical imaging.