OMR

- OMR is a popular electronic method which involves the process of collecting human marked data (generally on paper) and converting it into a form which is readable by a computer.

- This technology is generally used by the educational institute or by any institutions who conduct examinations. Multiple-choice questions exams, surveys, assessments etc. are evaluated very easily if optical mark recognition is used.

How do OMR scanners work?

- OMR scanner focuses a beam of light on a dedicated area.
- Since the marks or bubbles on the OMR sheet are filled (generally with black colour) they will absorb this light.
- The OMR sheet being white (or similar shades) will reflect back the light.
- Now with the help of computing processes the areas where lights weren’t reflected will be used for evaluation.

Advantages of OMR:

- The evaluation by OMR scanner is more accurate than that of a human
- The evaluation can be done at a much faster pace
- Very useful in case of large surveys
- High cost benefits if the a large number of documents are to be scanned
- Easy to implement and support
- Data can be stored directly in the cloud and hence can be transferred wherever required
- Helps in grading without being biased

Disadvantages of OMR

- It is complicated for the mark reader to design documents.
- To check marked data, it is often difficult for a computer.
- It is difficult to follow the instruction for the person putting the marks on the document.
- The mark has to be dark enough to be readable.
- OMR is often not suitable for text input.
- OMR reader need to have a specific sheet format for scanning.

OCR

- OCR (optical character recognition) is the use of technology to distinguish printed or handwritten text characters inside digital images of physical documents, such as a scanned paper document.
- The basic process of OCR involves examining the text of a document and translating the characters into code that can be used for data processing. OCR is sometimes also referred to as text recognition.

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- OCR systems are made up of a combination of hardware and software that is used to convert physical documents into machine-readable text. Hardware, such as an optical scanner or specialized circuit board is used to copy or read text while software typically handles the advanced processing.

How optical character recognition works

- The first step of OCR is using a scanner to process the physical form of a document. Once all pages are copied, OCR software converts the document into a two-color, or black and white, version. The scanned-in image is analyzed for light and dark areas, where the dark areas are identified as characters that need to be recognized and light areas are identified as background.
- The dark areas are then processed further to find alphabetic letters or numeric digits. OCR programs can vary in their techniques, but typically involve targeting one character, word or block of text at a time. Characters are then identified using one of two algorithms:

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- Pattern recognition- OCR programs are fed examples of text in various fonts and formats which are then used to compare, and recognize, characters in the scanned document.

- Feature detection- OCR programs apply rules regarding the features of a specific letter or number to recognize characters in the scanned document. Features could include the number of angled lines, crossed lines or curves in a character for comparison. For example, the capital letter “A” may be stored as two diagonal lines that meet with a horizontal line across the middle.

- When a character is identified, it is converted into an ASCII code that can be used by computer systems to handle further manipulations. Users should correct basic errors, proofread and make sure complex layouts were handled properly before saving the document for future use.

Applications of OCR

- Scanning printed documents into versions that can be edited with word processors, like Microsoft Word or
- Automating data entry, extraction and processing.
- Deciphering documents into text that can be read aloud to visually-impaired or blind users.
- Archiving historic information, such as newspapers, magazines or phonebooks, into searchable formats.
- Electronically depositing checks without the need for a bank teller.
- Placing important, signed legal documents into an electronic database.
- Recognizing text, such as license plates, with a camera or software.
- Sorting letters for mail delivery.
- Translating words within an image into a specified language.

Advantages of OCR

- The main advantages of OCR technology are saved time, decreased errors and minimized effort. It also enables actions that are not capable with physical copies such as compressing into zip files, highlighting keywords, incorporating into a website and attaching to an email.
- While taking images of documents enables them to be digitally archived, OCR provides the added functionality of being able to edit and search those documents.

Differences between OMR and OCR

- OCR is used to re-encode the already printed document without human handling whereas the purpose of OMR is to evaluate answer sheets of MCQ.
- In case of OCR you have to design a system to analyze and recognize the marks while OMR scans the document in no time and recognize the characters fast.
- OCR needs much more complex hardware and software system whereas OMR is comparatively simple affair.
- OCR includes more manual effort while OMR reduces manual effort and chances of human errors.