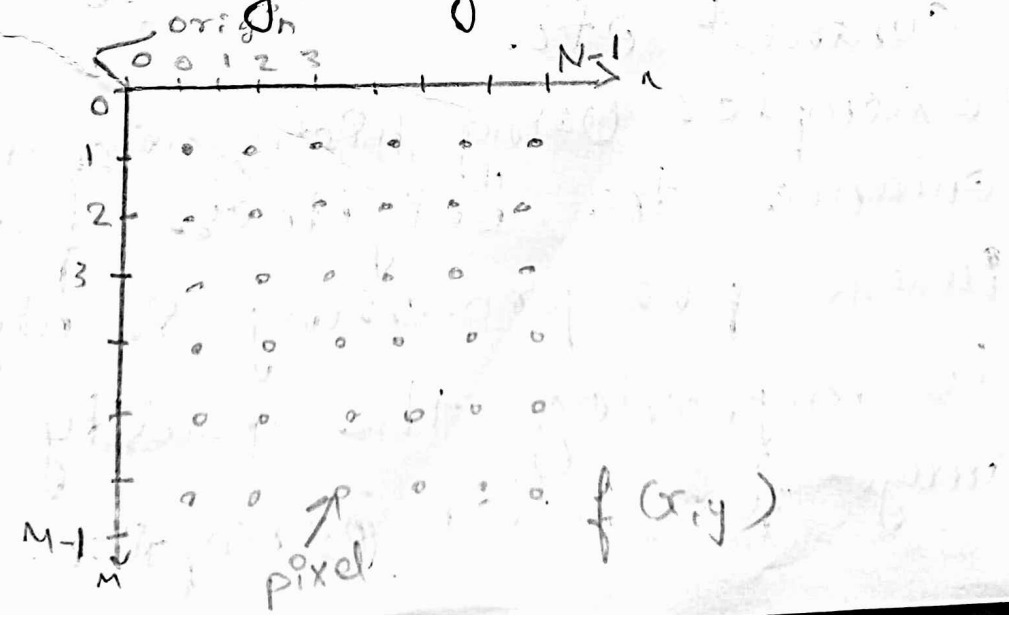
(1) * The sampling rate governs the spacial resolution of the digitized image, where the level fixes number of grey levels in that image.

* The magnitude of the sampled image is expressed as a digital value in the image processing.

* The chage between continuous values of the image function and it is equalant is called quantization.

* The number of quantizal-tion levels should be high enough for human perception of the shading details in the image.

* Representing images ex:-



② Importance of image pre-processing :②

* Pre-processing involves operations on images at the lowest level of abstraction where both input and output images are intensity images.
- The aim is to improve the image data that eliminates distortions and enhances some image features suitable for further processing.
- Enhancement of images is the preprocessing technique, to bring out detail that is obscured, or simply to highlight certain features of interest of the image such as, changing brightness and contrast etc.
- Example: Using histogram to enhance the brightness of an image
- image pre-processing is highly useful to improving the quality of an image for better perception.

(3) Image analysis and understanding is an useful task for better society building, Some major fields of our society in which digital image processing is most widely used are:

* agriculture * Autonomous vehicles
* Biometrics * Face recognition
* character recognition * Forensics
* Robotics * Geo-science
* Trasport * Remote sensing etc...

Some of above are:

Agriculture

- we are using DIP for weed detection and removal etc.
- For harvesting
- For cleaning
- For quality inspection
- For disease identification etc.

Banking

- Document verification
- Person authentication
- Cheque validation etc.

Biometrics

- Authenticating the person in → Banking

→ airport
→ electronic voting
→ secured transactions.

Remote sensing

- Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object.

(4) Importance of biometric technology

- In current situation, it is common to have physical and behavioral characteristics to authenticate a person.
- Nowadays several sectors using biometric based person authentication for attendance, money transaction, airport entry, electronic voting etc.
- The kind of biometrics is differs from face, palm-print, sign, ear to speak and many more.
- We are using this biometrics in our daily life in handheld devices like: voice search, fingerprint

Page screen lock, face lock, ok google etc.

- currently we are facing covid pandemic. so its better to use biometrics like face and eyes recognition on every sector as possible.

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(5). Image representation

- Selecting the good representation is the better part of the solution for transforming image data into a form suitable for succeeding processing.
- description is also called feature extraction that is extracting the attributes that result in some quantitative information of interest and are basic for discriminating one class objects from another.
- The feature extraction technique is devised to extract the feature of an image
- They are in two ways local and global.
- In global, entire image is used as an input and in local approaches, a portion of an image is used as an

input to extract the features.

- Some of the types of feature extractions are principal component analysis, linear discriminant analysis, texture features, shape based features, etc.