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Assignment = CR and DR

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Answer No 1

PREPROCESSING the Digital Radiographic image.

- preprocessing of digital image is largely automatic.
- The principal advantage of digital radiographic imaging over screen-film radiographic imaging is the ability to manipulate the image before and after display preprocessing and post-processing respectively.
- Preimage processing and postimage processing alter image appearance usually for the purpose of improving image contrast.
- Preprocessing action ~~are~~ is ~~entire~~ designed to produce artifact-free digital image.

(2)
Preprocessing provides electronic calibration to reduce pixel to pixel, row to row and column to column response difference.

The process of pixel interpolation, leg. correction and noise correction are automatically ~~provided~~ applied with most system.

Offset image and gain image are automatic calibration image designed to make the response of the image receptor uniform.

Gain image generate every few months.

Offset image are generate many times each day.

The preprocessing calibration techniques are identified as Flat Field.

= Digital image receptors and display devices have million of pixel.

The response of pixel surrounding the defective pixel is averaged and the value is assigned to the defective pixel.

= Each type of digital image receptor generates an electronic latent image that may not visible completely.

(3)

Postprocessing the Digital Radiographic image:

Postprocessing is where digital imaging shines. In contrast to preprocessing, which is largely automatic, post processing requires intervention by the radiologic technologist and the radiologist.

Postprocessing refers to anything that can be done to a digital radiographic image after it is acquired by the imaging system.

Postprocessing of the digital radiographic images is performed to optimize the appearance of the image for the purpose of a better pathology. Digital images have dynamic range up to 16-bit or 536 gray level.

The amplification of contrast is the most important of digital radiographic images.

The larger matrix size digital display devices have better spatial resolution.

Multiple digital images must be flipped horizontally or vertically.

The digital radiographic images are viewed through the contrast reduction of

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Screen - Film images
The visible image inversion
which result in a black
appearance of bone and
white appearance.

Created use is being
made quantity imaging
that is use of the
numeric value of pixel to
help in diagnosis.

The area of digital
imaging that has been
identified as quantity
radiology

The edge - enhancement is
effective for fractures and
small high contrast tissue.

Highlighting can be effective
in identifying tissue.

non focal disease, pain, swell,
and zoo allow for
close full visualization of
pre use regions of an
image.

(5)

Answer No 2:

Spital Resolution:

spital resolution (Resolution in space) it is the ability of imaging system to resolve and send on the image a small high-contrast object.

In medical imaging systems spital resolution is described by the quantity of "spital frequency".

Contrast Resolution:

The contrast resolution has the ability to distinguish many shades of grey from black and white. All digital imaging systems have better contrast resolution than ~~increase~~ screens film imaging.

= one hundred percent contrast is black and white.
= contrast resolution is the ability to distinguish many shades of grey from black and white.

(6)

The principal describe for contrast resolution in grey scale also called dynamic rang.

Answer No 3

patient radiation dose

with acceleration to all imaging we have opportunity to reduce patient dose by to 50% depending on the examination

⇒ How ever quite the opposite often has occurred - some ~~times~~ thing that many does keep.

⇒ By not changing factor between and lateral view and anterior posterior view when taken consecutively as a result possible in increase patient radiation dose

⇒ patient radiation dose reduction should be possible by DQE.

Reduction of dose by exposure not repeated.

characteristic of ~~teleg~~ Digital imaging.

There are four characteristics of digital imaging which are the following.

- (1) parameter
- (2) matrix
- (3) pixels
- (4) voxel

A digital imaging is made up of 2D array called matrix pixels.

The individual matrix bone are also called matrix voxel.

in formation convert into number value and expressed in the pixel.

The number bit or binary digital per pixel called bit ~~width~~ depth.

Answer No 4.

LCD are superior to CRT

A liquid ~~state~~ crystal has a metastable state between that of a liquid and a solid.

LCD is the property of a highly molecular order structures of a crystal and the property of viscosity a fluid. Liquid crystal material are linear organic molecules that are electrically charged. Forming natural molecular dipole. Consequently, the liquid crystal can be aligned through the action of an external electric field.

~~Features~~

Concept:

This concept was presented by Bernard J. Lechar. in 1968

Features:

= Fast response time

= good image characteristic

= A liquid crystal material
a linear organic molecule
that are electrically charge
forming a natural molecular
dipole

- Liquid crystal can be
aligned by applying
external electric field.

- Liquid crystal displays
by pixel by pixel

a signal at all over the electrically
for each subpixel.

to avoid interfering
adjacent element.

Answer No 5

PICTURE ARCHIVING And Communication System.

Picture archiving and communication system improves image quality, internal protection, processing, viewing, storage and recall.

The four principal components of a picture communication system are the image acquisition, display system, network and storage system.

→ When a radiologist is not available for image interpretation the image can be transferred to a PACS workstation in the radiologist room.

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→ PACS is the radiologist
date base systems.

- The cost of the hospital
space to accommodate a
film file room is
sufficient to PACS

→ PACS store electronically
image and reports
instead of using
old method of manually
filling set tievery and
transporting file jacket.

Answer No 6

These are three type of

digital radiograph imaging
artifacts.

Image receptor ARTIFACTS

Artifacts produce by dust
can be corrected easily
with proper cleaning unless

(11)

The dust is internal to the optic of computed radiography (CR) imaging system.

~~System~~

- ⇒ Dust
- = Dirt
- = scratch
- = Pixel malfunction
- Ghost image.

Software ARTIFACTS

Digital radiograph images are obtained as bit data sets, as such these image are ready for processing and the radiologic technologist can use for the interpretation by the radiologist.

- Histogram
- Range/ scaling
- image compression.

Object ARTIFACTS:

Object artifacts can arise from the technologist excess in patient, positioning x-ray beam collimation, and kilovoltage selection. Backscattered radiation also can be troublesome because of the sensitive radiographic image character.

- patient positioning.
- collimator / position
- Backscatter

Avoid the ARTIFACTS:

We can avoid different in image receptors by exposed the image plate.

to remove metal object from patient body. Feels clear image.

(13)

Form of routine documentation
of imaging plate reduce
artifact.

→ in software artifacts avoid
the dead pixels or
dead row or column of
pixels because most artifacts
occur by dead pixel

- Algorithm correction are used for

→ Flatfielding software also used
for equalization of pixel
of uniform x-ray beam.

- object artifact can be
avoid by technologist errors

→ correct patient position

→ Avoid Backscattering.

Answer NO 7

Data compression:-

In signal processing, data compression source coding is a bit-rate reduction is the process of encoding information using fewer bits than original representation.

=> Any particular compression is either lossy or lossless

The process is reducing the size of a data file is often referred to as data compression. it is useful because it reduces resources required to store and transmit data.

Basis for compression is provided by information theory and rate distortion theory. These are essentially of study were created by Claude 1940.

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Different b/w Lossless and Lossy.

Loss less

∴ It represent data without lossing any information.

⇒ It is reversible process.

= Lossless compression is possible because most real world data exhibits statistically redundancy.

⇒ Compression ~~method~~ method are among the most popular algorithms for lossless storage.

⇒ It can be slow.

⇒ It reduce the data file 10% to 50% of original file.

⇒ No large image files because transmission time and data manipulation time can still be acceptable.

Lossy:

∴ Data with lossing any information.

(6)

⇒ It is not reversible

⇒ Lossy compression is possible

⇒ It can be fast

⇒ It not reduce the date

⇒ Large image file.

⇒ provide compression up to 100:1 or greater can be used an image in which exact measurement or fine detail is not required

⇒ video recording that are ~~used~~ to the be reaped on standard domestic vision

It is not acceptable for memory

P10

Answer No 9:

Collimation and position.

If the x-ray exposure field is not properly collimated and positioned exposure errors may occur.

Result is very dark or very light or very noisy image.

Automatic radiation field recognition is an essential for artifact free image. Proper collimation and centering ~~prevent~~ prevent histograms ~~edges~~ that can illustrate the opposite situation.

partitioning of multiply digital image on a single IP results in proper separation and collimation of each image.

18)

Collimation of each projected
of x-ray beam is
importance for patient
radiation dose reduction
and for improved
image contrast is screen
film radiography.

Alignment:

Alignment of the exposure
field on the IP is
important is the same
way and for the
same reason as collimation

2) When an image field
such as that is not
aligned with the size
and dimensions of
the IP image cassette
com appears.

Answer No 8:

For processing and For
Presentation of AN image

→ For processing image are
manipulated For presentation
image that the radiographic
technologist can use For
QC and For interpretation
by the radiologist

→ Before an image is
prepared For processing several
manipulations of the out put
of an image receptor
may be necessary to
correct For potential artifacts

→ such artifacts can
occur because of dead
pixels / dead row / columns