

BASIC SCHEME FOR DATA ACQUISITION

In computed tomography (CT), transmission measurements, or projection data, are systematically collected from the patient. Several schemes are available for such data collection, each based on a specific “geometrical pattern of scanning” (Villafana, 1987).

Data acquisition refers to the method by which the patient is scanned to obtain enough data for image reconstruction. Scanning is defined by the beam geometry, which characterizes the particular CT system and also plays a central role in spatial resolution and artifact production.

Two elements in a basic scheme for data acquisition are the beam geometry and the components comprising the scheme. Beam geometry refers to the size, shape, and motion of the beam and its path, and components refer to those physical devices that shape and define the beam, measure its transmission through the patient, and convert this information into digital data for input into the computer.

1. The x-ray tube and detector are in perfect alignment.
2. The tube and detector scan the patient to collect a large number of transmission measurements.
3. The beam is shaped by a special filter as it leaves the tube.
4. The beam is collimated to pass through only the slice of interest.
5. The beam is attenuated by the patient and the transmitted photons are then measured by the detector.
6. The detector converts the x-ray photons into an electrical signal (analog data).

7. These signals are converted by the analog-to-digital converter (ADC) into digital data.

8. The digital data are sent to the computer for image reconstruction

