RI Image Processing Systems in Chiba Cancer Center

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In Chiba Cancer Center, we have a computer CDS-4096, which is designed for processing data from Gamma Camera, for use of nuclear medicine. We can also put into it some data from whole body scanner and renogram apparatus through interfaces.

CDS-4096 has functions of some data processing itself and of sending data to other computing system by using PT or MT. In our hospital, we can use two computer system in addition to CDS-4096. They are NEAC-M4, which is designed for calculating of dose distribution of radiation therapy, and FACOM 230–25, a medium scale computer for all purposes. For display of processed data, we have 5 inches CRT connected with CDS-4096, X-Y plotter and 11 inches CRT with NEAC-M4 and line printer with FACOM 230–25.

In this work, some processing method using these systems are reported. Smoothing or iteration has been used as a method of improvement of poor RI image, but it is difficult to decide what the most suitable weighing factor for calculating is. We made experiment with some phantoms to decide the most suitable weighing factor by comparing the image of long time counting and smoothed data of poor image of short time counting.

In conclusion, we recognized that when the counts are small, the smoothing is desired, but when the counts are large, the smoothing is injurious.

Image Processing for Coded Aperture Imaging

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A decoding method for an arbitrary time-modulated aperture is presented, and the characteristics of noise in the decoded images is discussed. The first step of image formation is to construct a "shadow image" by accumulating the shadow of the aperture onto the object plane from each point of detection. The shadow image is further processed by a correction function, $h(x, y)$, to yield a final image which has a point spread function, $p(x, y)$, Then, we have:

$$p(x, y)=\overline{j(x, y, t)* j(-x, -y, t)}* h(x, y)$$

where j (x, y, t) is the aperture function defined at the object plane, *denotes the convlution operation and —indicates the time-averaging.

The auto-covariance function of noise for a locally uniform image is given by: