476

A RI IMAGE DATABASE UNDER THE MUMPS SYSTEM ENVIRONMENT. K.Minato,M.Komori,H.Koide, A.Hirakawa, Div. of Biomedical Informatics, Kyoto Univ. Hospital,Kyoto, Y.Yonekura, N.Tamaki,T.Fujita,E.Komori.R.Morita, K.Torizuka, Dept. of Radiology and Nuclear Medicine,Kyoto Univ. Hospital, T.Yamazaki, M.Kuwahara, Automation Research Lab. Kyoto Univ. Uji, Kyoto.

Recently the medical image database system has become necessary and important because of the management and diagnosis of rapidly increasing digital image data. This report describes an attempt of prepareing RI image database under the MUMPS system environment.
A RI invivo examination database has been developed in the KYOTO UNIV. HOSPITAL for effective management of patient's registration and research purposes during these three years. This alphanumeric database is constructed logically with tree structure files supported by MUMPS system. The keys of the database are a patient's ID number, an examination code and an examination date. The data contain patient's age, section,RI dosage, diagnosis, ICD code, comments etc.
We extend this alphanumeric database to a total RI image database system by adding RI image directly to the data of the MUMPS tree structure files. Where the QUAD-TREE image representation is adopted for taking a suitable matching to the MUMPS system.
Using the QUAD-TREE, a possibility of extending the alphanumeric MUMPS database to the image database was shown successfully.

477

A UNIFIED DESIGN ALGORITHM OF TWO-DIMENSIONAL DIGITAL FILTERS FOR RADIOISOTOPE IMAGE PROCESSING. K.Murase,M.Ishine, M.Koizumi,U.Watanabe,M.Kimura,A.Iio and K.Hamamoto. Ehime University School of Medicine. Ehime.

Digital filtering is a powerful mathematical technique in computer analysis of nuclear medicine studies. Then, a unified design algorithm of two-dimensional digital filters was proposed and described. The algorithm is based on the Fourier-Bessel transform and the weighted least-square method was used to compute the best approximation to the desired frequency response. The design examples of digital filters, a low-pass filter, a band-pass filter and a Wiener filter were presented as typical examples, and applied to Tl-201 myocardial images and Tc-99m cardiac blood-pool images. The band-pass filter eliminates low-frequency image components that represent background activity and high-frequency components due to noise. The Wiener filter sharpens the image while also reducing noise, which illustrates the power of this technique to design filters with any desired frequency response.

478

A NEW DISPLAY METHOD--A SHADED IMAGE DISPLAY T.Tomitani and E.Tanaka. National Institute of Radiological Sciences. Chiba.

Usually medical images are displayed in terms of their intensity or density. Due to lack of grey levelts, fine details may often be destroyed with such displays.

We recognize a three-dimensional object not by its shape but rather by the shade it produces on its surface. Therefore conventional image display methods do not match with our visual perception.

Here a new display method which utilizes a new image transform called "SHADED IMAGE TRANSFORM" is presented. A density image is converted into shading it produces when it is illuminated from a particular direction. With this display, we may have a sense of three-dimensional extent of the object. Shaded image transform involves a kind of differentiation of the image, which results in the compression of the dynamic range, so that we can make full use of the grey levels given by a display hardware. In application of the shaded image transform, the original images should be presmoothed properly in order not to over-enhance high frequency noise, but fine details destroyed by such a smoothing can be, at least partially, restored by the differential operation of the transform.

The proposed method was tested on the images obtained by positron emission CT. It turned out that finer details of the image are discernible clearly compared to conventional display.

479

A PROGRAM FOR COMPUTING LOCAL CEREBRAL METABOLIC RATE OF GLUCOSE FROM 18-FDG POSITRON CT IMAGES. M.Endo, T.Matumoto, T.A.Iinuma, Y.Tateno, T.Yamasaki and F. Shishido. National Institute of Radiological Sciences, Chiba. Research Institute of Brain and Blood Vessels, Akita.

Local cerebral metabolic rate of glucose (LCMRGlc) is a quantitative index of cerebral metabolism which reflects functions of brain. Phelps et al. in UCLA improved a Sokoloff-model on cerebral metabolism and proposed a method for computing LCMRGlc and rate constants k1*-k4* from 18-FDG positron CT images. We implemented a program for computing k1*-k4* and LCMRGlc by their method into the software system of POSITOLOGICA II, a positron CT device for whole body. This program can calculate 1) k1*-k4* distributions from the time variations of FDG images and 2) a LCMRGlc distribution from an equilibrium FDG image. Because this program makes use of NOLLS1 which is one of the best curve fitting routines, it may give more stable results against various error sources. This program is easily operated by an operator console of POSITOLOGICA II.