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NEW ALGORITHMS FOR THE AUTOMATICAL DETERMINATION OF THE PHYSIOLOGICAL COMPONENTS OF A DYNAMIC SCINTIGRAPHIC STUDY. Aurengo A., Bazin JP., DI Paola M., DI Paola R. Unite de Radiobiologie Clinique (U66 INSERM) Institut Gustave Roussy 94800 Villejuif France

Factor analysis of dynamic studies (FADS) has proven to be a powerful help in the interpretation of cardiac, renal or multitracer scintigraphic sequences. We have studied the problem of existence and uniqueness which called "Physiological Components (PCS)". We show that in the most general case, two kinds of indetermination may appear:

- The first one appears every time one of the searched "PCS".
- The second one is due to the organs superimpositions created either anatomically or by the "Time-Pixels" gathering.

We show that, under some hypothesis both kind of undetermination problem can be solved through two new algorithms:

- The optimal stochastic segmentation (OSS) of the images sequence, based upon time-pixels clustering through a stochastic distance function taking into account poison statistics.
- The determination of PCS by a recursive maximum-likelihood estimation of both pure components and of their mutual superimposition (RMLEC Algorithm).

The results provided by these algorithms are compared to those obtained by ROI methods or classical FADS. In every case, OSS and RMLEC allow an improved determination of both FADS and FADS images.

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ADAC 32 BIT PROGRAMMABLE FLOATING-POINT ARRAY PROCESSOR. YUJI MAENO, KAZUO OISHI, MASAYUKI NISHIO, CENTURY MEDICAL,INC. TOKYO

A current issue of image processing system for medical field is to process in feasible time and to be flexible at the same time aiming at versatile post processing of image which consists of large number of digitized data growing in number to high resolution for digital subtraction angiography as an example. Also, processing algorithm is getting complicated, for instance rotational emission computer tomography (ECT) in nuclear medicine. DPS-3300 Nuclear medicine processing system for ECT manufactured by ADAC Laboratories and DPS-4100 Digital radiography system use 32 bit programmable floating-point array processor designed by ADAC so that the system provides high throughput with precise computation, which enables accurate and flexible image processing in real time. Some example of execution times are listed below.

Logical Operations (32 bit)	0.313 μsec
Multiply (real Numbers)	0.625 μsec
Multiply (Complex Numbers)	2.5 μsec

We present the system archi ecture of the array processor and examples of the application.

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SHIMADZU COMPACT CYCLOTRON FOR MEDICAL USE. M.Asari,I.Konishi,A.Hirakimoto,H.Fujita and F.Ohtani. Shimadzu Corporation,Kyoto.

The Shimadzu compact cyclotron is under development and the machine operational test comes to be in final stage. The design principles are based on the philosophies listed below:

1.simple operation and easy maintenance,
2.small running cost
and
3.light in weight and small in size.

The machine can accelerate proton up to energy of 17 MeV and deuteron 8.5 MeV. In the table is shown the fundamental specification of our cyclotron.

Beam current:	proton 50μA deuteron 50μA
Ion source:	cold cathode PIG type (vertical insertion)
Magnet:	AVF type with 4 sectors average mag. field 17.8kG weight 15 ton (approx.)
Dee:	45°-2Dees in valleys (fixed frequency) RF harmonics proton 2 deuteron 4
Target:	automatic target changer (vertically moved) target mount capacity 8

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PRESENT STATUS OF MEDIUM AND LARGE SCALE AVF-CYCLOTRON FOR PRODUCTION OF RADIOISOTOPE UTILIZED FOR NUCLEAR MEDICINE. K.Fujii, T.Satho, M.Maruyama and J.Abe. Sumitomo Heavy Industries, Ltd.,Niihama.

We have recently developed our new series of cyclotrons listed below. 480 is for the production of Ga-67, Tl-201 and In-111. 560 is not only for the radioisotope production, but also for the neutron therapy. The aim of 750 is the production of high purity I-123. Beam current of 3KW are available on the external target. They are fully computer-controlled,so easy operation and maintenance are realized.

TYPE	480	560	750
ENERGY	MeV	MeV	MeV
PROTON	3-30	5-42	25-70
DEUTERON	5.5-15	10-21	12.5-35
HELIUM3	8-40	15-52	20-90
HELIUM4	11-30	20-42	25-70
CURRENT	μA	μA	μA
PROTON	100	100	100
DEUTERON	100	100	100
HELIUM3	50	50	50
HELIUM4	50	50	50