New System Developed For Early Diagnosis Of Alzheimer's Disease

Main Category: Alzheimer's / Dementia
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Researchers of the University of Granada have developed a new computer program that allows early diagnosis of Alzheimer's disease through processed images. This new system has enhanced successful early diagnosis of Alzheimer's disease up to 90%, which is an important progress within this area of study.

The study was conducted by professor Ignacio Alvarez Illán, a member of SIPBA (Signal Processing and Biomedical Applications) TIC-010 of the University of Granada, and supervised by professors Juan Manuel Gorriz Saez, Javier Ramírez Perez de Inestrosa and Carlos Garcia Puntonet.

Scientists of the University of Granada have validated some new techniques for diagnosing Alzheimer's disease through a series of processed images. These techniques were successfully tested, and promising results were obtained. This study is part of a wider project - still under development - which purpose is developing a complete software for clinical use in hospitals. It is being developed in cooperation with the companies PET-Cartuja and PTEC, and it belongs to the prizewinning project PETRI-DENCLASES, which was rewarded at the III Premios Andalucía Sociedad de la Información 2010 edition, a prize awarded by the Andalusian Regional Government to companies contributing to an enhanced information society.

The research group has cooperated with the international project ADNI (Alzheimer's Disease NeuroImaging Initiative), which confers an international character to the study, and has enabled the use of one of the largest database in the world concerning Alzheimer's disease.

Tomograms

To test this new automated computer-assisted diagnosis, the researchers of the University of Granada used SPECT and PET tomographies from three different databases. The first database contains 97 de-identified SPECT images which were labeled by experts and provided by Dr. Manuel Gómez-Río and the Department of Nuclear Medicine, university hospital Virgen de las Nieves, Granada, Spain. The second database contains 60 PET images provided by the company PET- Cartuja (Seville). The third was the largest database, and it had 219 PET images provided by ADNI (United States).

These databases included brain CT scans from aged patients suffering from Alzheimer's disease or with normal development patterns. A series of algorithms were developed, which allowed the identification of brain areas affected by the disease, and helped in distinguishing diseased patients from healthy ones.

The three methods presented in this study attained 90% success rate in identifying Alzheimer through CT -both PET and SPECT. At present, a computer software is being developed jointly with the company PTEC (Malaga) to translate these results into a software that can be used in hospitals. Thus, neurologists will have a tool as precise as a team of experts.

These results were partially published in the journals Information Sciences (2010), Neuroscience Letters (2009) and Electronics Letters (2009).

Reference: Ignacio Alvarez Illán. Group SIPBA (Signal Processing and Biomedical Applications), TIC-010 of the University of Granada.

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