3D Population Maps for Noninvasively Identifying Phenotypes and Pathologies in Individual Patients

Tech ID: 29843 / UC Case 2014-592-0

SUMMARY

UCLA researchers in the Department of Radiological Sciences have developed a novel computation system that uses large imaging datasets to aid in clinical diagnosis and prognosis.

BACKGROUND

Population and subpopulation images can be used as a diagnostic guide to search for abnormalities, especially ones that are difficult to detect, and the probabilities based on these population maps may also guide procedures such as biopsies to maximize removal of diseased tissue. Many studies have examined image features between various populations and have created population maps to visualize and draw comparisons between patients. However, the accuracy of predicting pathologies for a single patient given a large dataset of patients has not be achieved. This type of system could aid the prediction of treatment response, phenotypes, and outcomes in individual patients.

INNOVATION

UCLA researchers led by Dr. Dieter Enzmann have developed a novel inference system that enables the use of large databases of image lesions, pathology locations, and other image features to provide clinical prediction of patient prognosis, phenotypes, and early detection of abnormal pathologies. Physiological or anatomical images (i.e. MRI, PET, CT, ultrasound, etc.) from large databases, such as clinical picture archiving and communication systems (PACS) and Alzheimer's disease neuroimaging initiative (ADNI) databases, can be used. This innovative inference system can use an individual patient's imaging data to provide information regarding a predicted diagnosis, identification of a pathology, lesions or areas of interest, as well as the uncertainty in its prediction.

APPLICATIONS

- Clinical inference system
- Prediction device that assesses a patient's prognosis and response to a particular therapy
- Tool to identify location and presence of lesions or abnormal pathology

ADVANTAGES

- System uses clinical databases to predict abnormal pathologies and patient prognosis
- Large databases can be used (PACS and ADNI)
- Uses many types of radiological images (MRI, PET, CT, ultrasound)
- Provides uncertainty in the system's prediction

STATE OF DEVELOPMENT

A prototype of this invention has been developed and tested with patients with brain tumors. Currently, population maps using the data from the UCLA PACS database for various pathologies (i.e. lung cancer, cortical dysplasia, tuberous sclerosis, and gout) are being developed.

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Alzheimer's disease neuroimaging initiative, ADNI, Clinical inference system, inference system, 3D population maps, radiology, noninvasive, physiological images, MRI, PET CT, ultrasound, large databases, big data, picture archiving and communication system, PACS

CATEGORIZED AS

- **Biotechnology**
  - Bioinformatics
  - Health
  - Other
- **Computer**
  - Other
  - Software
- **Imaging**
  - Medical
  - Software
- **Medical**
  - Imaging
  - Other
  - Research Tools
  - Screening
  - Software

- Research Tools
  - Bioinformatics
  - Other

RELATED CASES

2014-592-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Wireless Remote Sensing of Changes in Fluid Filled Containers
- Computer-Aided Detection of Implantable Man-Made Devices in Medical Images
- Probability Map of Biopsy Site
- A New Human-Monitor Interface For Interpreting Clinical Images

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