

Synthetically Generating Medical Images Using Deep Convolutional Generative Adversarial Networks.

Tech ID: 34379 / UC Case 2020-639-0

BRIEF DESCRIPTION

An advanced AI-driven system for synthetic medical data generation and precise segmentation of cardiac MRI to enhance accuracy and efficiency in cardiovascular health.

FULL DESCRIPTION

This innovative technology leverages a Deep Convolutional Generative Adversarial Network (DCGAN) to synthetically augment training data by generating segmented cardiac MRI images, overcoming the overwhelming scarcity of labeled datasets. Automatic image segmentation is done using a deep fully convolutional network (FCN), which is trained and validated on MRI data. The FCN’s performance was superior to commercial software when tested on pediatric congenital heart disease patient data. Using synthetic and precisely segmented data is especially crucial for pediatric care, where there is always limited training data and large incurred bias in models, leading to unreliable and ineffective validation, as the patient’s heart shape is outside the learning set.

SUGGESTED USES

- » Automated clinical workflow enhancement in cardiac MRI imaging centers.
- » Diagnostic support tools for cardiologists treating congenital heart disease patients.
- » Research applications requiring precise cardiac function quantification.
- » Integration into commercial cardiac imaging analysis software platforms.

ADVANTAGES

- » Automates manual analysis of cardiac MRI images, saving time and reducing human error.
- » Synthetic data augmentation via DCGAN addresses limited training data challenges.
- » High segmentation accuracy demonstrated with superior metrics compared to commercial and U-Net models.
- » Validated on complex pediatric congenital heart disease cases ensuring clinical relevance.
- » Improves assessment of left and right ventricle volumes at critical cardiac phases.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,990,224	05/21/2024	2020-639

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OTHER INFORMATION

CATEGORIZED AS

- » **Biotechnology**
 - » Health
- » **Imaging**
 - » Medical
 - » Software
- » **Medical**
 - » Disease: Cardiovascular and Circulatory System
 - » Imaging
 - » Research Tools
 - » Software

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