



Visualization of intracardiac electrograms on 3D heart model (VIEgram)

A software for easy visualization of intracardiac electrograms on 3D heart models.

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Data visualization on patient-specific 3D heart models

Electrophysiologists use proprietary electroanatomic mapping systems from leading medical device manufacturers to visualize intracardiac electrograms mapped on to 3D models of the patient's heart. While these proprietary systems are highly useful for obtaining detailed electrical activities and identifying sites causing arrhythmia, they suffer from drawbacks that prevent wider-adoption in non-clinical settings. In particular, commercial systems are too expensive and are not flexible, thereby impeding the development of novel data analysis techniques. In addition, these systems are not ideal for in-depth analysis and post-treatment evaluation in clinical settings.

To address this gap, researchers at the University of Minnesota have developed VIEgram - **an adaptable software for processing, analyzing and visualization of electrophysiological data on patient-derived 3D heart models**. VIEgram, short for Visualization of Interacardiac Electrogram, allows the user to readily visualize the analysis results of intracardiac electrograms obtained through conventional catheter mapping systems.

As VIEgram software is built on Python (for data handling) and MATLAB (for data processing, analysis and visualization), researchers have the freedom to easily modify the script to perform custom actions such as

- localized and region-specific inspection and analysis of iEGM data
- implement custom interpolation and analysis schemes
- integrate with CT/MRI data to incorporate fibrosis and scar data

to better fit their needs. This software will be useful to further our understanding of atrial fibrillation, and for development and validation of new automated analysis algorithms. Moreover, electrophysiologists can use this software to evaluate the effectiveness of treatment procedures and identify potentially active atrial fibrillation sites. Lastly, this software is ideal for instructional and training purposes.

Benefits

- Easy to use visualization and mapping tool in non-clinical (academic) setting
- Timesaving as compared to that of proprietary mapping systems
- Allows to modify/add different analysis techniques
- Helpful visualizations for discussion in the clinical environment
- Helpful in characterizing internal heart anatomy to detect structural changes/anomalies

Applications

- Intracardiac electrograms (iEGMs) analysis
- 3D heart model visualization
- Catheter mapping
- Research and instructional uses

System Requirements

- OS: Mac, Windows or Linux
- Python 3.7.0 version or newer
- MATLAB 9.4(R2018a) version or newer

Phase of Development

Alpha version. The software is tested using atrial fibrosis patient data exported from CARTO mapping system.

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