Epsidy internship

AI-driven system for low-latency pattern matching in disturbed electrocardiograms

Introduction

Born from an electric impulse, with smart connectivity and mindful technology, we empower clinical scientists in the fight against cardiovascular diseases. Yet, the best research and diagnostic tool, Magnetic resonance imaging (MRI) is used too rarely, and too often as a last resort when other techniques fail. Epsidy is addressing technological and practical issues with cardiac MRI.

Epsidy is a dynamic young start-up co-founded by engineers and PhDs, with a solid scientific culture and decades of combined experience. Epsidy focuses on the development of MRI-compatible instrumentation for better diagnosis and more effective therapy. Epsidy is in a close-knit relationship with the IADI Lab [1], and parts of any Epsidy position include regular exchanges with researchers.

Epsidy core values are ownership, trust, and curiosity.

Your mission

Within the Design and Development team (DND), you will be responsible for the development of new Epsidy product features. You will design, develop and test efficient frameworks to analyze and enhance electrocardiograms (ECG) acquired during MRI exams. One of the key aspects is to design similarity metrics comparing reconstructed and reference signals to fit real-time requirements of triggered cardiac imaging. Your main missions will be:

- To survey existing similarity metrics and pattern matching techniques, applied to time series, using classical or machine learning algorithms [2-9];
- To propose and to develop an ECG signal matching framework;
- To integrate this framework into TruzyG™, a true 12-lead reconstruction solution;
- To test results and document your code.

Medtech being a regulated environment, you will be documenting various aspects following Epsidy Quality Management System.

Your skills

You demonstrated curiosity, rigor and autonomy during your education curriculum. You have developed software for various applications, in various languages, in the course of your studies as well as extra-curricular activities (reference required). You enjoy discovering new programming languages and are not afraid of tackling complex problems. You know common programming languages such as Python, Java, C or C++. You also are familiar with the concepts of Git, Dockers, and API.

Practical details

Send 1-page CV + ½ page motivation letter to **careers@epsidy.com**, referencing 2024-INT-DND-SW.
Ideal start date: Early 2024. Competitive retribution.

References

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[3] Z. Wang, Time series matching: a multi-filter approach, New York University, 2006.

[4] W. Han, J. Lee, Y. Moon and H. Jiang, Ranked subsequence matching in time-series databases, International Conference on Very Large Databases, 423-434, 2007.

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[7] Y. Tong, J. Liu, L. Yu, L. Zhang, L. Sun, W. Li, X. Ning, J. Xu, H. Qin, Q. Cai, Technology investigation on time series classification and prediction, PeerJ Computer Science, 8, e982, 2022.

[8] Y. Li, Z. Chen and X. Deng, Similarity matching of time series based on key point alignment dynamic time warping, International Conference on Software Engineering and Knowledge Engineering, 300-305, 2022.

[9] H. Li, Z. Liu and X. Wan, Time series clustering based on complex network with synchronous matching states, Expert Systems with Applications, 211, 118543, 2023.