**Intro**

Atrial fibrillation (AF) is one of the most common types of arrhythmias, which are irregular heart rhythms [1]. AF occurs when the upper chambers of the heart (atria) beat out of rhythm and as a result, blood is not pumped efficiently to the rest of the body, causing an unusually fast heart rate, quivering, or thumping sensations in the heart [2]. Often episodes of AF are actually asymptomatic [3]. AF is the most common sustained cardiac arrhythmia and as of 2020, 33 million people are affected by this disease worldwide [4]. AF patients are at moderate-to-high risk of stroke and the disease is a common factor of heart failure [5]. As such, establishing an effective monitoring system for early AF detection along with an effective approach to treating AF is essential [5].

AF is often transient or paroxysmal in nature, and the correct diagnosis of AF can be challenging in patients with paroxysmal AF [6]. The main characteristic of AF disorder is the irregular rhythm of the heartbeat or more specifically when a varying period is observed in ECG signal between R–R peaks [7].

Heart disease prediction using machine learning has become common in the last few decades. There are numerous studies using deep learning techniques to detect heart arrhythmias in general and AF in particular. We based our project on two studies regarding Detection of Paroxysmal using deep Recurrent Neural Network (RNN).

עכשיו להוסיף הסבר על הגישה של כל אחד משני המאמרים (דאטא ומודל)

תרומה של כל מאמר??

לפרט על החסרונות שאנחנו נתייחס אליהם (רוני – מה זה אומר?)

\*\* צריך להבין מה להכניס כאן ומה להכניס בmethod כי יש הגדרות חופפות באתר הקורס

[1] - <https://www.nhlbi.nih.gov/health-topics/atrial-fibrillation>

[2] - <https://www.medtronic.com/us-en/patients/conditions/atrial-fibrillation-afib.html>

[3] - Munger, TM; Wu, LQ; Shen, WK (January 2014). ["Atrial fibrillation"](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3904170). *Journal of Biomedical Research*.

[4] - Chung, MK; Eckhardt, LL; Chen, LY; Ahmed, HM; Gopinathannair, R; Joglar, JA; Noseworthy, PA; Pack, QR; Sanders, P; Trulock, KM; American Heart Association Electrocardiography and Arrhythmias Committee and Exercise Cardiac Rehabilitation, and Secondary Prevention; Committee of the Council on Clinical Cardiology; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Cardiovascular and Stroke Nursing; Council on Lifestyle and Cardiometabolic Health (March 2020). ["Lifestyle and Risk Factor Modification for Reduction of Atrial Fibrillation: A Scientific Statement From the American Heart Association"](https://doi.org/10.1161/CIR.0000000000000748).

[5] [- Atrial Fibrillation Recurrence and Peri-Procedural Complication Rates in nMARQ vs. Conventional Ablation Techniques: A Systematic Review and Meta-Analysis](https://www.frontiersin.org/articles/10.3389/fphys.2018.00544/full)

Ka H. C. Li1,2,3†, [Mei Dong](https://loop.frontiersin.org/people/537180/overview)4†, [Mengqi Gong](http://www.frontiersin.org/people/u/528268)5, George Bazoukis6, Ishan Lakhani2,3, Yan Y. Ting2,3, [Sunny H. Wong](http://www.frontiersin.org/people/u/468199)2,3, Guangping Li7, William K. K. Wu8, Vassilios S. Vassiliou8, Martin C. S. Wong10, [Konstantinos Letsas](http://www.frontiersin.org/people/u/19580)5, [Yimei Du](http://www.frontiersin.org/people/u/292862)11, [Victoria Laxton](http://www.frontiersin.org/people/u/377563)12, Bryan P. Yan1, Yat S. Chan1, [Yunlong Xia](http://www.frontiersin.org/people/u/501745)12, [Tong Liu](http://www.frontiersin.org/people/u/282803)2\*, [Gary Tse](http://www.frontiersin.org/people/u/335924)2,3\* and International Health Informatics Study (IHIS) Network

[6] - [Improved Detection of Silent Atrial Fibrillation Using 72-Hour Holter ECG in Patients With Ischemic Stroke](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884)

[Martin Grond](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Marek Jauss](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Gerhard Hamann](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Erwin Stark](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Roland Veltkamp](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Darius Nabavi](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Markus Horn](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Christian Weimar](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Martin Köhrmann](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Rolf Wachter](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884), [Ludger Rosin](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884" \o "Ludger Rosin), and [Paulus Kirchhof](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.113.001884) (Oct 2013)

[7]  **-** [Early Detection of Atrial Fibrillation Based on ECG Signals](https://dx.doi.org/10.3390%2Fbioengineering7010016)

[Nuzhat Ahmed](https://www.ncbi.nlm.nih.gov/pubmed/?term=Ahmed%20N%5BAuthor%5D&cauthor=true&cauthor_uid=32069949)1 and [Yong Zhu](https://www.ncbi.nlm.nih.gov/pubmed/?term=Zhu%20Y%5BAuthor%5D&cauthor=true&cauthor_uid=32069949)2,\* (March 2020)