Методы IML, предложенные в литературе для объяснения результатов работы модели машинного обучения, разработанной для классификации заболеваний сердца на основе ЭКГ-сигналов, исследуются и представлены в [**разделе 5**](https://www.mdpi.com/2075-4418/13/1/111#sec5-diagnostics-13-00111). [**В разделе 6**](https://www.mdpi.com/2075-4418/13/1/111#sec6-diagnostics-13-00111) обсуждаются методы оценки эффективности методов IML, ориентированных на классификацию заболеваний сердца на основе ЭКГ-сигналов. Результаты этой обзорной работы, существующие проблемы и будущие направления обсуждаются в [**разделе 7**](https://www.mdpi.com/2075-4418/13/1/111#sec7-diagnostics-13-00111) и [**разделе 8**](https://www.mdpi.com/2075-4418/13/1/111#sec8-diagnostics-13-00111).

Integrating IML methods in the workflow of the ML model development for heart disease classification from an ECG signal is in its infancy stage and not well tested. – конец главы 7

Статьи и гитхаб

1. [145] Hong, S.; Xiao, C.; Ma, T.; Li, H.; Sun, J. MINA: Multilevel Knowledge-Guided Attention for Modeling Electrocardiography Signals. In Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence, International Joint Conferences on Artificial Intelligence Organization, Vienna, Austria, 10–16 August 2019; pp. 5888–5894

<https://www.ijcai.org/proceedings/2019/0816.pdf>

<https://github.com/hsd1503/MINA>

**Метка: .csv**

**Dataset (PhysioNet/Computing in Cardiology Challenge 2017): .pkl**

1. [53] Hannun, A.Y.; Rajpurkar, P.; Haghpanahi, M.; Tison, G.H.; Bourn, C.; Turakhia, M.P.; Ng, A.Y. Cardiologist-level arrhythmia detection and classification in ambulatory electrocardiograms using a deep neural network. *Nat. Med.* **2019**, *25*, 65–69  
   <https://stanfordmlgroup.github.io/projects/ecg/>

<https://github.com/awni/ecg>

<https://irhythm.github.io/cardiol_test_set/> - dataset

**Dataset: .json**

1. [114] Goodfellow, S.D.; Goodwin, A.; Greer, R.; Laussen, P.C.; Mazwi, M.; Eytan, D. Towards Understanding ECG Rhythm Classification Using Convolutional Neural Networks and Attention Mappings. In Proceedings of the 3rd Machine Learning for Healthcare Conference, Palo Alto, CA, USA, 17–18 August 2018; Volume 85, pp. 83–101.

<https://proceedings.mlr.press/v85/goodfellow18a>

<https://github.com/Seb-Good/deepecg>

**Dataset (PhysioNet/Computing in Cardiology Challenge 2017): .hea, .mat**

1. [18] Ribeiro, A.H.; Ribeiro, M.H.; Paixão, G.M.M.; Oliveira, D.M.; Gomes, P.R.; Canazart, J.A.; Ferreira, M.P.S.; Andersson, C.R.; Macfarlane, P.W.; Meira, W.; et al. Automatic diagnosis of the 12-lead ECG using a deep neural network

<https://www.nature.com/articles/s41467-020-15432-4>

<https://github.com/antonior92/automatic-ecg-diagnosis>   
**Dataset состоит из csv! (.hdf5)**

1. [110] Zhang, D.; Yang, S.; Yuan, X.; Zhang, P. Interpretable deep learning for automatic diagnosis of 12-lead electrocardiogram

<https://www.cell.com/iscience/fulltext/S2589-0042(21)00341-2>

<https://arxiv.org/abs/2010.10328?utm_source=chatgpt.com>

<https://github.com/AIMedLab/ecg-diagnosis/tree/master>

<https://github.com/onlyzdd/ecg-diagnosis>

**Dataset (1-го конкурса China Physiological Signal Challenge (CPSC) 2018): .hea, .mat**

1. [31] Khan, A.H.; Hussain, M.; Malik, M.K. Cardiac Disorder Classification by Electrocardiogram Sensing Using Deep Neural Network

<https://onlinelibrary.wiley.com/doi/full/10.1155/2021/5512243>

<https://github.com/alijiskani/ECG_Object_Detection>

**Dataset: .jpg**

1. [125] Aufiero, S.; Bleijendaal, H.; Robyns, T.; Vandenberk, B.; Krijger, C.; Bezzina, C.; Zwinderman, A.H.; Wilde, A.A.M.; Pinto, Y.M. A deep learning approach identifies new ECG features in congenital long QT syndrome. *BMC Med.* **2022**

<https://link.springer.com/article/10.1186/s12916-022-02350-z>

<https://github.com/Aufiero/aiecglqts>

**Dataset: .pckl**

Модели не из статьи

1. Inter- and Intra-Patient ECG Heartbeat Classification For Arrhythmia Detection: A Sequence to Sequence Deep Learning Approach Sajad Mousavi, Fatemeh Afghah

<https://arxiv.org/pdf/1812.07421v2>

<https://www.researchgate.net/publication/329772246_Inter_and_Intra_Patient_ECG_Heartbeat_Classification_For_Arrhythmia_Detection_A_Sequence_to_Sequence_Deep_Learning_Approach> - на русском

<https://github.com/MousaviSajad/ECG-Heartbeat-Classification-seq2seq-model>

**Dataset: .atr, .dat, .hea, .xws -> .mat**

1. Deep learning for ECG classification: A comparative study of 1D and 2D representations and multimodal fusion approaches

Hemaxi Narotamo , Mariana Dias, Ricardo Santos , André V. Carreiro, Hugo Gamboa, Margarida Silveira

<https://www.sciencedirect.com/science/article/pii/S174680942400199X>

<https://github.com/HemaxiN/DL_ECG_Classification>

**Формат .dat and .hea**

1. ECG arrhythmia classification using a 2-D convolutional neural network Tae Joon Jun1 · Hoang Minh Nguyen1 · Daeyoun Kang1 · Dohyeun Kim1 · Daeyoung Kim1 · Young-Hak Kim

<https://arxiv.org/pdf/1804.06812>

<https://github.com/ankur219/ECG-Arrhythmia-classification?tab=readme-ov-file>

**Dataset: .atr, .dat, .hea, .xws**

1. ECG Classification using Deep Learning

Authors: Vishnu Vardhan Atmakuri, Nanda sri Mogili, Naseer Hussain Mohammed, Anusha Neela, Om Vyshanavi Singamsetty, Aqil Hussain Mohammed

<https://github.com/naseer30/ECG-CLASSIFICATION-USING-DEEP-LEARNING>

**Dataset: .jpg**

Датасеты

1. <https://www.kaggle.com/datasets/bjoernjostein/china-physiological-signal-challenge-in-2018/data> - **.hea, .mat - Его берём**
2. <https://physionet.org/content/mimic-iv-ecg/1.0/> - даже с кодом предобработки. **Формат .dat and .hea**
3. <https://www.kaggle.com/datasets/abdallahwagih/mit-bih-arrhythmia-database> . **Format files: .atr, .dat, .hea, .xws**
4. <https://www.kaggle.com/datasets/aqsaabbasarain/ecg-dataset>

**Format files: .jpg**

1. <https://www.kaggle.com/datasets/evilspirit05/ecg-analysis>

**Format files: .jpg**