

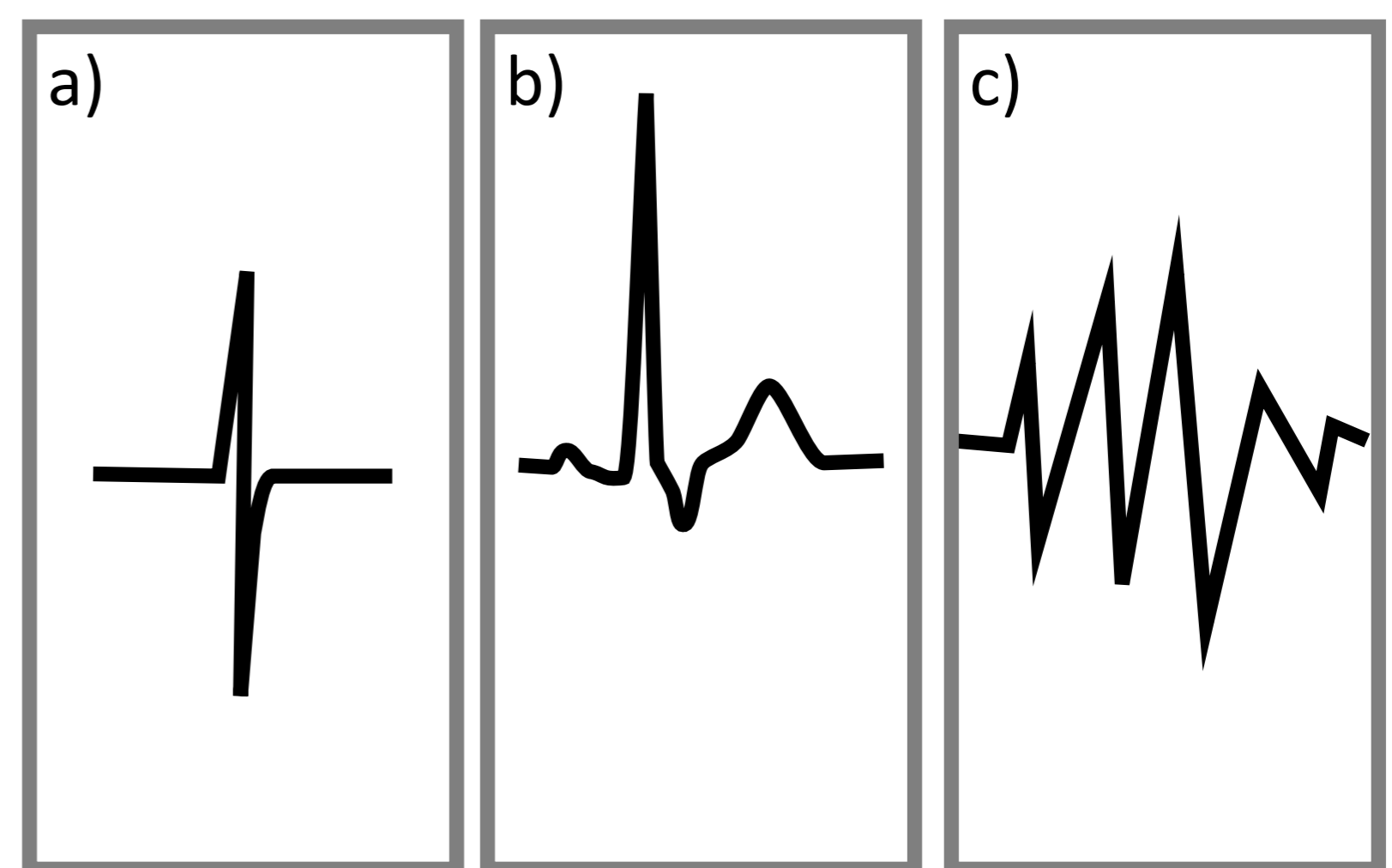
Machine Learning for self-serviced Electrocardiograms

Towards an automatic classification of heartbeats

Task

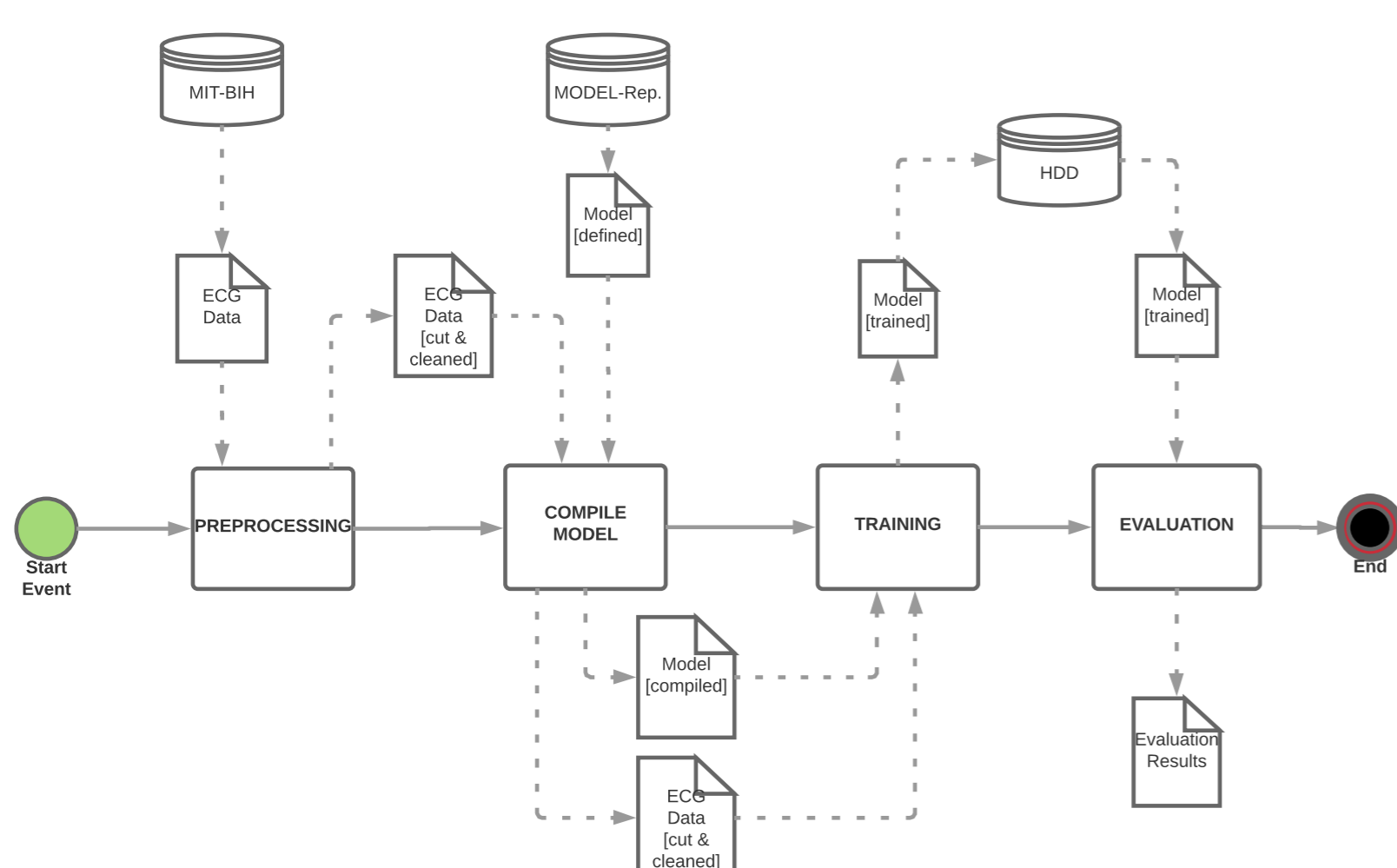
Electrocardiograms today are manually interpreted and used as a basis for diagnosis. The use of electrocardiographs that can be operated by the patient himself open new possibilities of diagnosing heart arrhythmia and other conditions. At the same time they increase the amount of data that needs to be processed. While the final diagnosis will remain the task of a doctor for the near future, there is already now potential for an automated system to prioritize electrocardiograms.

This work investigates the automatic classification of heartbeats on modern hardware architectures. We show that an accuracy of 98.5% is possible with different types of neural networks.



Heartbeats that have been automatically recognized should be classified into normal beats (a), wide beats - like the right bundle branch block shown in (b), or artifacts that were recognized as beats (c).

Architecture



Results

The results of both MLP and LSTMN techniques scored about 98% in all measures. With this result they are far superior to the results for DTW.

In general the training phase of LSTMNs is slower than MLPs.

Type	Accuracy	Precision	Recall	F1-score
MLP	98.45%	98.54%	98.33%	98.44%
DTW DT	65%	73%	68.4%	70.62%
LSTMN	98.87%	98.86%	98.90%	98.87%