

Machine Learning in Cardiology

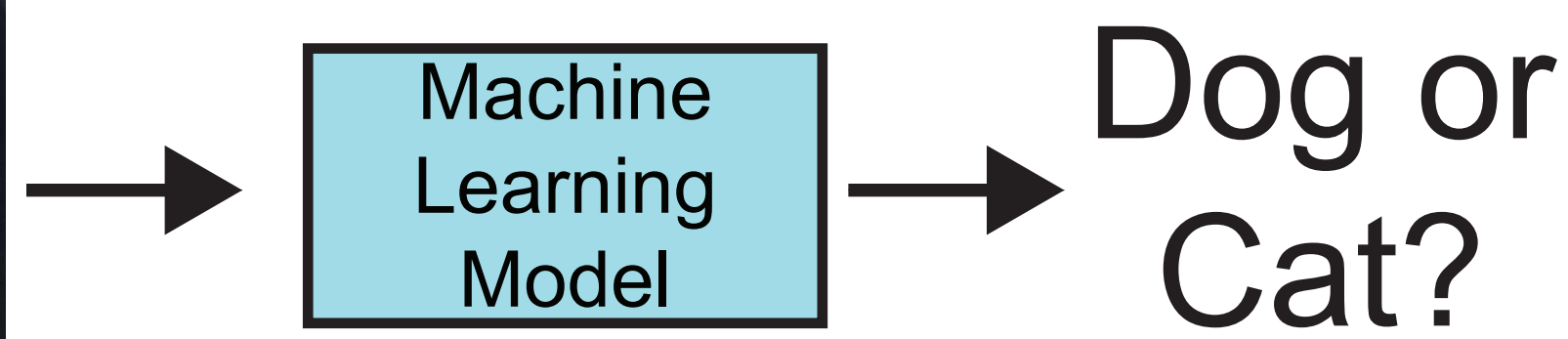
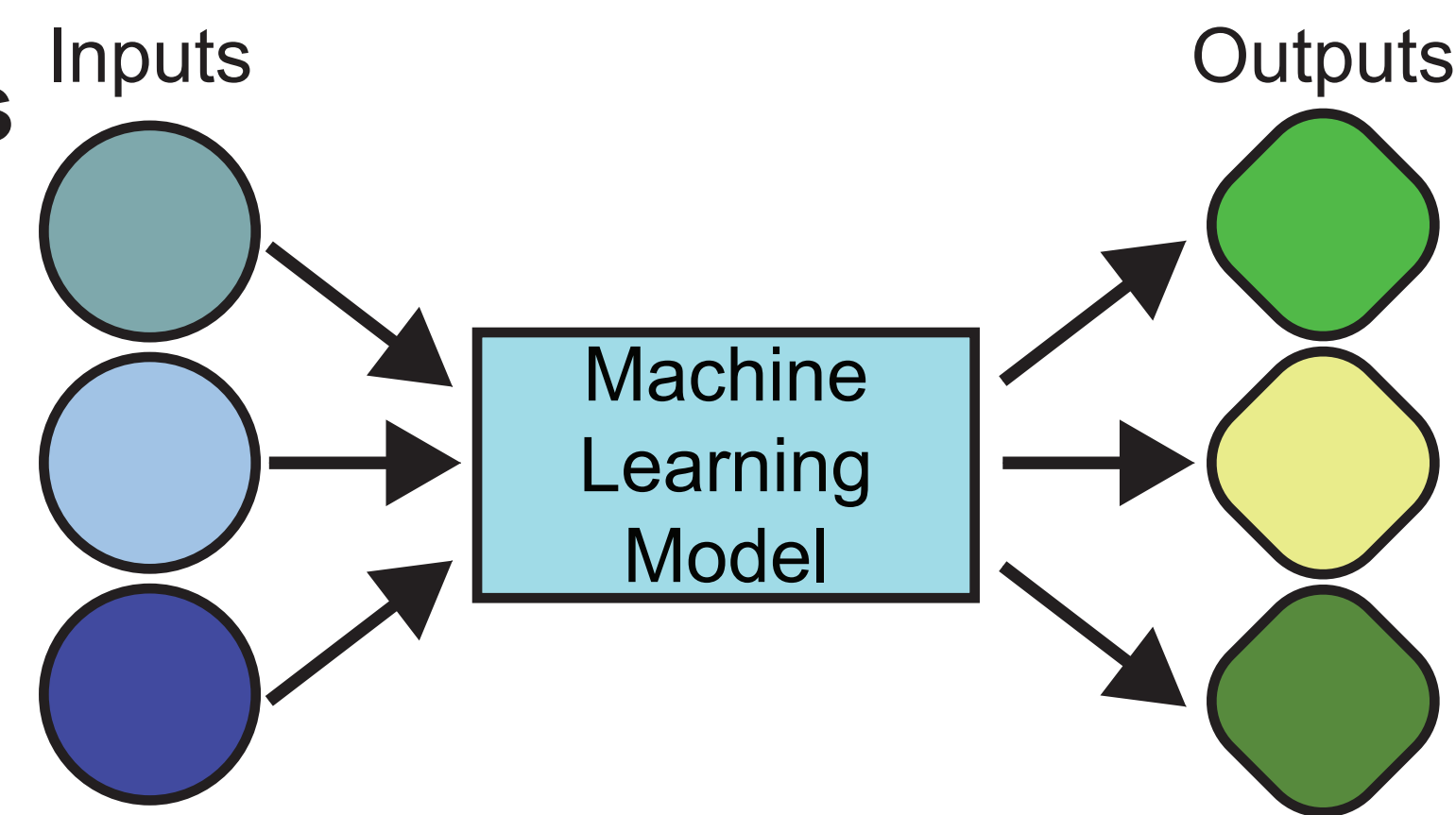
Computational Electrocardiography Group

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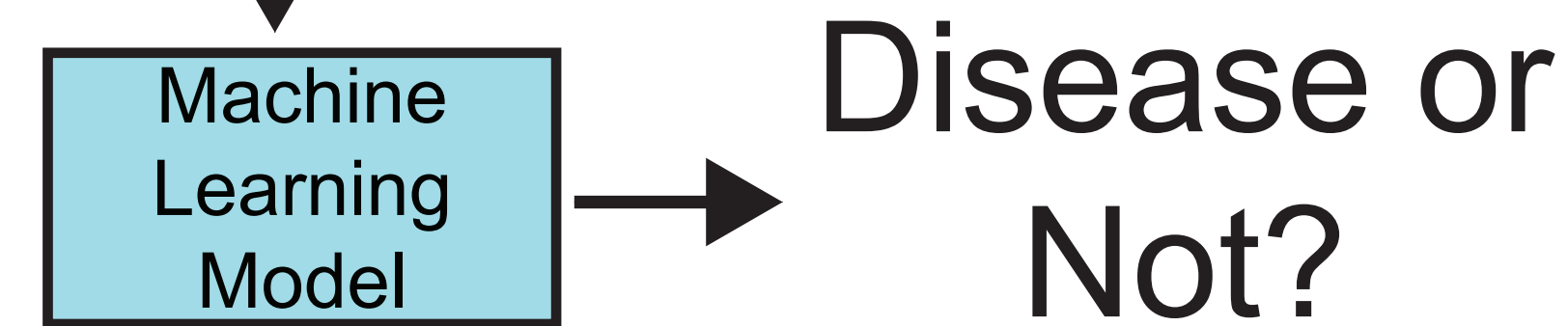
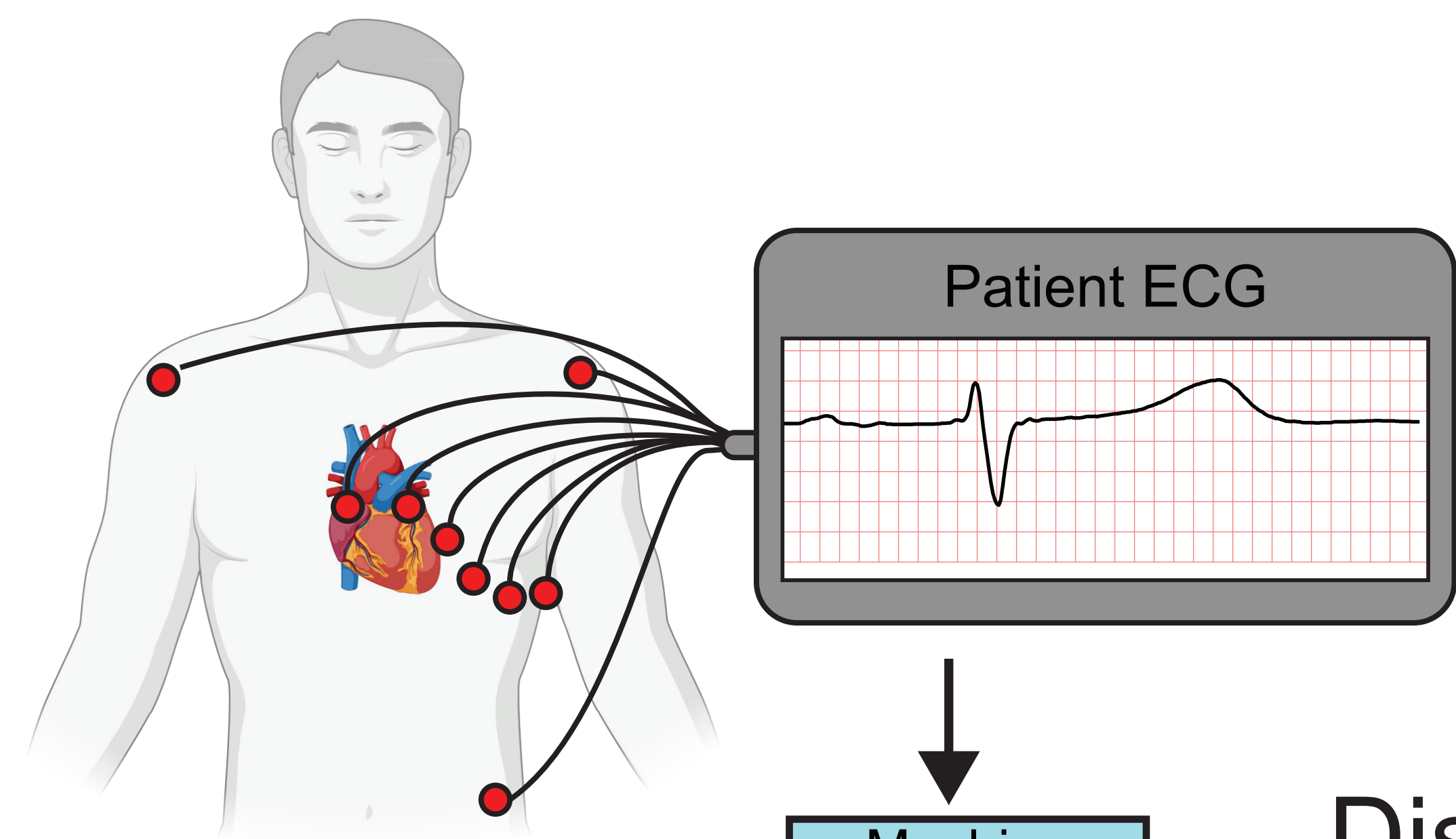


Problem Statement

Machine Learning tools are data-driven models which produce desired outputs from given inputs.



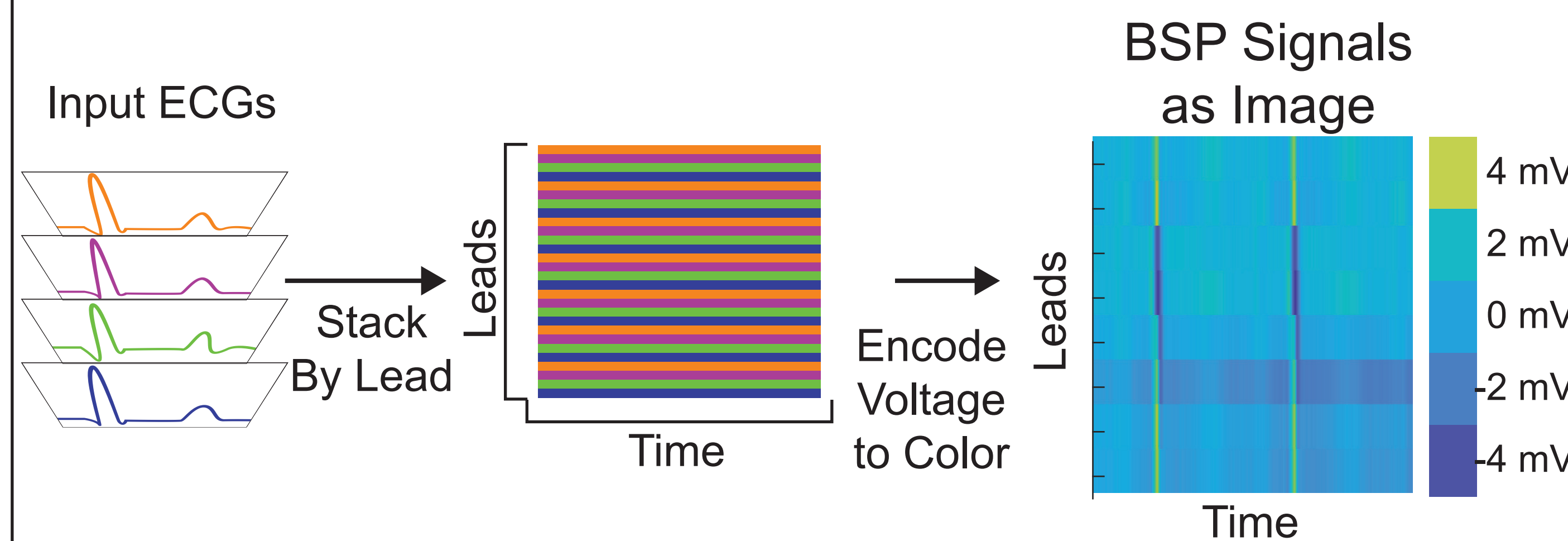
A common example of this is where a machine learning model is trained to look at an image and determine what is in that image.



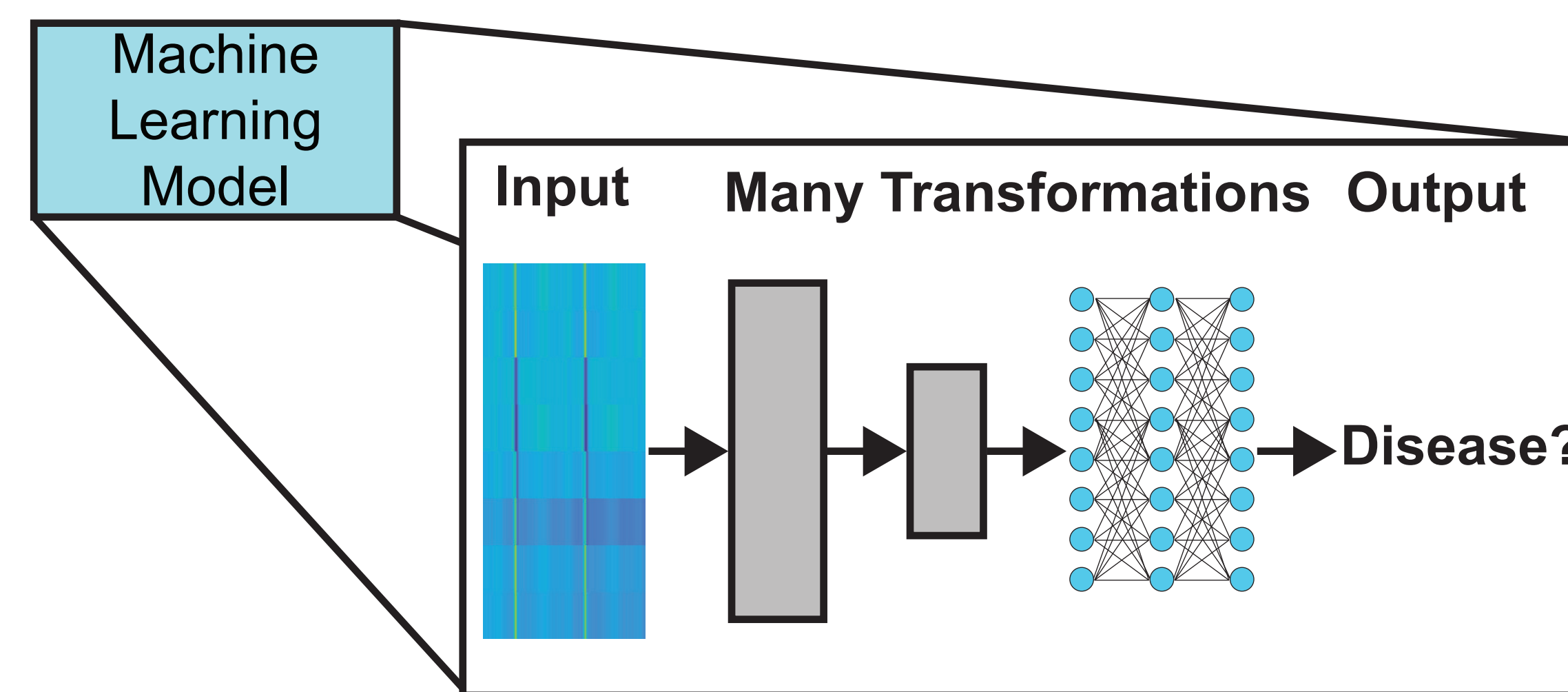
Machine learning in cardiology can leverage these same tools. The goal is to identify a disease or assist with a diagnosis. Instead of a photo of an animal, we now provide the machine learning with inputs that relate to heart function, such as a body surface electrocardiogram (ECG).

Methods

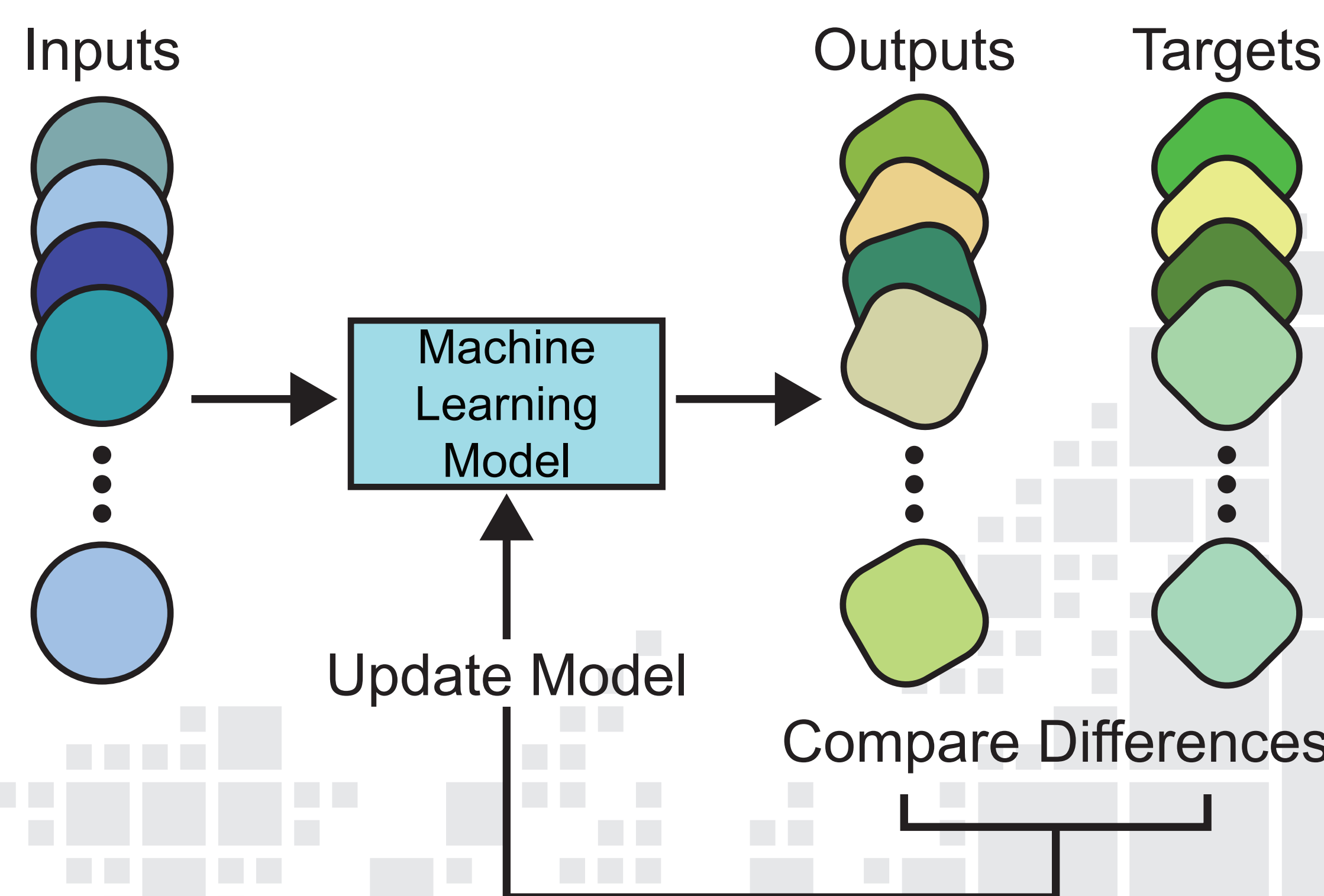
Preparing ECG Data for Machine Learning



Designing a Machine Learning Model

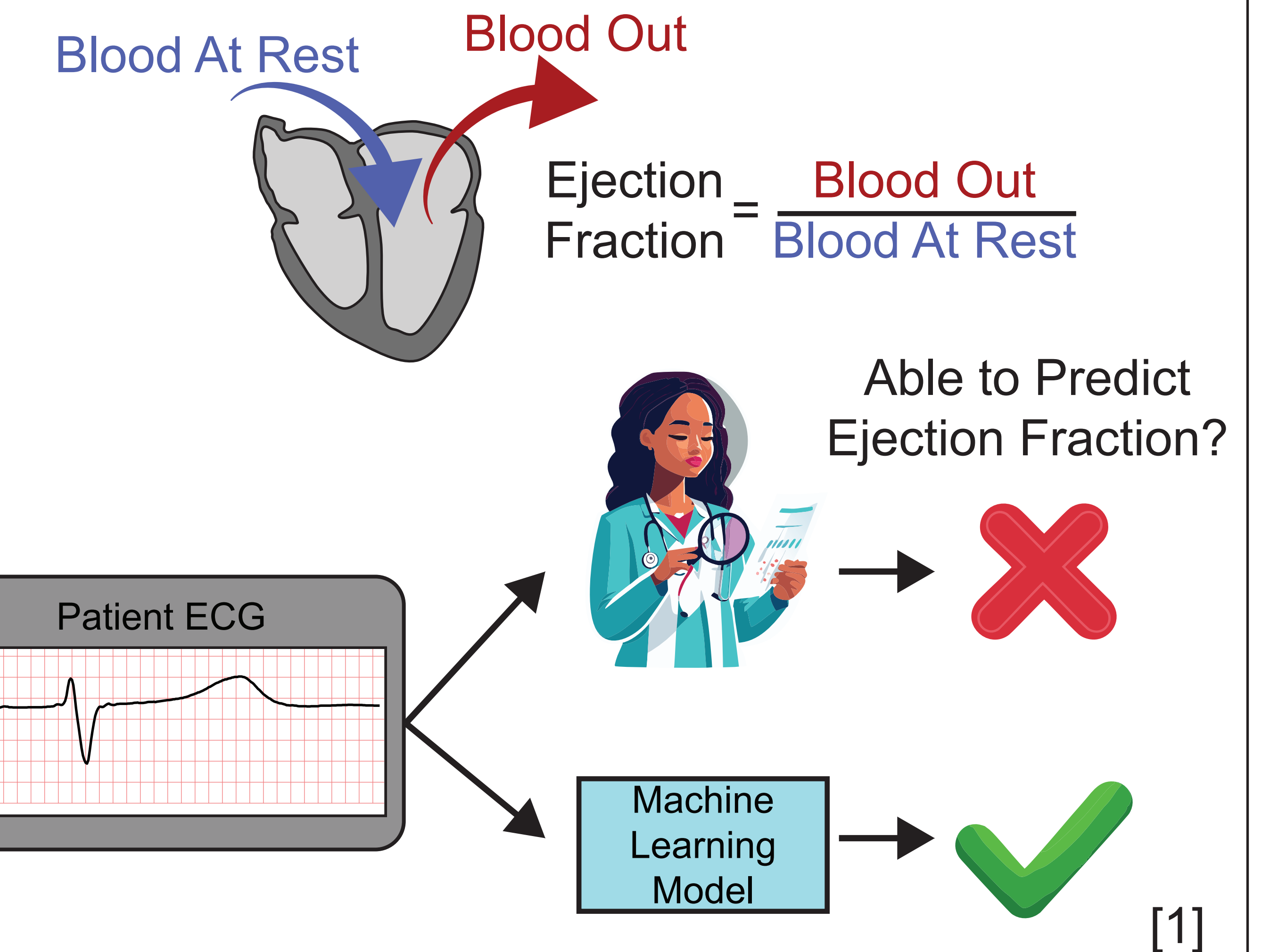


Training of Machine Learning Models



Applications

ECG Machine Learning Detects Mechanical Function



Biases Exist in ECG Machine Learning

After using a machine learning model to detect low ejection fraction, we compare low ejection fraction prediction accuracy to patient specific factors to look for bias.

Patient Specific Factors	Machine Learning Accuracy
Presence of Comorbidities	↓
Higher Age	↓
Female Sex	↑
Higher Socioeconomics	?
Demographic Factors	?

[2]