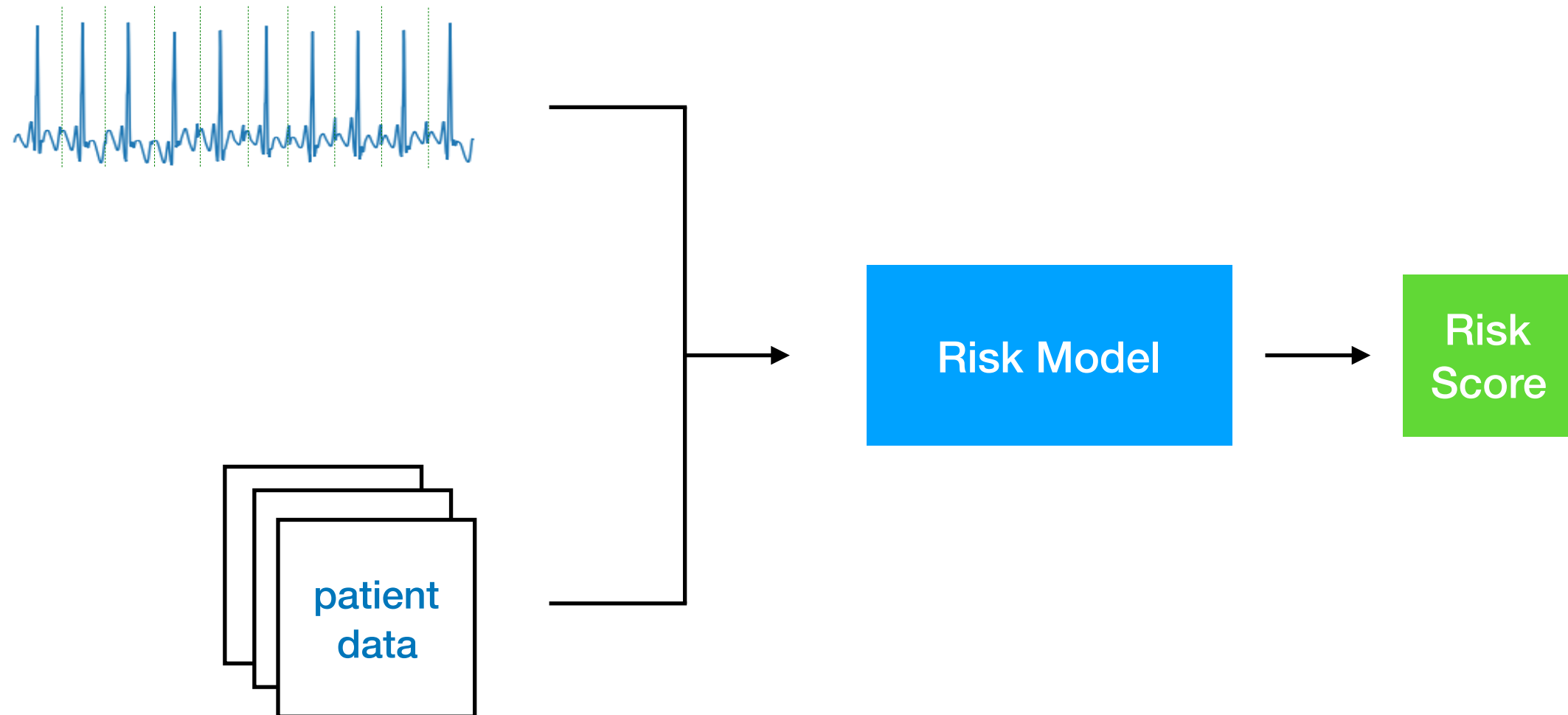


Multiple Instance Learning for ECG Risk Stratification

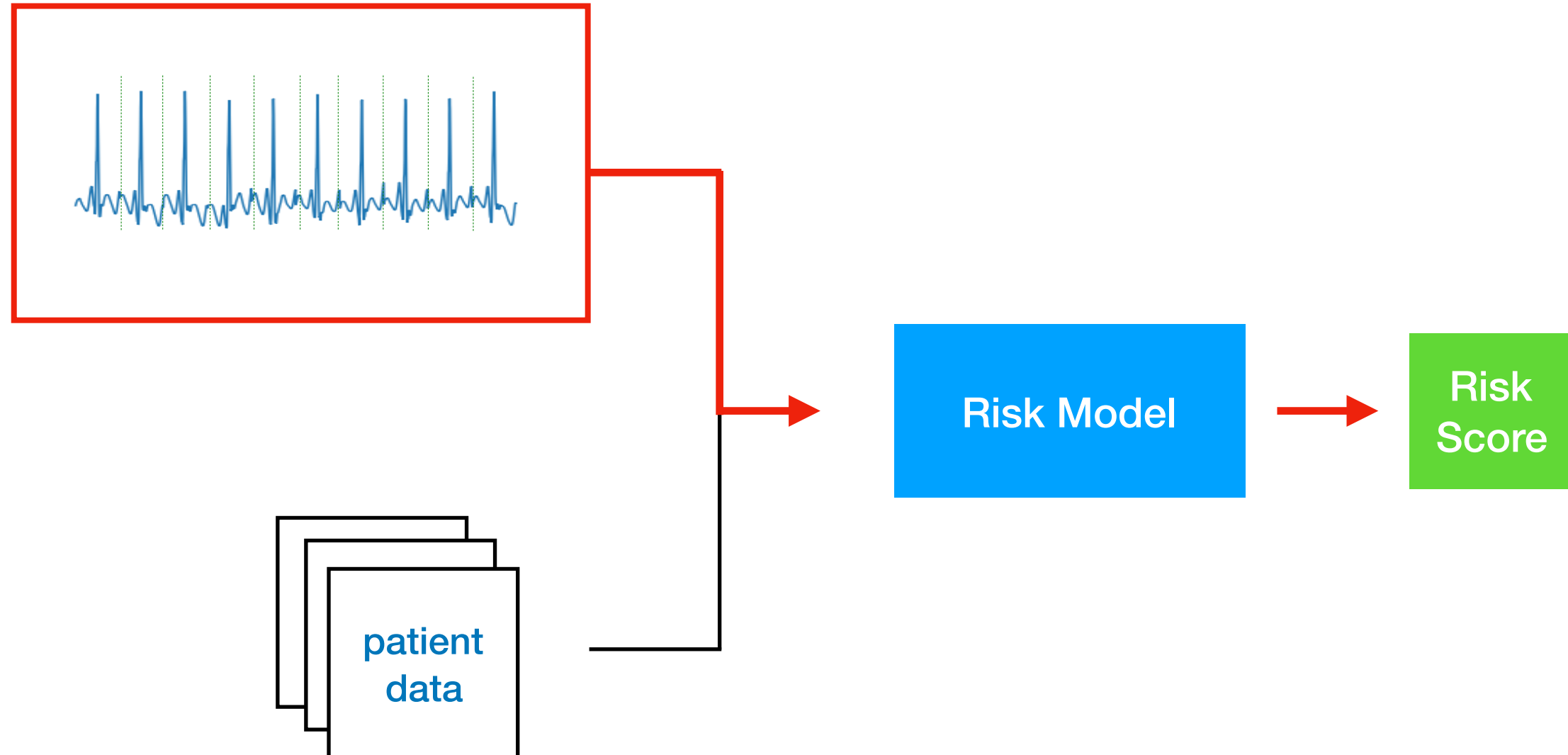
Divya Shanmugam, Davis Blalock, John Guttag



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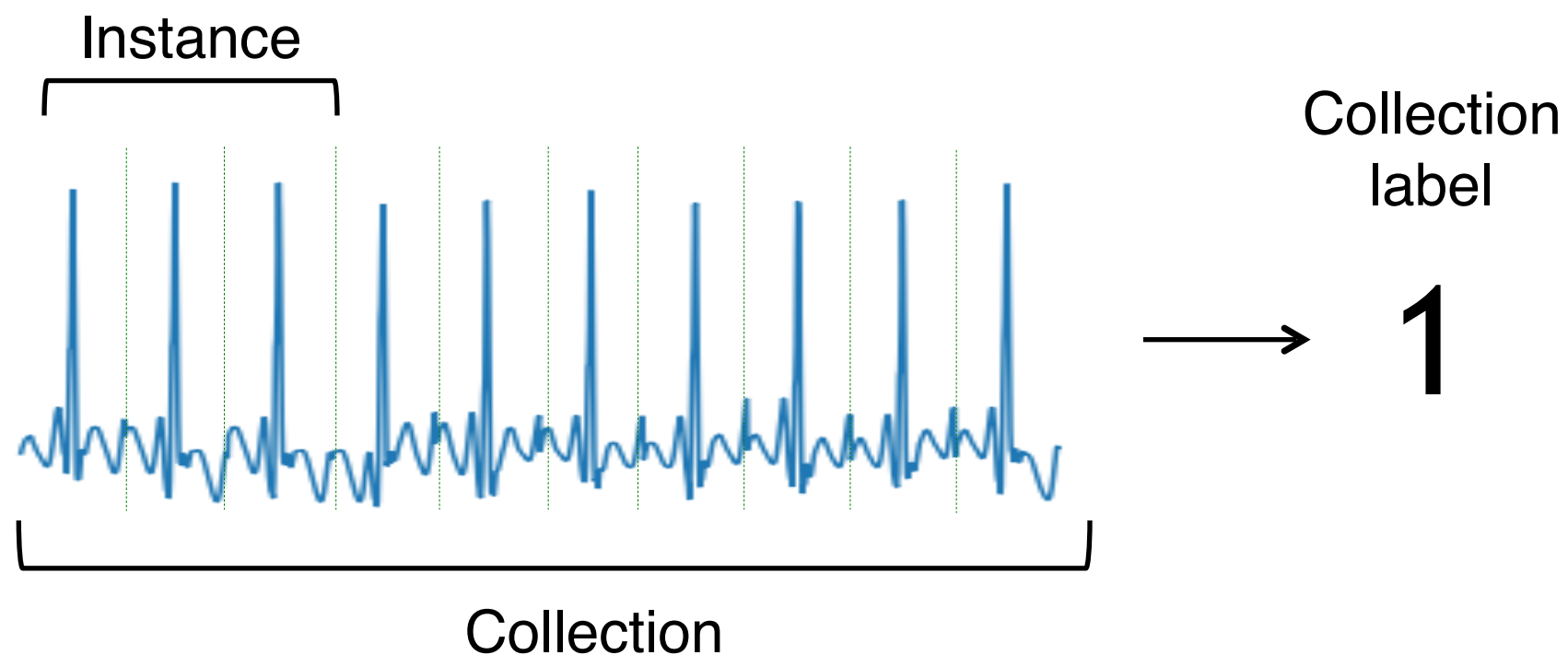
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- Typical of existing work
- Approximates characteristics of risky signals

Learn what a risky set of heartbeats look like!

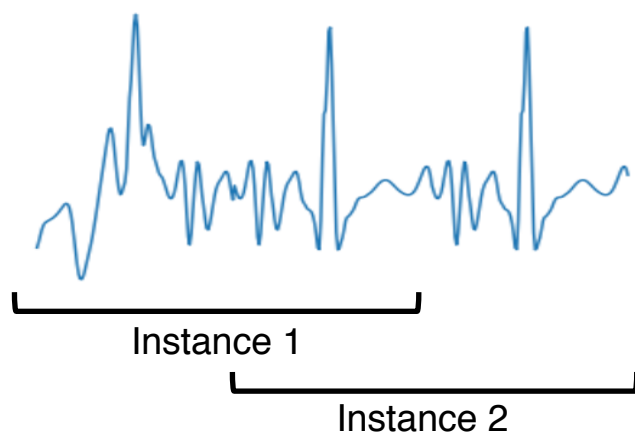
We reframe the risk stratification task as a **multiple instance learning** problem.

- * Labels of collections of instances are available, but labels of instances are not
- * Assumption: patients at higher risk of cardiovascular death have *more* risky instances than those at lower risk



Our method consists of three steps: **instance extraction, classification, and aggregation**

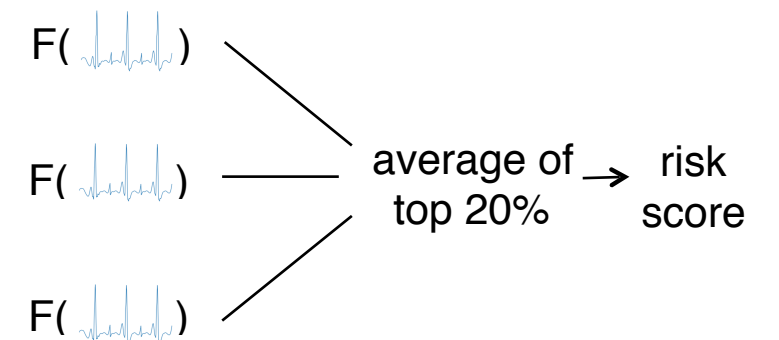
Extraction



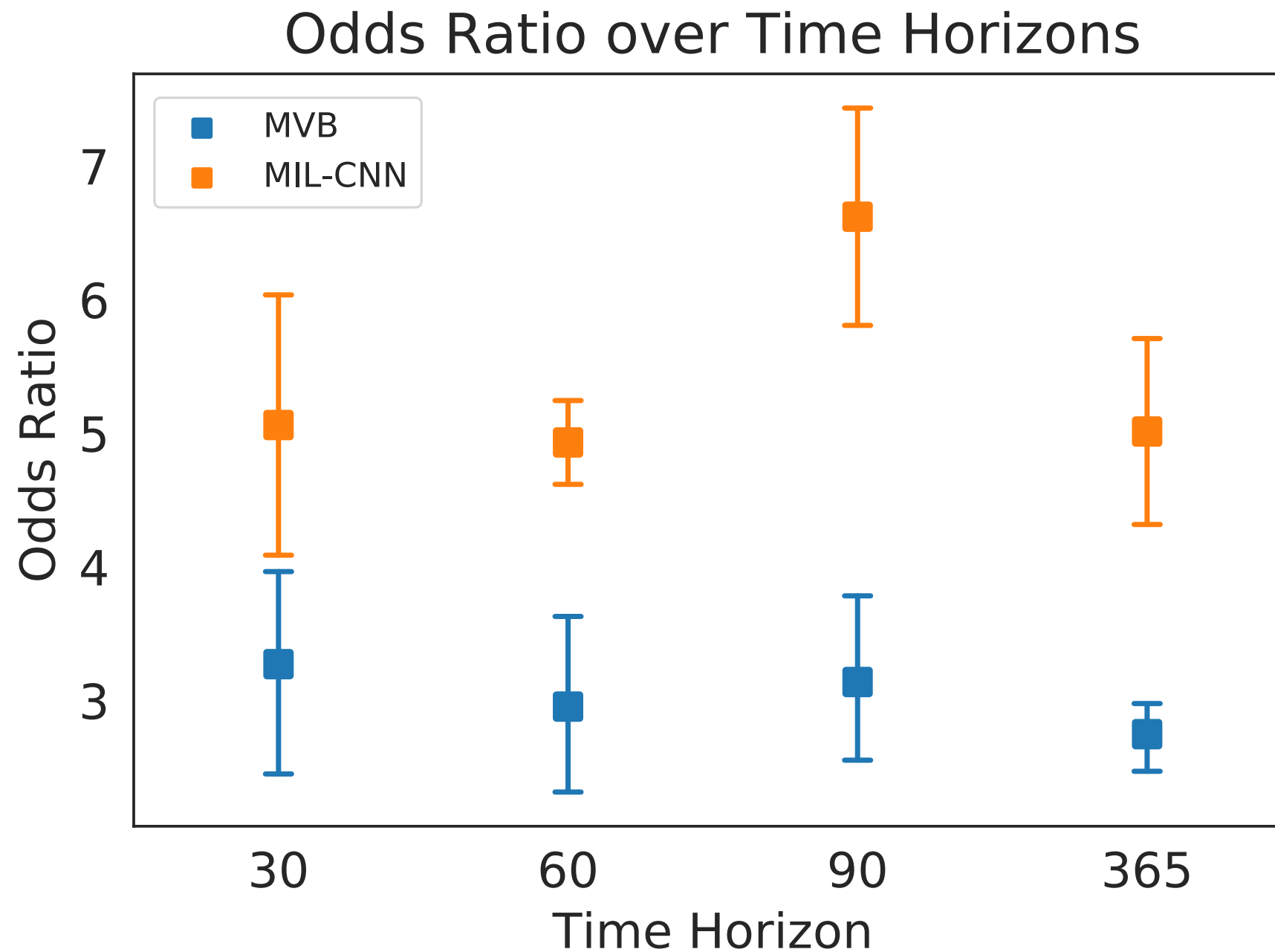
Classification

$$F(\text{instance}) \rightarrow [0,1]$$

Aggregation



Produces a **state-of-the-art ECG-based risk score for cardiovascular death**



Takeaways

- * We propose a general-purpose method for incorporating very long time series into risk models
- * Using this method, we produce a state-of-the-art ECG-based risk score!

Thanks!