



DETECTING ABNORMAL EGGS

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Capstone Project
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We Will Propose

That next steps may be taken in implementing computer-based identification of abnormal electrocardiograms (ECGs)



— Today's Agenda —

BUSINESS PROBLEM

DATA & METHODS

RESULTS

NEXT STEPS





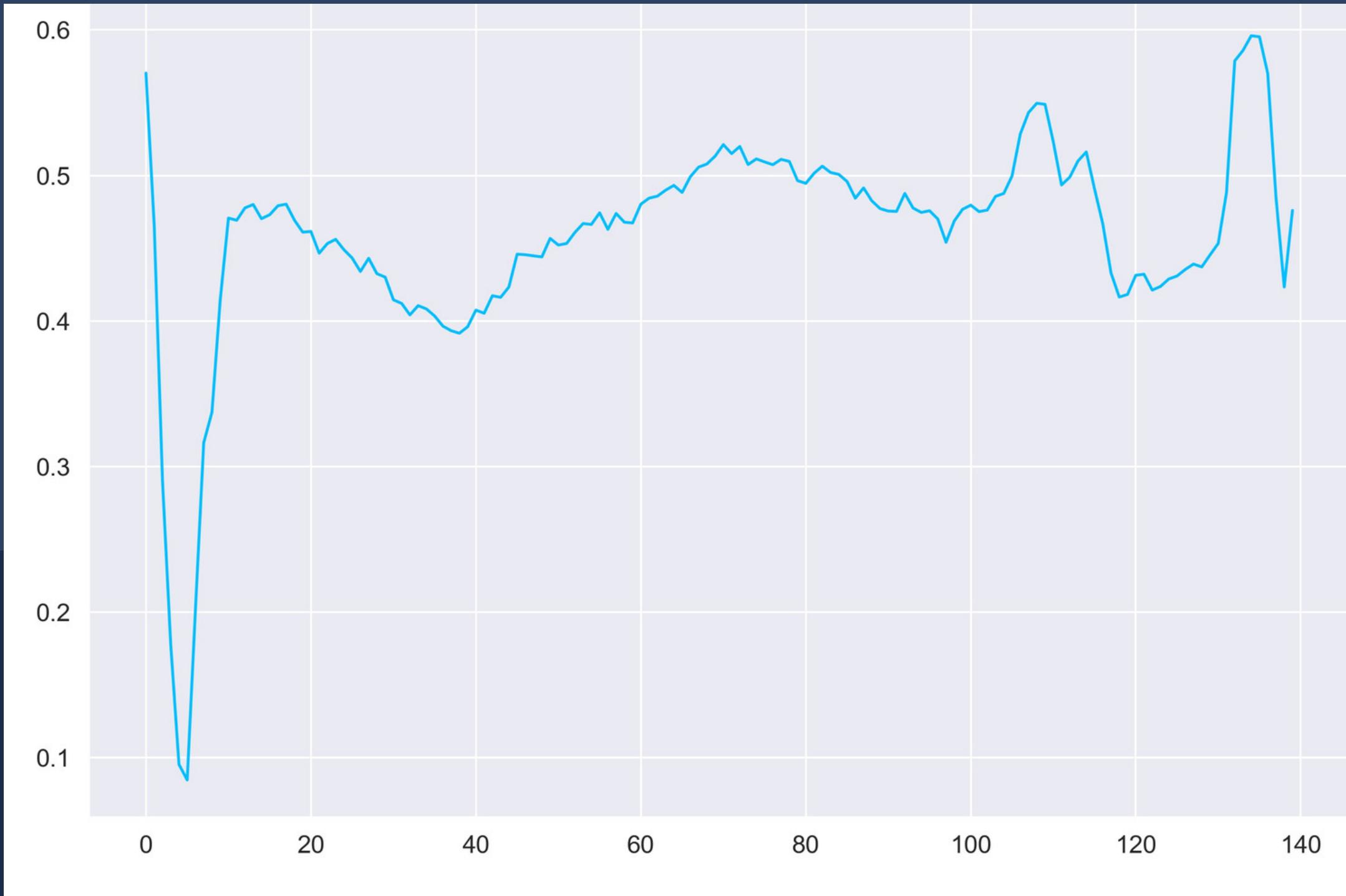
Business Problem

To correctly identify
abnormal ECGs for fast-
tracked diagnosis



The Data

A normal ECG from the dataset



- Contains almost 5,000 heartbeats
- 140 data points for each heartbeat
- All from a single patient with congestive heart failure
- 2,919 normal heartbeats
- 2,079 abnormal heartbeats

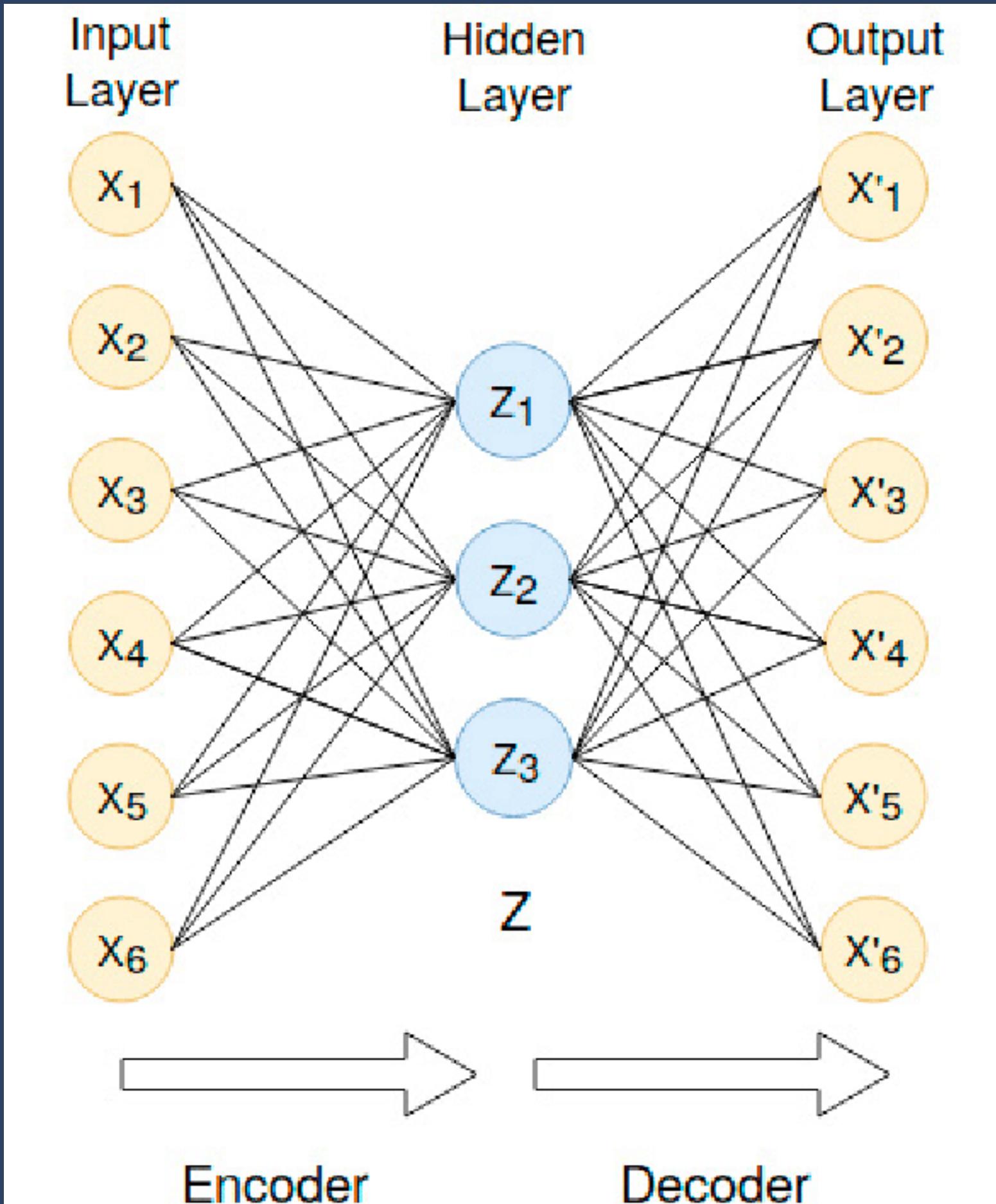
Our Methods

- Teach the model how to recognize a normal heartbeat and reproduce it
- Present the trained model with normal and abnormal heartbeats and see if it can identify one from the other



Modeling: Autoencoding

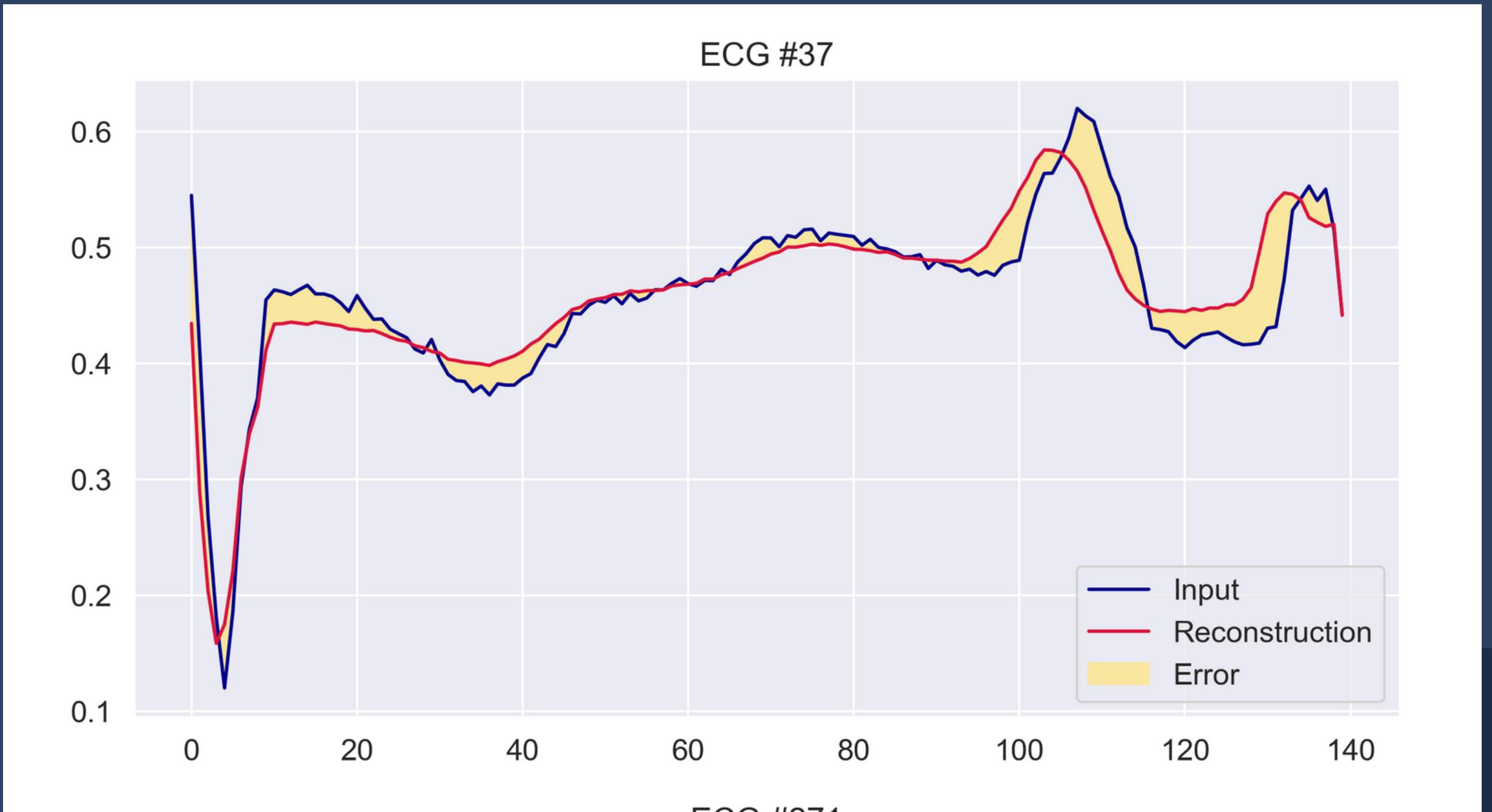
- Start with inputs
- Reduce them
- Expand them back to the same size and reproduce the original





How It's Done - A Normal Heartbeat

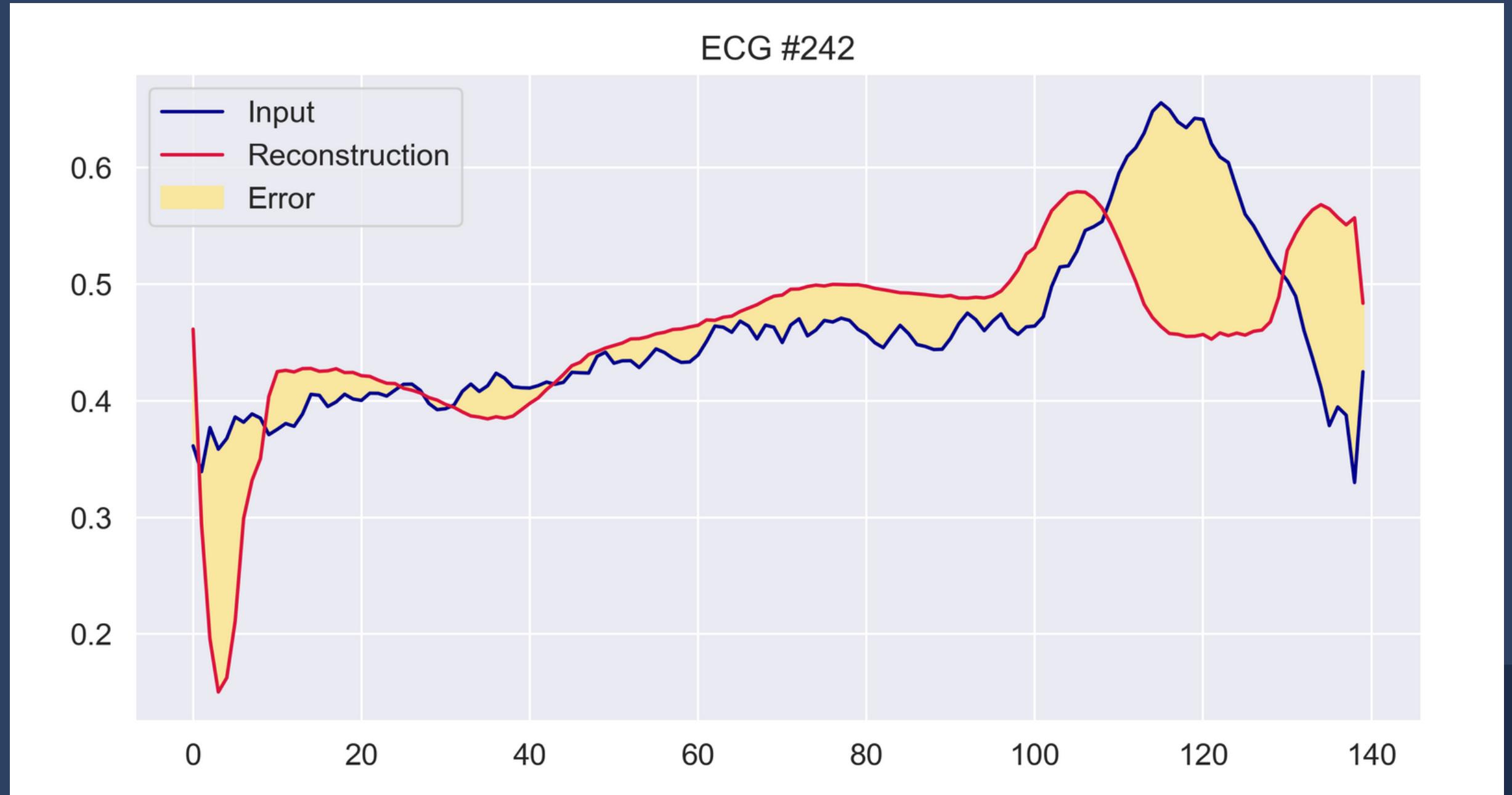
This is a normal heartbeat and the copy reconstructed by the model. The area shaded in yellow is the amount of error.



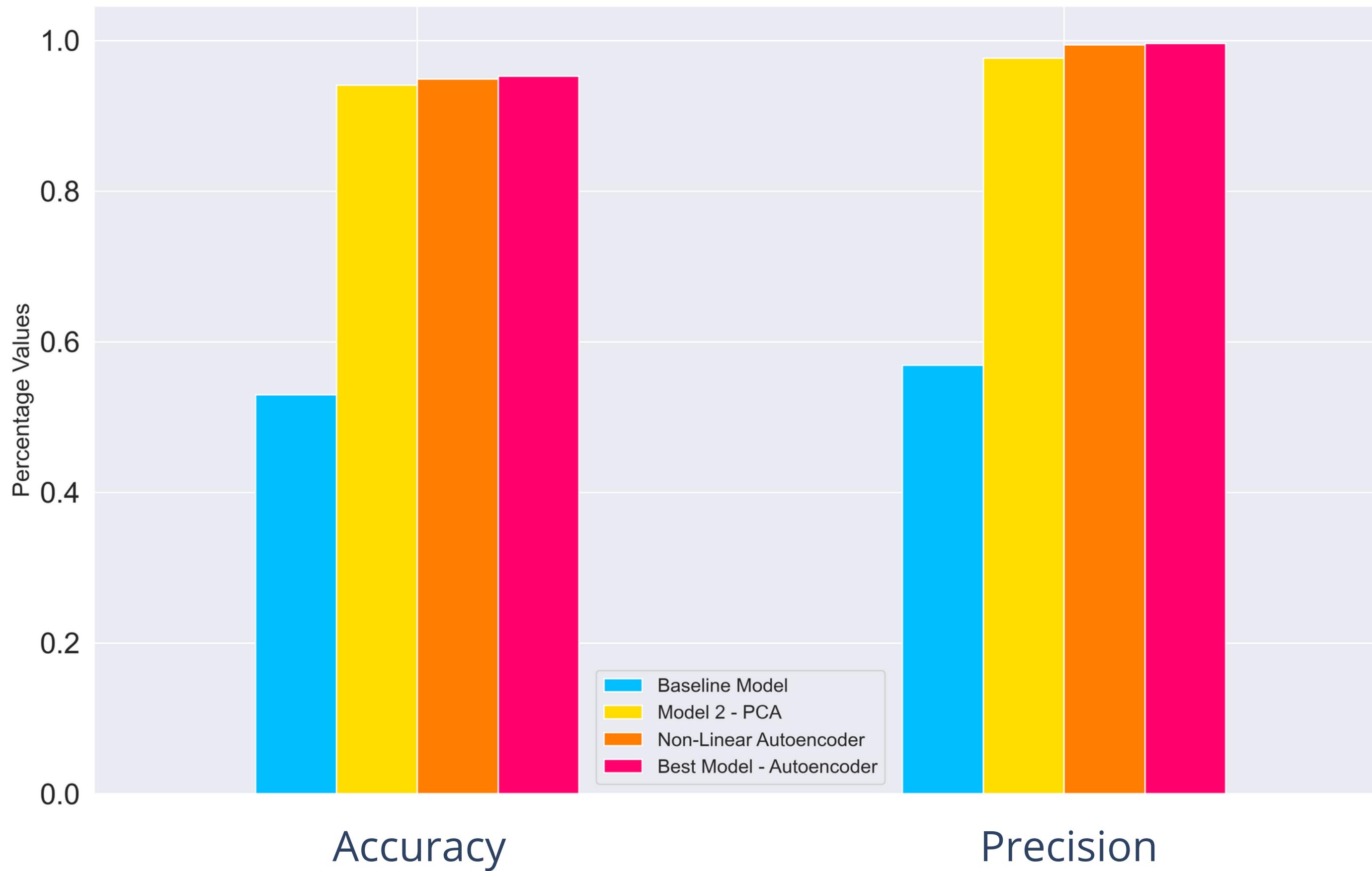


How It's Done - An Abnormal Heartbeat

Note the greater error in the reconstruction, because it's never seen an abnormal heartbeat before!



Comparision of Accuracy and Precision for Each Model



Results

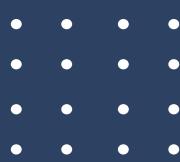
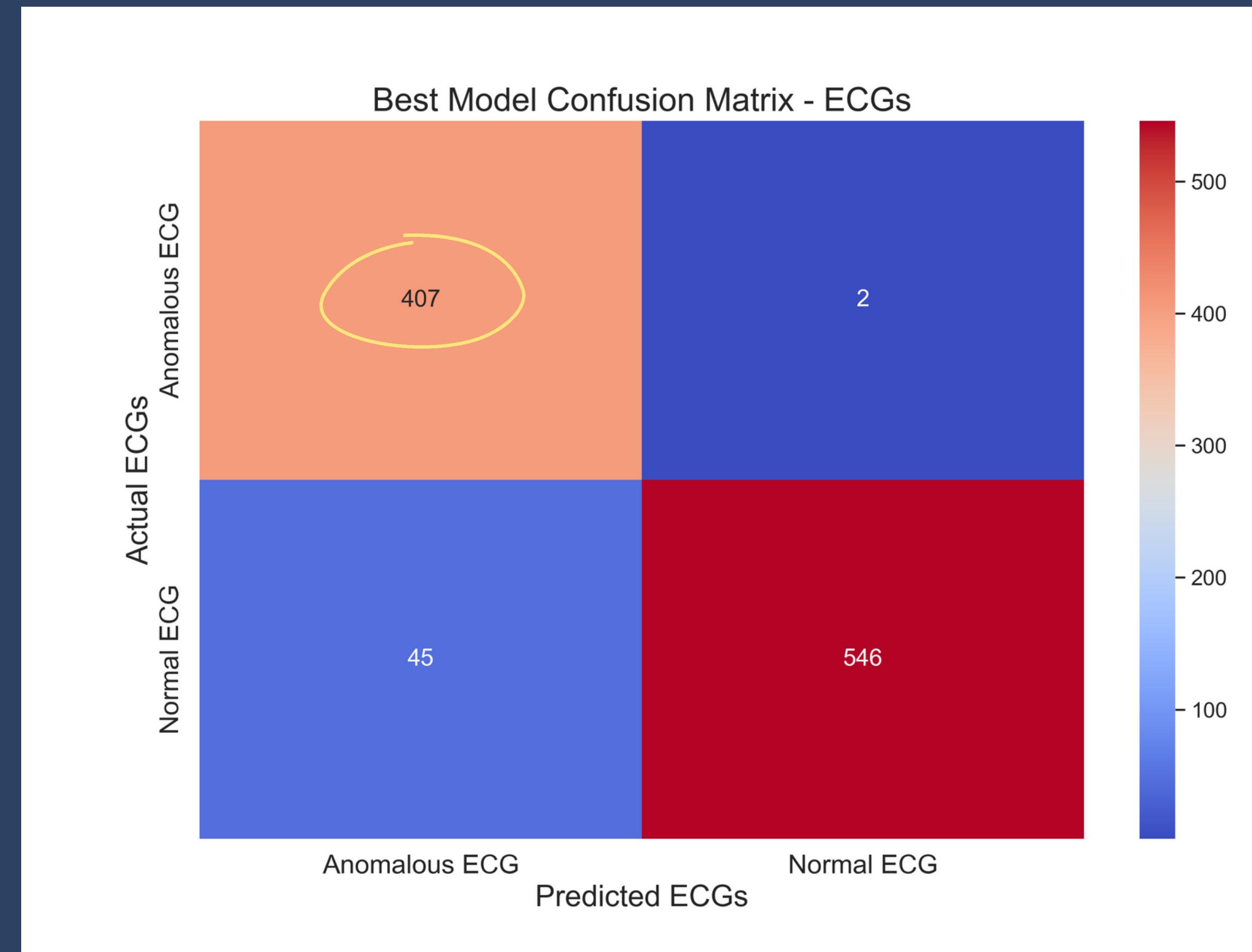
Best Model

Accuracy - ~ 95%

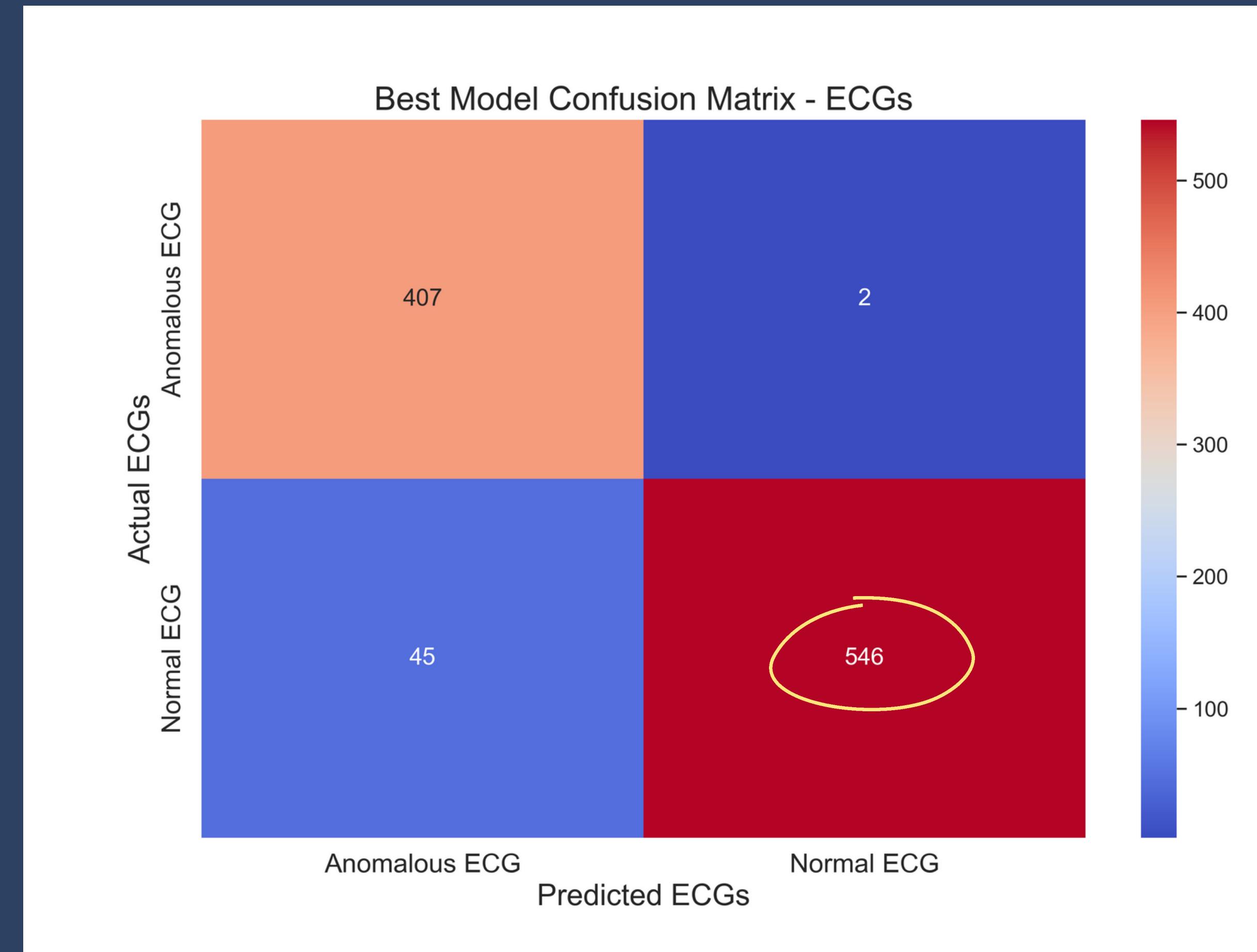
Best Model

Precision - ~ 99%

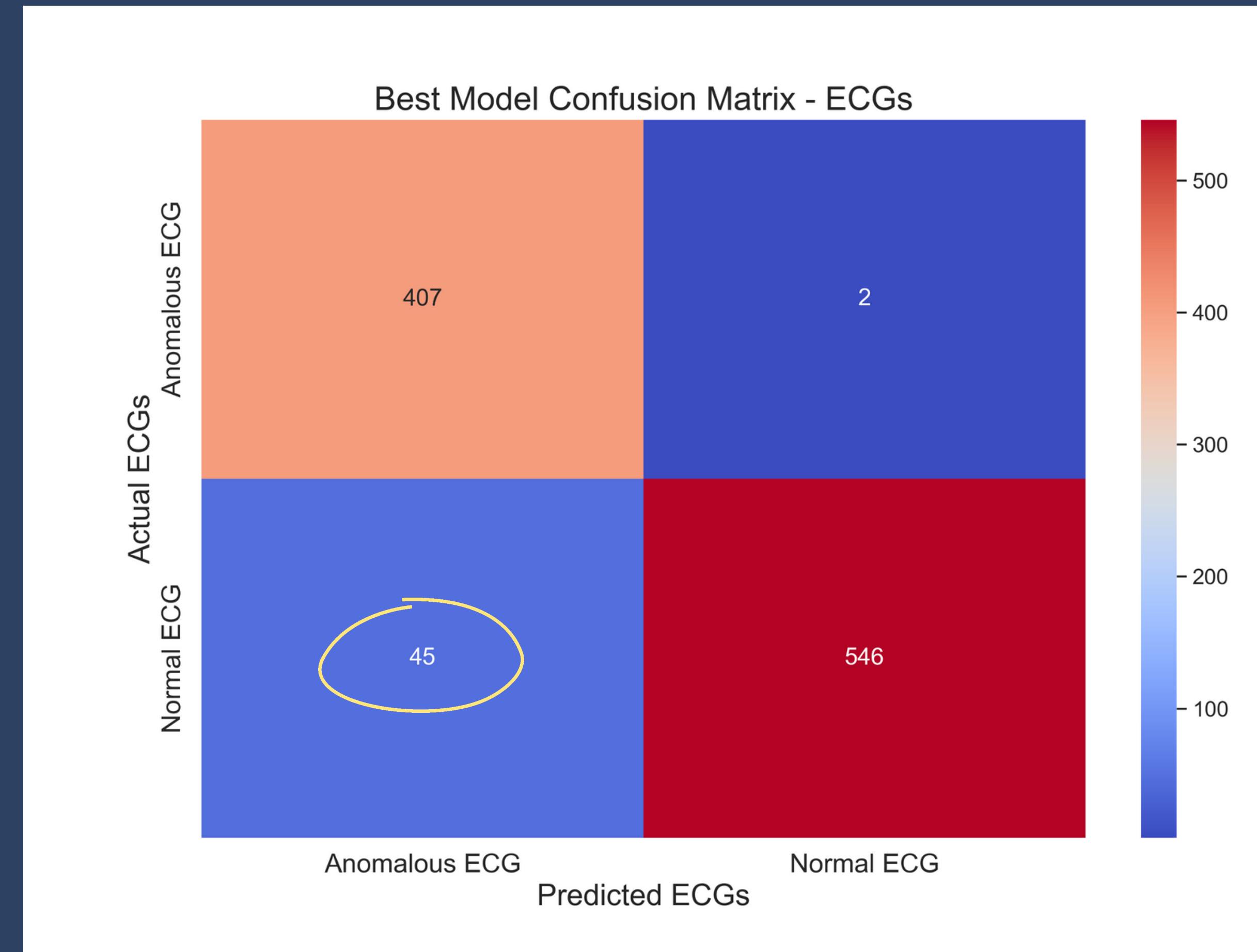
Our Best Model Results



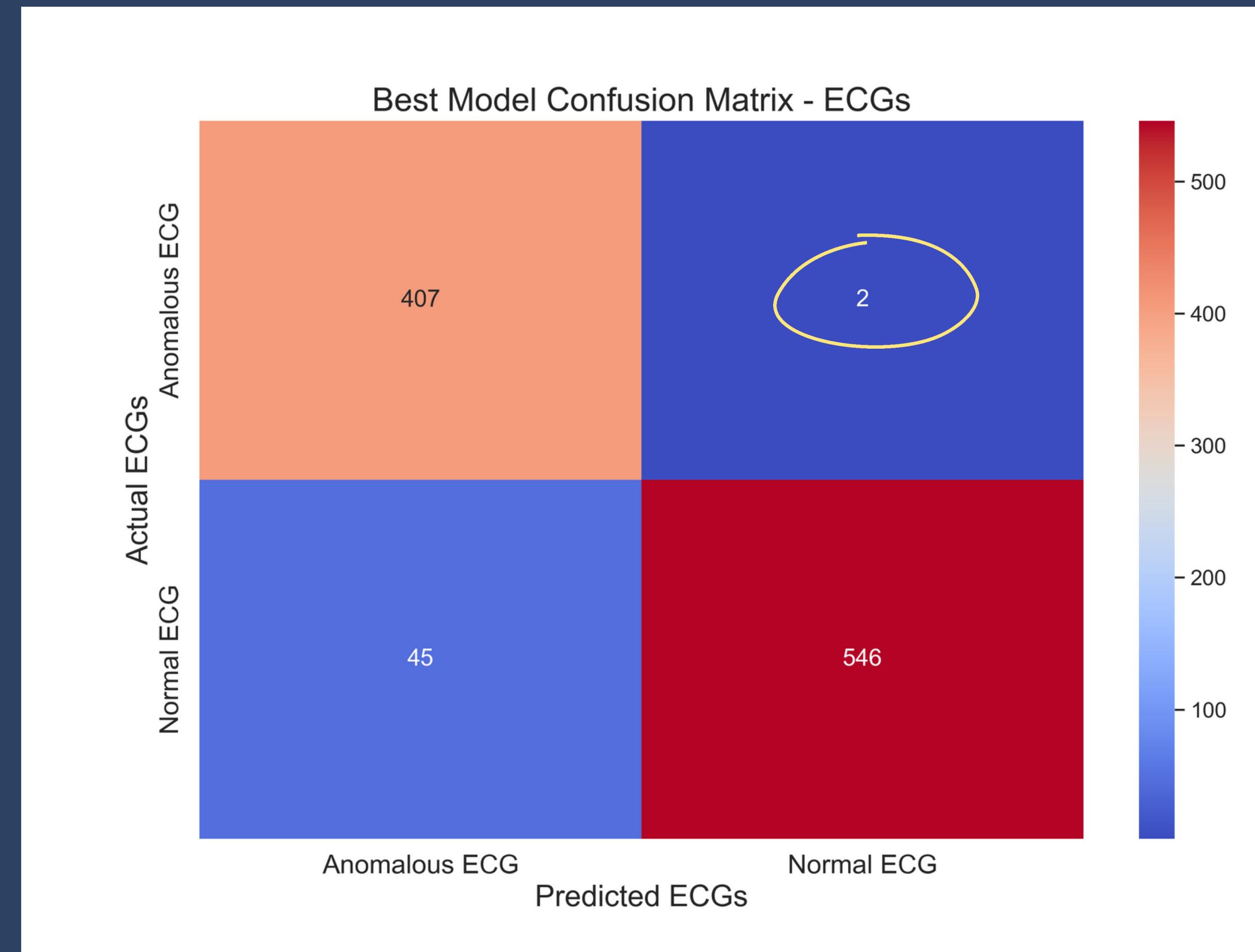
Our Best Model Results



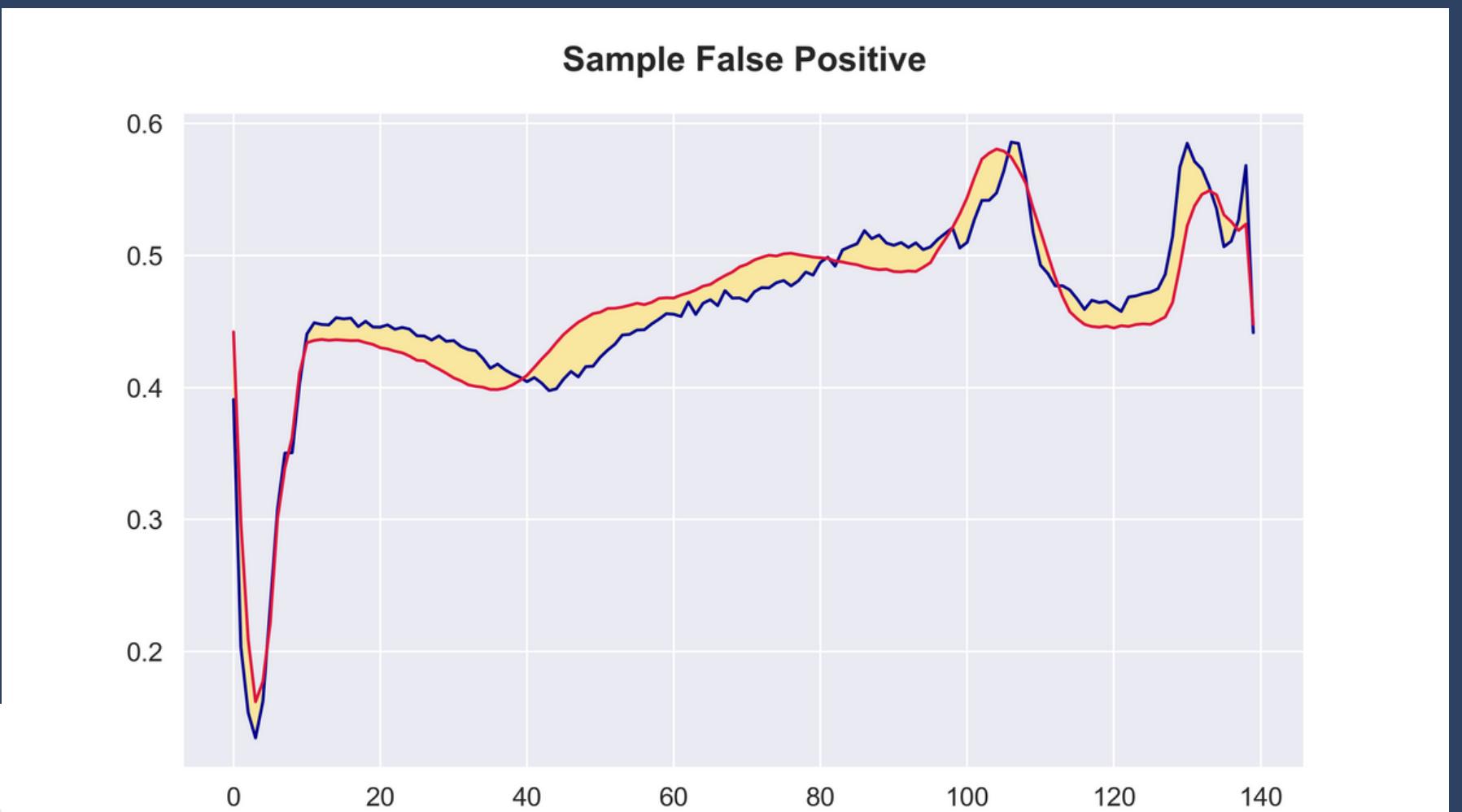
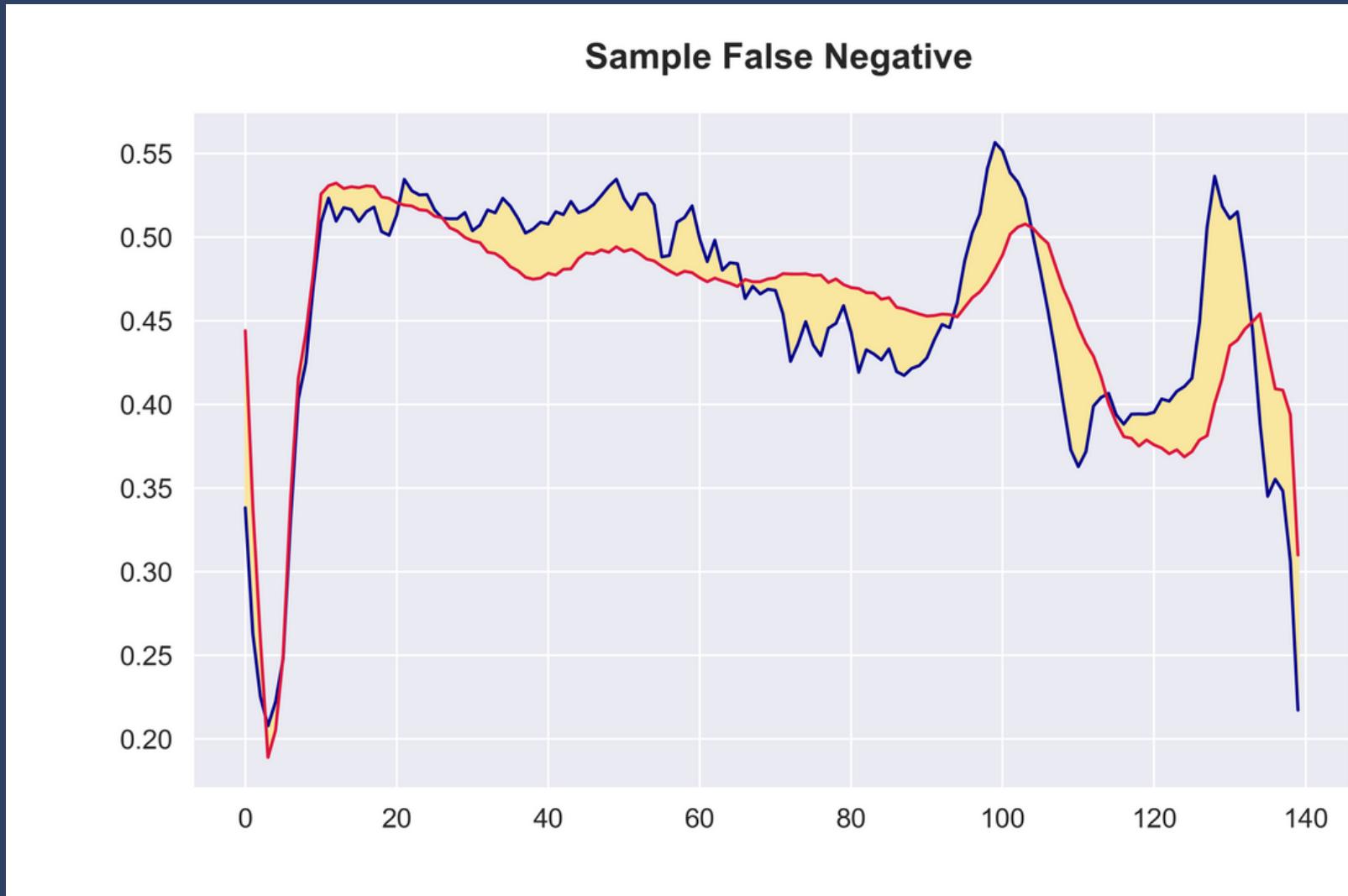
Our Best Model Results



Our Best Model Results



A look at what we got wrong



Conclusions

- Successfully identified the vast majority of anomalous heartbeats
- The modeling tool produced accurate and fast results

Next Steps



Next Steps

VERIFY



Next Steps

VERIFY

CLARIFY



Next Steps

VERIFY

CLARIFY

DEVELOP



Next Steps

VERIFY

CLARIFY

DEVELOP

TRAIN



THANK YOU!

Questions or Comments?

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