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Screening for cardiac contractile dysfunction using an artificial intelligence–enabled electrocardiogram

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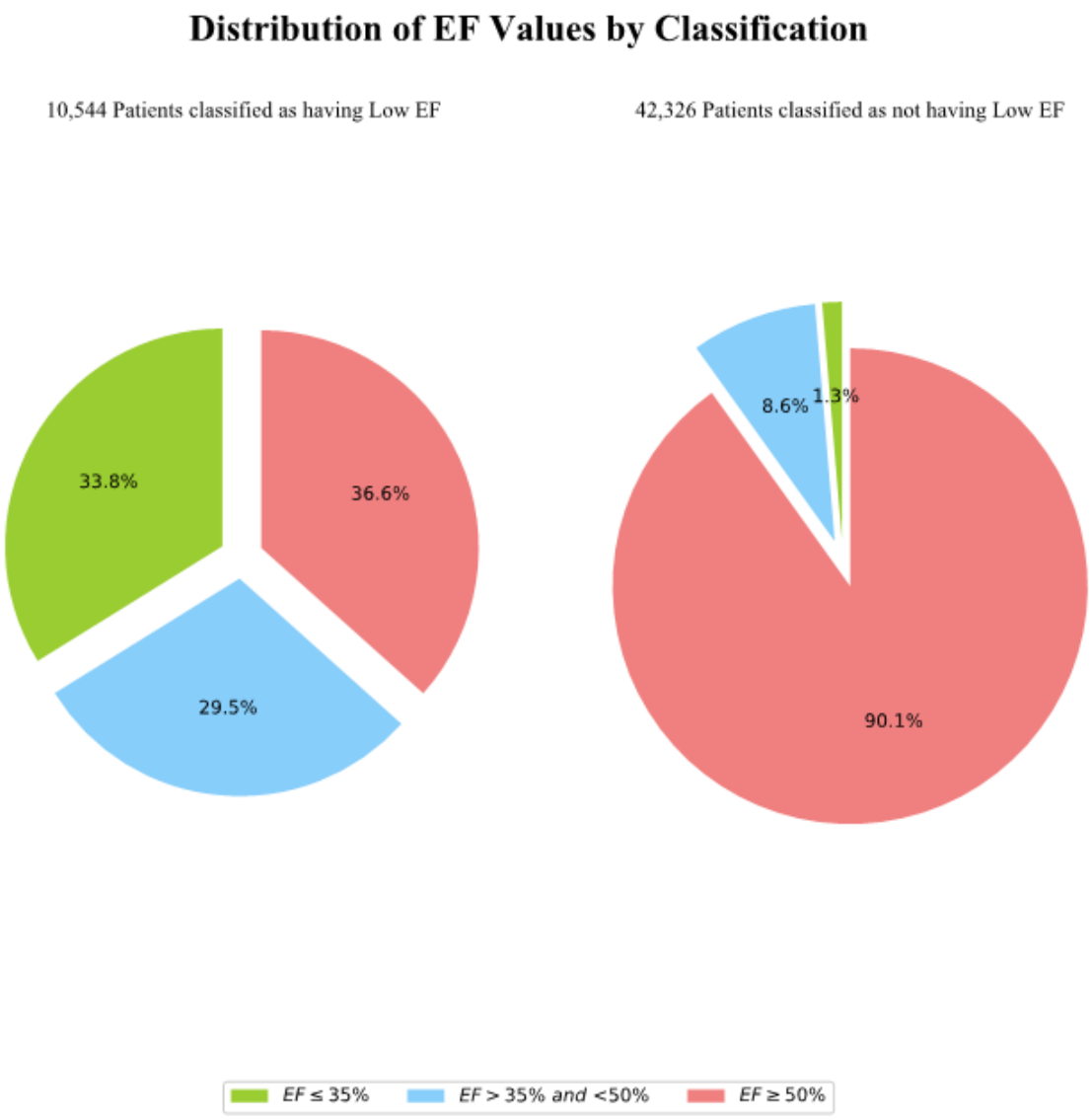
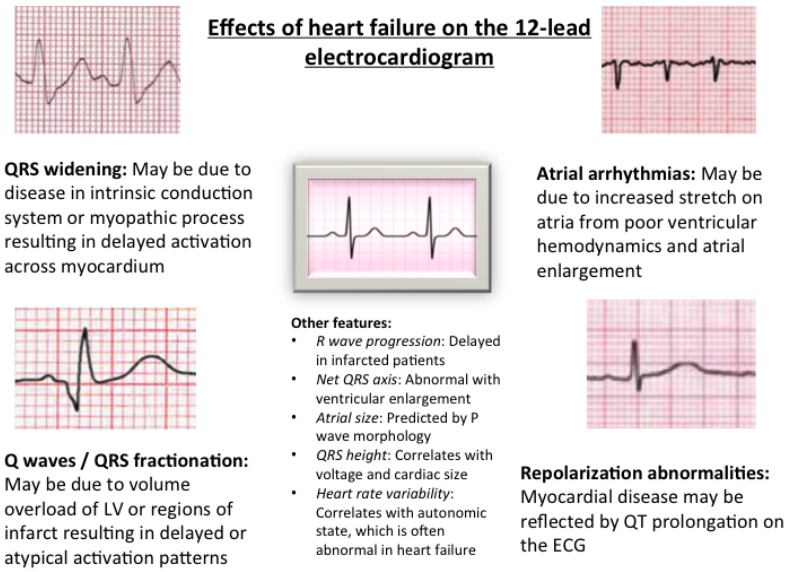
Supplemental Information

Supplementary Figure 1 Legend: Distribution of Ejection Fraction based on network classification. Of patients classified as having a low ejection fraction using the threshold selected to achieve similar sensitivity and specificity, 63.5% had a EF under 50%. If classified as normal, 1.3% had a EF $\leq$ 35%, and 90.1% had an EF $\geq$ 50%.



Supplemental Figure 2 Legend: Effects of Ventricular Dysfunction on the 12-Lead Electrocardiogram. Cardiac hypertrophy, ventricular enlargement, and cardiac abnormalities that lead to a reduced ejection fraction may be reflected by electrocardiographic abnormalities in several ways including but not limited to those outlined in the figure. Scarring of the ventricles may lead to changes in several electrocardiographic findings due to aberrant electrical conduction, including the presence of Q waves, QRS prolongation, or fractionation in the QRS. In turn, the hemodynamic abnormalities associated with poor forward flow may lead to other arrhythmias such as atrial fibrillation. Enlargement and scarring of the ventricles may lead to both depolarization abnormalities (reflected as abnormalities in the QRS as noted) or repolarization prolongation as reflected by a long QT interval. In addition, enlargement of the ventricle may lead to a shift in the cardiac axis which is reflected on the 12-lead electrocardiogram by the net electrical activation vector, QRS height, and other findings. All of these features may be present to different extents depending on the individual with heart failure and the cause of heart failure.



Supplemental Figure 3 Legend – Network Architecture: an abstraction of the selected architecture, the network is composed of three main part : 1) temporal features extraction – using convolutional blocks on the temporal axis. 2) Spatial feature extraction – using similar convolutional blocks but with no zero padding. 3) Dense/Fully connected network to regress the visual features to the output.