Contrastive Learning of Electrocardiogram signals for the inference of cardiac pressure

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Abstract

Abnormal cardiac signals in an electrocardiogram (ECG) are used to screen the heart condition. Physicians oftentimes order diagnostic tests which include invasive procedures. For instance, the function of the left heart can be precisely measured by the cardiac pressure, pulmonary capillary wedge pressure (PCWP). PCWP is acquired with the invasive right heart catheterization. To reduce the risk of invasive procedures, we can build a model to infer PCWP using non-invasive ECG screening. We can also leverage the vast unlabeled ECG dataset to learn a useful representation for downstream pressure inference using contrastive learning. Yet, an important question remains; what are the good views (**?**) of ECGs for contrastive learning? Previous works have tried to include ECGs from the same patients (**?**), different augmentations from the same ECG (**?**), leads from the same ECG (**?**) to define proper 'views' for contrastive learning. However, none of them has explored the various views of ECGs and compared them. In this project, we define different views according to age, sex, racial groups with and without augmentation (scaling, adding Gaussian noise, shifting, augmentation on spectrogram domain (**?**). Then compare their learned representation using the downstream cardiac pressure (PCWP) classification and regression tasks.

Appendix A.

Some more details about those methods, so we can actually reproduce them. After the blind review period, you could link to a repository for the code also. *MLHC values both rigorous evaluation as well as reproduciblity.*