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Coronary Stenosis Diagnosing System Using 2-step Machine Learning Algorithm¹ YOUNG WOO KIM², SUSIE RYU, HEEMIN LEE, JOON SANG LEE³, Yonsei University — In this study, a two-step machine learning (ML) algorithm is introduced to estimate fractional flow reserve (FFR) along with decision (DEC) for coronary artery. This paper suggests the possibility of ML-based FFR to overcome the computational fluid dynamics (CFD) based FFR estimation, which includes calculation time and accuracy. Both synthetic model and patient model are used for the training of 2-step algorithm. In the first step, synthetic models are analyzed by CFD method and are used to train Gaussian process regression model in order to increase the quantity of data. In this process, not only FFR but also flow characteristics are considered. Patient models are used to train the second step of the algorithm, which is based on a support vector machine. This step provides more information related to biometrical features from the patient. In result, both the calculation time and accuracy of the model were higher for ML-based FFR than that from CFD-based FFR. This study suggests that both flow characteristics and biometrical features should be also included in the dataset of ML algorithm, by analyzing the weight factor of each features.

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