Advancement of AI-based lower urinary tract symptom diagnosis assistance model

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In order to diagnose and differentiate lower urinary tract symptoms in men, a urodynamic test is usually performed. Urodynamic testing is invasive and uncomfortable because a catheter is inserted into the urethra and anus. In addition, the possibility of occurrence of complications cannot be ignored. Simple uroflowmetry is a simple, non-invasive test that is widely used in clinical practice as a screening tool and a follow-up tool for dysuria. However, the interpretation of the result graph is subjective and there is no validated evaluation method yet. The purpose of this study is to learn the pattern of the result data of the simple urine rate test using artificial intelligence and to improve the performance of the model that classifies the presence or absence of lower urinary tract symptoms.

In this study, a total of 2801 simple urine velocity test result data is used as the data set. We build a dual-mode model by combining a CNN model for image learning and a DNN model for numerical data learning. In addition, cross-validation was performed by applying the stratified K-fold technique, and area under the ROC (AUC) was adopted as an evaluation index. We are currently upgrading model performance based on pilot studies on CNN models for image learning and DNN models for numerical data learning. In the pilot study, the AUC of the CNN model was 0.6616 and the AUC of the DNN model was 0.7927. In order to advance the model, about 3,000 additional test result data are being secured and are being prepared for use. And in order to improve image learning performance, we are performing scaling work. We plan to build a dual-modal model by applying additional datasets and scaling operations to advance the CNN model.

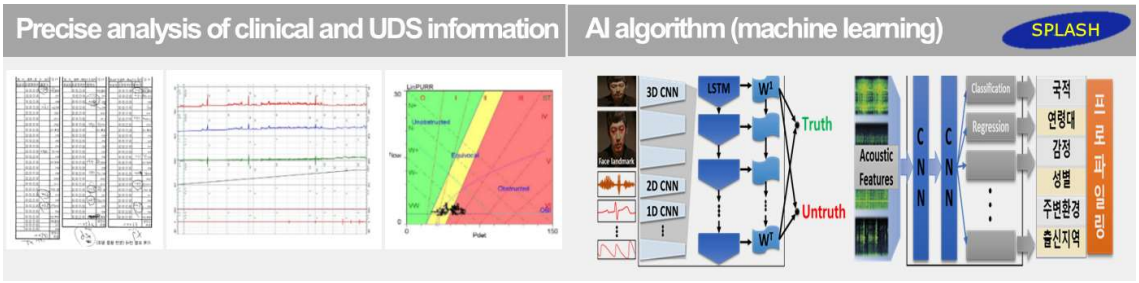

Figure 1 Overview of Prostatic Hyperplasia diagnosis Assistant Research

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References

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