2022, 10, 11(화)

Introduction_ver0

Globally, respiratory diseases are the third-highest cause of death in the world, and asthma, lung cancer, chronic obstructive diseases, and acute respiratory infections cause more than 3 million deaths each year [1]. Respiratory diseases can be diagnosed through stethoscope or various methods such as CT and X-ray. In particular, stethoscope is non-invasive, real-time, and is the most basic and important diagnostic method for respiratory disease screening and initial diagnosis at a minimum cost [2]. Diagnosis of lung disease through stethoscope is usually classified according to whether or not there is an adventurous sound. The adventurous sound is a representative sound that can predict lung abnormalities, and is divided into wheeze and crackle [3]. Since skilled medical personnel are essential to accurately interpret breathing sounds, interns and residents may misunderstand some breathing sounds. Due to the increase in the incidence of respiratory-related diseases due to the spread of COVID-19, 1,000 patients per medical staff are required to be treated [4]. Therefore, there is a very lack of professional medical personnel who can diagnose and monitor patients with respiratory diseases through stethoscope. Therefore, a diagnostic system that automatically analyzes respiratory diseases using artificial intelligence (AI) is expected to be of great help in resolving medical blind spots. In 2017, with the release of a large international conference on biomedical and health informatics (ICBHI) public dataset on respiratory sound, many studies of machine learning and deep learning methodologies on respiratory sound classification have been actively conducted [5]. Early lung sound classification studies focused on classification

studies through traditional machine learning methods. Jakovljevicé et al. [6] proposed a breathing sound classification methodology using hand-crafted feature extraction and hidden Markov models, and Serbes et al. [7] proposed a classification methodology using a machine learning support vector machine (SVM) model. Recently, deep learning has attracted a lot of attention as a breathing sound classification model along with a machine learning method, and has shown excellent classification performance. We extracted features for respiratory sounds with two-dimensional spectrogram images and compared the classification performance of respiratory sounds through convolutional neural network (CNN) [8] and recurrent neural network (RNN) [9] models. In this work, we propose a simple yet effective model to classify optimal abnormal breathing sounds. Using HF_LUNG_V1 data [9], we extract characteristic information of lung sound through log mel spectrogram and MFCC method, which are effective speech data feature extraction techniques, and classify abnormal respiratory sounds through deep learning. The composition and contents of this paper are as follows. Chapter 2 describes the preprocessing methodology for respiratory sound classification and recent research on deep learning network algorithms. Chapter 3 describes the data preprocessing and feature extraction used in this study. Chapter 4 describes the hyperparameters associated with the proposed model networks and experiments, and Chapter 5 describes the evaluation indicators used and the results for the performance of the proposed methodology. Chapter 6 provides conclusions and future research direction.

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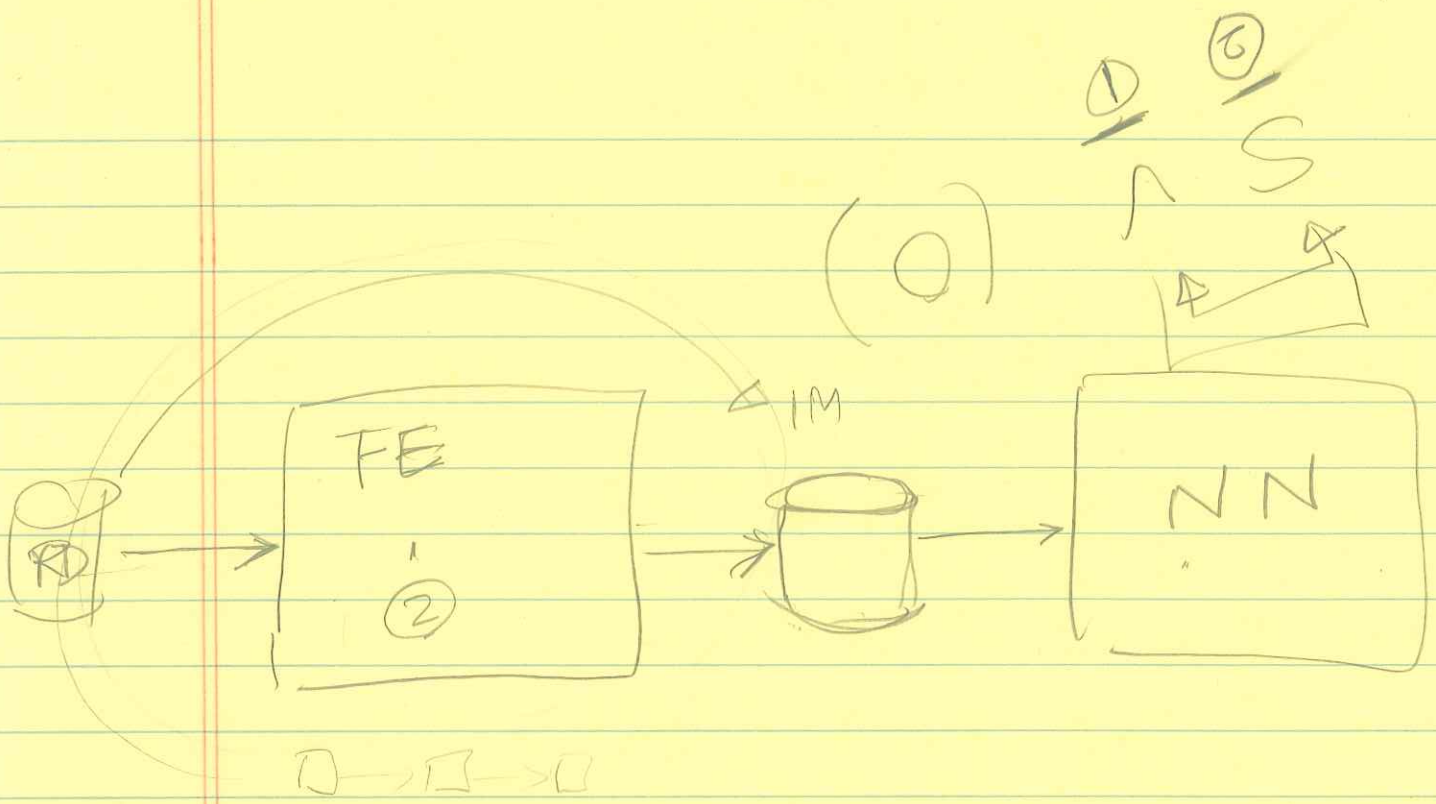

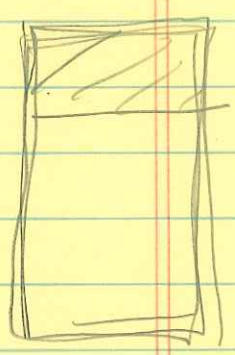

다음 → next future.

Because network traffic data contains inter-dependency on time,