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Gender Recognition using Voice

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***Abstract*—Gender recognition using voice is an important problem in several applications such as speech recognition, virtual assistants, and voice-based authentication. This paper proposes a deep learning-based approach for gender recognition using voice, which involves extracting features from audio recordings and training a deep neural network to predict the corresponding gender. We use a dataset of audio recordings of male and female voices and evaluate our approach on several metrics such as accuracy, precision, and recall.**

***Keywords*— Automatic speech recognition, conventional neural network (CNN)**

I. INTRODUCTION

Gender recognition using voice is a challenging problem that has received significant attention in recent years. The goal of gender recognition is to identify the gender of a speaker from their voice. This problem has several applications such as speech recognition, virtual assistants, and voice-based authentication. Traditional approaches for gender recognition involved extracting handcrafted features from audio recordings and using statistical models such as Gaussian Mixture Models (GMMs) to classify the gender. However, these approaches have limitations such as the need for expert knowledge in feature extraction and the inability to capture complex patterns in the data. Deep learning techniques, on the other hand, have shown promising results in solving gender recognition using voice. Deep learning uses artificial neural networks to learn and extract features from data. Several deep learning architectures such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) have been proposed for gender recognition using voice. They have demonstrated exceptional performance in various speech recognition tasks, including gender recognition. The use of these advanced techniques has enabled researchers to develop highly accurate and efficient gender recognition models that can classify speakers. based on their voice characteristics. The gender recognition process using voice involves analyzing various acoustic features such as pitch, intensity, formants, and harmonics of the speech signal. These features can be extracted from the audio signal using signal processing techniques such as cepstral analysis, and wavelet analysis. The extracted features are then used to train a model, which can classify the voice as male or female. In this paper, we propose a gender recognition system using deep learning.

II. DATA DESCRIPTION

The workflow of building the model for gender recognition using voice is as follows:

A. Data Collection:

Data used for the project has been collected from Kaggle. The data set contains speech data of the common people around the world. The purpose of selecting this dataset is because it enables us to perform training and testing and build a simple ASR (Automatic speech recognition system).The dataset contains 2 columns and 1900 rows of data. It contains the speech recordings of people and their corresponding gender. The Columns are namely mp3_file_name `corresponding to the person`, Gender. Input features contains the audio signals, Output features are classified into two classes namely male and female.

B. Data Exploration:

By exploring the dataset further, we found that it contains lot of missing values, to 0handle it, we filtered out all Nan values in both the columns and perform exploratory data analysis using pandas. During Analysis we found that dataset is highly imbalanced, hence under-sampling method is employed. Under-sampling we are taking a portion of available data such that class-distribution is balanced. For our Project we are selecting 100 audio samples of male and 100 audio samples of female speakers and put them in two separate data Frames namely df_male ,df_female. We used librosa module to convert audio signal values and store it in python variables. But there's a problem with this module. It is unable to read the digital signals stored in mp3 format.So we converted all mp3 files to wav files.