

With the advancement of Automatic Speech Recognition (ASR) systems, a significant number of large ASR models trained on high-resource languages were created. We want to explore the application of transfer learning to develop ASR systems for low-resource languages, in our case on Lithuanian. Understanding the challenge of having a limited amount of labelled data available for low-resource languages, we want to speed up the fine-tuning of pre-trained models by making use of the common linguistic features across languages. The first experiment conducted uses clustering techniques to analyse feature similarity in cluster visualisations and silhouette scores. The second experiment performs fine-tuning on the pre-trained models and then gets predictions using the test dataset, to calculate Word Error Rate (WER) and Character Error Rate (CER) scores. Then we examine the results from experiment one and experiment two, to find a correlation. The results indicate that we can reduce the computational expenses of choosing models by pinpointing model compatibility prior to fine-tuning. From this, we can conclude that transfer learning can significantly reduce the need for large labelled datasets in building ASR systems for low-resource languages, like Lithuanian.