Automatic speech recognition (ASR) is a crucial component of any voice-integrated application. With the advent of deep learning, immense progress has been made in reducing word-error rate (WER) in a variety of languages. However, performance significantly degrades for non-standard accents and dialects, which bars many speakers from using speech technologies and can lead to inappropriate vocabulary choices in downstream NLP tasks. The present study investigates effects of phonetic variability on Spanish ASR using transcribed recordings from Mozilla Common Voice to evaluate performance on datasets disaggregated by regional accent. We then leverage the findings of the error analysis for data augmentation to build a classifier that uses MFCC and PCA for feature extraction from the acoustic signals to acquire formant, intensity, and duration values for accent prediction. Once the accent is identified, we implement a language model that generates region-appropriate responses for a restricted-domain conversational agent task.