Speech Recognition in Java

A Recognizer provides access to speech recognition capabilities.
The Recognizer interface extends the javax.speech.Engine interface and so inherits the basic engine capabilities and provides additional specialized capabilities.

The primary capabilities provided by a recognizer are grammar management and result handling. An application is responsible for providing a recognizer with grammars. A Grammar defines a set of words (technically known as tokens) and defines patterns in which the tokens may be spoken. When a grammar is *active* the recognizer listens for speech in the incoming audio which matches the grammar. When speech is detected, the recognizer produces a Result. The result object is passed to the application and contains information on which words were heard.

A Recognizer is created by a call to createRecognizer method of the Central class.

When more people speak together everything that the recognizer recognizes will be notified. But if it has too many requests in same time, it will throw out an error.

Speech Recognition in Android

This class provides access to the speech recognition service. This service allows access to the speech recognizer. setRecognitionListener should be called before dispatching any command to the created SpeechRecognizer, otherwise no notifications will be received.

Code Snippet :

import android.speech.speechrecognizer

The methods startListening() and stopListening() can be called to control the Speech Recognition. However in default cases, calling StopListening() is not needed if it has a fixed endpointer.

As in Java, when more people speak together everything that the recognizer recognizes will be notified. But if it has too many requests in same time, it will throw out an error called “TooManyRequests”

Other Errors that may Arise:

ERROR_AUDIO

ERROR_CLIENT

ERROR_INSUFFICIENT_PERMISSIONS

ERROR_LANGUAGE_UNAVAILABLE

Issues with the Speech Recognition

- Error rates increase as the vocabulary size grows:

  e.g., the 10 digits "zero" to "nine" can be recognized essentially perfectly, but vocabulary sizes of 200, 5000 or 100000 may have error rates of 3%, 7%, or 45% respectively.

- Vocabulary is hard to recognize if it contains confusing words:

  e.g., The 26 letters of the English alphabet are difficult to discriminate because they are confusing words (most notoriously, the E-set: "B, C, D, E, G, P, T, V, Z — when "Z" is pronounced "zee" rather than "zed"

depending on the English region); an 8% error rate is considered good for this vocabulary

- Speaker dependence vs. independence:
  A speaker-dependent system is intended for use by a single speaker.
  A speaker-independent system is intended for use by any speaker (more difficult).

- Isolated, Discontinuous, or continuous speech

  With isolated speech, single words are used, therefore it becomes easier to recognize the speech.

  With discontinuous speech full sentences separated by silence are used, therefore it becomes easier to recognize the speech as well as with isolated speech.
  With continuous speech naturally spoken sentences are used, therefore it becomes harder to recognize the speech, different from both isolated and discontinuous speech.

- Read vs. Spontaneous Speech – When a person reads it's usually in a context that has been previously prepared, but when a person uses spontaneous speech, it is difficult to recognize the speech because of the disfluencies (like "uh" and "um", false starts, incomplete sentences, stuttering, coughing, and laughter) and limited vocabulary.
- Adverse conditions – Environmental noise (e.g., Noise in a car or a factory). Acoustical distortions (e.g., echoes, room acoustics)

Accuracy of the Speech Recognition

Right now, most systems have an accuracy of 75% to 85% off-the-shelf.

(Reference : https://searchenterpriseai.techtarget.com/feature/Automatic-speech-recognition-may-be-better-than-you-think)

References :

1. https://www.youtube.com/watch?v=dBAn67ZKbZ4
2. https://developer.android.com/reference/android/speech/SpeechRecognizer

How to send the Letter sketches to the plotter?

1. Create G-Code.
2. Send the G-Code to the CNC Writing Machine.