Smartphones and mobile devices are in the middle of major innovations in technology to provide hands-free access to features and navigation, often called voice commands, voice-enabled, voice actions or speech recognition. This technology has major implications for use by people who have disabilities as assistive technology. As long as a user has a strong, clear voice, these devices become easier to use and give increased access to use of the Internet, use of mobile devices and communication accessibility.

This document considers the basic use of a mobile device. When the mobile device is “wi-fi enabled”, many of these apps will increase online accessibility using the device. Some applications or programs will require the device to be connected online to work. Others will work without an Internet connection.

Part 1. Accessibility Feature, Mobile Device

What is a “native” accessibility feature within a mobile device?

Any feature, tool or customizable setting in a mobile device that enables accessibility for a user who has a disability and needs to use it right away within a device from the start is a native feature. For example, a person who is blind will need a built-in screen reader to access any of the tools of a smartphone or tablet. A person who is vision impaired will need a way to enlarge the icons and text of the device so they can use it. A person who has limitations with dexterity may need to adjust the touch input commands or use speech recognition and voice commands. If one has these customizable features in the device it is at least somewhat “accessible”.

For voice and speech, a native feature must have a way to use voice commands and a way to dictate commands using the built-in microphone. Voice commands are used as navigation tools to operate functions of the device. Speech recognition is an advanced feature that allows voice commands and voice input to perform navigation and operations such as using dictation and accessing phone calls as dialing by voice, and for text messaging. Speech recognition may use sophisticated programs to enable dictation instead of touch input of text.

“voice recognition” or “speech recognition”?

These two terms are often used interchangeably, but they really should not be. They have distinct meanings. Imagine you answer the telephone, listen for a few seconds and then say "Caroline, can you call me back? We have a bad connection. I can barely hear you." You recognized your friend Caroline's voice. That is Voice Recognition. You couldn't hear her well enough to understand her Speech. **Speech Recognition is trying to understand the words being spoken.**

**Voice Recognition** can be used like a fingerprint to identify a person. What matters is WHO said it.
Speech Recognition can be used to control a computer, navigate telephone menus, etc. What matters is WHAT was spoken.

So, if you want to be correct, use the term Speech Recognition anytime you are talking about controlling something by speaking -- even though you use your voice to do it! Speech recognition applications include voice user interfaces such as voice dialing (e.g., "Call home"), call routing (e.g., "I would like to make a collect call"), appliance control, search (e.g., find a podcast where particular words were spoken), simple data entry (e.g., entering a credit card number), preparation of structured documents (e.g., a radiology report), speech-to-text processing (e.g., word processors or emails), and aircraft applications.

**Definition of “voice command”**

Accessibility feature enabling device navigation made by using voice commands rather than pressing the numbers or keys. **Using voice command means there is a speech recognition tool native in the device.** In smartphones, memory can be programmed to store and identify names spoken into the handset and call numbers associated with them. Some smartphones and mobile devices provide the accessibility setting to be enabled so that the user may navigate to different settings, applications and menu selections by voice command.

**Voice Command for Mobile Devices**

Any mobile device running Google Android, Microsoft Windows Phone, Apple iOS 5, or Blackberry OS provides **voice command capabilities**. In addition to the native voice recognition software for each mobile phone's operating system, a user may download third party voice command applications from each operating system's application store: Apple App store, Google Play, Windows Phone Marketplace (initially Windows Marketplace for Mobile), or BlackBerry App World. The links to these resources are listed below:


Other terms related:
- **Voice Control** – Apple term for iPhones prior to the newest phones
- **Voice Actions** – Android term for voice commands
- **Voice Input**
- **Voice-enabled**

**Common native voice command/voice action or speech recognition tools in mobile devices:**

- **VoiceOver** – Apple products such as Mac computers and iDevices like iPod, iPad, and iPhone
- **Siri** – iPhones only
- **Talkback** – Android products like cell phones and tablets. Note that some speech recognition tools may require installing additional applications to make Talkback more fully-featured.

Great tutorials are available online to teach how to use VoiceOver and TalkBack. Check these current video links:

- iPhone VoiceOver Function for People with Disabilities [http://www.youtube.com/watch?v=WxQ2gKShymc](http://www.youtube.com/watch?v=WxQ2gKShymc)
- Android TalkBack and Accessibility Features (Jelly Bean OS) [http://www.youtube.com/watch?v=LEQHyC3NMGc](http://www.youtube.com/watch?v=LEQHyC3NMGc)
- Google Nexus 7 Android 4.1 Jelly Bean Accessibility [http://www.youtube.com/watch?v=w3Sz3KNko4U](http://www.youtube.com/watch?v=w3Sz3KNko4U)
Part 2. Accessories to improve or enable use of speech recognition

All mobile devices that enable voice commands and speech recognition have an internal microphone for this purpose. This may work well for some people but those who have challenges on positioning the device for the microphone to pick up their voice will likely use an external microphone, a headset with microphone or accessories that may combine using ear buds and an external microphone with a jack to hook the together. Some typical external microphones are pictured below:

![Typical Computer Headset with Mic and Adapter Cables](image1)
![Bluetooth (Wireless) Headset with Mic](image2)

Most people who need an external microphone for assistive technology will use a microphone/headset combination, or a plug-in microphone with a jack for the ear buds, all pictured below:

![Typical Computer Headset with Mic and Adapter Cables](image3)
![Bluetooth (Wireless) Headset with Mic](image4)

Some people, especially wheelchair users, will need to have a special high-quality microphone that is Bluetooth or one that is on a stand to rest securely or be clamped onto a table or mounting arm, pictured below:
Part 3. Custom assistive technology accessories to improve use of speech recognition

The ideal use of computer programs and mobile device applications for speech recognition will use Bluetooth technology wherever possible. This is a built-in feature of the system to enable a receiver and transmitter for this purpose, at the very least to enable voice commands to navigate a device. Sometimes Bluetooth is just used to provide a way to transmit audio to another device, as when boom box speakers project sound much better than the device. Bluetooth is also used to connect remote devices with the base system. Good quality Bluetooth features will enable a user to operate more than one device that is “discoverable” in the accessibility settings of the device and pairs with the device. The quality of the transmission by Bluetooth is variable by the quality of the product. The universal symbol for Bluetooth-enabled devices and programs is shown below as the trademark symbol top left:

Both the base system of the computer or mobile device, AND the program must be compatible with the use of any accessories. It is important to verify specifications for all components that make assistive technology work for a user.

Part 4. Free applications to improve speech recognition in a touch screen mobile device

Beyond what comes native in the mobile device, there are free apps for voice commands AND for full speech recognition. These are many in variety, suitable for Android phones, iPhones, and wi-fi enabled tablets. Be aware that some applications only work on the device voice commands for navigation. Others may solve the issue of getting more voice commands to work on websites. Some products may be designed only for use with productivity, academic or business software such as Microsoft Office Suite programs.

Many manufacturers and vendors are working to develop more speech recognition applications for other products. The competition is very active at this time and the future will bring far more options that may be even better for use as assistive technology. Speech recognition technology is one of the hottest trends now and for the future.

Pay attention to what the operating system requirements are for each device. For example, some applications work with Android OS for versions 2.0 or newer but others would work only for those Android devices with the Jelly Bean OS versions 4.0 or newer. For iPhones, most work with iPhone 4S and iPhone 5. The following free apps are provided with information from the websites of vendors that provide apps for smartphones and wi-fi enabled mobile devices.

Examples of Android and iDevice applications:
Simple, free voice applications: Dragon Dictate and Dragon Search, Dragon Go! and Dragon Mobile Assistant. At this time, many of the Dragon applications are changing in availability and name. Basically any Dragon application made for mobile devices will work similar to each other.
Dragon Dictate: As a simple dictation app, Dragon transcribes whatever you speak. End of story. The app does have some shortcut buttons to push the transcribed text through to Facebook, a new email message, and a few other places, but Dragon Dictate doesn't actually store any notes in the app itself.

Dragon Go! and Dragon Mobile Assistant (they work together) They provide many convenient features but do not “learn” and are not “trainable” as the full program for a computer is.

Android app for Dragon Go!  

iPhone app for Dragon Go! (At this time you may also get Dragon Dictation and Dragon Search in iTunes)  

Android updated app for Dragon Mobile Assistant  

Here are a few examples of things you can do with Dragon:
* Make a call - "Call Ashley on her mobile"
* Send a text message - "Tell John I'll be there in five"
* Create a calendar event - "Set up a meeting with Jake Barnes tomorrow at 2pm"
* Update Facebook or Twitter - "Sent out a new Tweet, What a finish to the game!"
* Use maps and find directions - "What's the best way to Portland, Maine?"
* Find restaurants and make reservations - "Find brewpubs in Boston"
* Check the weather - "How's the weather look this week?"
* Look up local businesses and points of interest - "Fenway Park"
* Opening applications - "Open calculator"
* Playing on-device music - "Play Katy Perry"
* Setting alarm - "Set alarm for 6 AM tomorrow"
* And access content and information from over 200 websites with the Dragon Go! search carousel

Another popular and free app is Speaktoit, for Android only. Speaktoit has a customizable voice and is considered more human-sounding than some other apps at this time.

Speaktoit Assistant  
A completely new idea for Dragon users:
Dragon Remote Microphone

Check out Dragon Remote Microphone if you are a skilled user of Dragon with a computer program. This will allow a computer user to work from their smartphone or mobile device as a remote microphone with their computer.

App turns your cell phone or other mobile device into a wireless microphone, making it easier and more comfortable for individuals to use their Dragon Desktop software. The version of Dragon NaturallySpeaking on the computer must be current or recent. This app uses a wi-fi connection to the PC while running Dragon software. Reviews are mixed at this time, with some enthusiastic and others disappointed. Best reliability is with iPhone 4S and iPhone 5 as of January 2013.

This app can be used with Dragon NaturallySpeaking for the PC (Home Edition and higher for Versions 11.5 and higher) and Dragon Dictate for the Mac (Versions 2.5 and higher).

For iPhone: https://itunes.apple.com/app/dragon-remote-microphone/id436624808?mt=8

For Android: https://play.google.com/store/apps/details?id=nuance.com&feature=search_result#?t=W251bGwsMSwxLDEsIm51YW5jZS5jb20iXQ


Part 5. Browser-supported speech recognition, a new trend

When a mobile device works with a browser for Internet access, some will work with speech recognition features in the device. Some websites and internet accessibility may be improved by using an additional or substitute application instead of the native feature of the device. And a new technology has begun accommodation online by large websites with an embedded speech recognition tool. Programming for an accessible website with speech recognition tools can be done with special authoring programs. For the public, Google is the first large company to provide search by voice on mobile devices that can use a free, downloadable app.

Voice Search is a feature of Google Search app for iPhone, BlackBerry, and Nokia S60 V3 phones. If you have an Android phone, search for the "Voice Search" app in Google Play. A slightly different version, Voice Search for Android supports Voice Actions on Android 2.2 (Froyo) and above. The Android operating system also enables you to speak instead of typing in any app where you launch the keyboard. Voice Search is not available in all languages and all mobile phones. Google Search by voice for iDevices: http://itunes.apple.com/app/google-mobile-app/id284815942?mt=8