In the developed world the versatility of mobile devices and operating systems allows to create focused solutions for people with disabilities. Advancement in OCR software and text-to-speech recognition makes it possible to convert printed documents or graphic-based text into an electronic format. NNSolutions System Development, a Brazilian company specializing in mobile platforms and image processing, is one of the foremost software developers in the region dealing with assistive mobile solutions for people with reading difficulties. Demonstrating technical feasibility of mobile OCR, it has developed a Portable Reader Scanner (SLEP™), an OCR-based solution embedded in personal devices meant to provide access to scanned text via adaptive technology and speech output. To ensure automatic text recognition and accurate conversion the solution was based on powerful mobile OCR toolkit of ABBYY, a leading provider of document conversion and data capture.

**Challenge**

The main goal of the project was to ease the life of blind or visually impaired people, giving them more freedom in everyday navigation. Technological tandem of mobile OCR and speech-to-text synchronizer enabled low vision individuals to “get” any text without resorting to the help of third parties. NNSolutions developed a system where users can capture and enhance textual information via common camera phone hardware, perform OCR and receive feedback through audio means. The recognized text can be either spoken in synthetic speech or saved to a computer file.

The choice of appropriate OCR technology was a key factor for successful realization of the project. After a thorough research of the market NNSolutions decided in favor of ABBYY Mobile OCR Engine which delivered the appropriate balance between powerful recognition capabilities and fast performance required for mobile applications. It disposed of a small software footprint requiring minimal hardware resources. Eventually the OCR developed by ABBYY proved to be an ideal software solution for mobile phones and small devices because of a compact code that was capable to operate in limited conditions like low memory, particular operational system or non-standard processor type.

**Customer Overview**

- **Name**: NNSolutions
- **Location**: Brazil
- **Industry**: Healthcare

**Challenge**

Provide OCR functionality for a mobile Text-to-Speech solution.

**Solution**

ABBYY Mobile OCR Engine

**Results**

- Visually impaired people have access to texts via OCR technologies and speech output

www.ABBYY.com
One of the most difficult — however, inevitable — tasks was to provide instant text recognition and enable users to read printed information on the go. The highly accurate ABBYY Mobile OCR ensured fast processing without wasting time on illustrations, charts, and other graphical objects by skipping them while processing a document.

Solution

With assistive mobile application developed by NNSolutions users can take a picture of a text with the phone’s camera and get it read out by loudspeakers or headphones. To ease the use of camera for visually impaired people, the system contains a built-in functionality which helps them to align the mobile phone correctly with the text before taking a picture. After being captured on mobile phone camera the image (or printed document) is scanned. Before conversion to audio format it has to pass through four consequent stages:

1. **Text recognition (performed by ABBYY Mobile OCR Engine)**

Cutting edge recognition technology of ABBYY Mobile OCR provided image conversion and creation of temporary files with text’s characters and page layout. Image pre-processing automatically detected the orientation of a page with text which should be recognized (if there are sideways or upside down). ABBYY Mobile OCR Engine ensured the recognition process which determined and followed the logical structure of the source language, identified the font properties of the text, i.e. “bold type”, “italic” or “underlined”.

2. **Adjustment of the volume and speed of the synthesized voice**

After text is converted and recognized, the voice-to-speech synthesizer in the OCR system would pronounce the recognized text. Shortcut keys on the keyboard permit to adjust volume and speed of the synthesized voice. All the modification possibilities include adjustment of speed, pitch, volume, intonation, echo, smoothness, richness, etc.

3. **Easy navigation**

After the text is recognized, the user can easily navigate through the text, having each sentence auditioned, with options to go forward, rewind or repeat them throughout the text.

4. **Information Storage**

On the final stage the information is stored in an electronic form. The recognized text can be saved automatically or manually: it’s possible to choose whether you want to save it or not after every reading. This enables the user to choose whether to listen to the texts on the mobile phone or via any other device.

“The OCR software for mobile phones specially developed by NNSolutions for visually impaired people, in my opinion is a feasible, practical and functional product. This solution would greatly assist all blind or visually impaired people in Brazil, including those who are temporarily unable to read. Additionally, it will let blind students, collegians and professionals to behave equally.”

Consultant of Laramara (Brazilian Association for Assistance to the Visually Impaired)

Results

The importance and the usability of mobile phones for the visually impaired people is inestimable. Many problems of people who have visual difficulties were eradicated with the use of modern assistive technologies while the burning issue of the day is to make them available and accessible for everybody.

A Portable Scanner (SLEP) of NNSolutions significantly eased the daily life of people who are unable to read and write print text due to a visual impairment. Thanks to mobile applications with embedded ABBYY Mobile OCR technology they get the ability to “perceive” the printed text while on the move. The common daily activities as shopping, preparing meals, taking medication, and reading traffic signs — all related to reading the printed text now can be accessible without visual perception.