Introducing Digital Pen for Different International Numerical Pronunciation Skills @ Pre-School Learners

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Abstract
English is a language which has great rich and influence. It is taught all over the world under many different circumstances. English contains a number of sounds and sound distinctions not present in some other languages. Speakers of languages without these sounds may have problems both with hearing and with pronouncing them. Some students may have very different cultural perceptions in the classroom as far as learning a second language English is concerned. Cultural differences in communication styles and preferences are also significant. For example, teachers in Pune, Bangalore hold the Language Proficiency Assessment for Teachers or their learning method since beginning is English. Those who work in private language schools may from commercial pressures, have the same qualifications as native speakers. In this paper we proposed to develop a digital pen for pre-school learners to teach and introduce different numeral pronunciation skills in international forms and tried to turn weaknesses in pronunciation skill into strengths. Most people who teach English are in fact not native speakers. Mostly they are state school teachers; as such they hold the relevant teaching qualification of their areas, usually with a specialization in teaching English.

Keywords
PDA, OCR, MFCC, DTW

I. Introduction
The digital smart pen has the capabilities to help user pronounce text, by verbal means. Also, this invention has the operations to do a spell check to text, to assist user in correct spelling of the word or words. This invention can be helpful for students, teachers, or people in mathematic environments. A digital electronic pen that provides user with pronunciation and spell check capabilities the smart pen can hold at least 300,000 Words inside the CPU by simply scanning the Word of choice, the user can receive a verbal response from the pen, or the user can speak into the pen’s microphone to request a correct spelling of unknown Word. The digital smart pen is useful in pronunciation, and Word meanings if needed [1].

II. Description of Prior Art
The digital pen is an electronic instrument that assists the user in Word recognition and pronunciation. A digital pen is a computer input device that allows the user to capture handwriting strokes inside the device. The strokes are then uploaded to a computer using USB or Bluetooth. The computer converts the strokes into a viewable file within the CPU, the digital pen will store and transfer any written text into a verbal response, with processing power to save unknown data to its storage unit. The user can continue work without the aid of a dictionary. There exists the need for a quicker response and accessible network to check and enunciate unknown Words. With a digital pen, handwriting or drawings can be stored in a receiver for future use. Digital pens are used with optical character recognition (OCR) software that recognizes handwritten characters. Some pens record audio as well as handwritten notes. These pens use ink and special paper to write on. Some digital pens are used with mobile devices such as PDAs and tablet PCs to make it easy to take notes.

III. Experimental Result: Database

<table>
<thead>
<tr>
<th>Symbols in English</th>
<th>English pronunciation</th>
<th>Spanish Pronunciation</th>
<th>Swedish Pronunciation</th>
<th>French Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Zero (zeer-ro)</td>
<td>Diez, Decena, cero</td>
<td>noll, nolla</td>
<td>zéro</td>
</tr>
<tr>
<td>1</td>
<td>One (wun)</td>
<td>Uno, Una, un, oo-no</td>
<td>en, ett, ena</td>
<td>un</td>
</tr>
<tr>
<td>2</td>
<td>Two (too)</td>
<td>dos, Par, dose</td>
<td>tva, tu</td>
<td>deux</td>
</tr>
<tr>
<td>3</td>
<td>Three</td>
<td>Tres, trace</td>
<td>Tre, Trea</td>
<td>trois</td>
</tr>
<tr>
<td>4</td>
<td>Four (for)</td>
<td>Cuatro, Kwat-ro</td>
<td>fyr, fyrtal</td>
<td>quatre</td>
</tr>
<tr>
<td>5</td>
<td>Five</td>
<td>Cinco, Sink-o</td>
<td>Fem, Femma</td>
<td>cinq</td>
</tr>
<tr>
<td>6</td>
<td>Six (siks)</td>
<td>Seis, saze</td>
<td>Sex, Sexa</td>
<td>six</td>
</tr>
<tr>
<td>7</td>
<td>Seven</td>
<td>Siete, see-yet-eh</td>
<td>Sju</td>
<td>sept</td>
</tr>
<tr>
<td>8</td>
<td>Eight (ate)</td>
<td>Ocho, och-o</td>
<td>atta</td>
<td>huit</td>
</tr>
<tr>
<td>9</td>
<td>Nine</td>
<td>Nueve, new-eh-veh</td>
<td>nio, nia</td>
<td>neuf</td>
</tr>
</tbody>
</table>
A. Numeral Recognition System

There are several kinds of parametric representation of the acoustic signals. Among of them the Mel-Frequency cepstral Coefficient (MFCC) is most widely used. We have developed the recognition system using MFCC and DTW [2]

B. Database

Few people recorded the number one in English and the same word in Spanish, Swedish and French respectively. Some of the MFCC Features extracted of the English Numerals are shown in the figures below (Fig. 1 and Fig. 2)

C. For accuracy in the numeral recognition, we need a collection of utterances, which are required for training and testing. The Collection of utterances in proper manner is called the database. The age group of pre-school learners for the collection of database ranges from 04 to -07. The vocabulary size of the database consists of English numerals 0-9

D. Then performed these mentioned steps for speech recognition

Acquisition Setup, Feature extraction, Mel-Frequency Filter bank, Discrete Cosine transform, delta energy and delta spectrum

![Fig. 2: Plot For English “One” Numbers and in the Same for Spanish Language “One”](image)

![Fig. 3: Plot for English “One” Number and in the Same for Swedish Language “One”](image)

IV. Benefits

1. The present invention provides an educational solution to overcome misspelled Words, and a Word pronunciation. This pen is storing all English numbers and its pronunciation skills in these 3 languages and pronounces word as user will select language option.

2. The user no longer has to search for English native speakers or regular dictionaries.

3. Introducing global languages to pre-school learners by learning by doing things

4. Pre-school learners having different cultural and Cultural differences in communication styles and preferences are also significantly reduced.

5. There is nice turn for pre-school learners to give the global vision

V. Conclusions

In this paper we are going to discuss the new features that we can design and put into digital pen and we can use it to teach to pre-school learners English and different international pronounce skills. The following are the benefits

1. This is best effective e-learning tool e-digital pen for pre-school learners as like a normal writing pen.

2. Introducing international languages to pre-school learners.

3. To help pre-school learners for different pronounce skills.

4. Portability of this digital pen.

5. Giving a real view of global vision, cultural, art and history and make an interactive learning and career option.

6. Real true term that is - “The digital pen is mightier than the sword”

VI. Conclusion

In this paper we have discussed the new features that we can design and put into digital pen and we can use it to teach the pre-school learners. This is best effective e-learning tool e-digital pen for pre-school learners as like a normal speaking and teaching pen.

VII. Acknowledgment

It is my pleasure to get this opportunity to thank my beloved and respected Guide and who imparted valuable basic knowledge of Electronics specifically related to Speech Processing

References

[1] “Digital electronic correction pen with audio pronunciation and spellcheck capabilities, with built-in memory”.


Mr. Zende Sachin Sahebrao received my M.Sc. degree in computer science from Dr. BAM University, Aurangabad, Maharashtra India in 2004 and received Master of philosophy degree in same subject in 2010 from YCMOU, Nasik. I am going to award my Ph.D. degree in the computer science subject titled “Handwritten Marathi numeral classification using structural features of digital pen” from Shri. Jagdish Prasad Jhabarmal Tibrewala University, Vidyanagari, Jhunjhunu, Rajasthan – 333001.

I worked as a lecturer in the computer science subject and having 9 years teaching experience of under graduate and post graduate subject. My research interests include handwritten character recognition, OCR, digital signal processing, data base management system and cloud computing.