

A Review: An Efficient Review of Phonetics Algorithms

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Abstract— Phonetics is the speech sound that occurs in all human languages. Phonetics plays a important role in improving our communication. It denotes all sound- changes effected for ease of pronunciation. This paper reviews the phonetics algorithms-soundex algorithm, metaphone and double metaphone, matching rating approach. The future work would include experimenting with different variations of the approach.

Keywords— Soundex; MRA; Instrumental approach; Traditional approach; NYSIIS; Metaphone

I. INTRODUCTION

NLP is a form of human-to-computer interaction where the elements of human language, be it spoken or written, are formalized so that a computer can perform value-adding tasks based on that interaction. Natural language processing is the use of computers to generate or understand written or spoken language for some practical purpose: machine translation, natural language queries and so on. It is the method to translate between computer and human languages. It deals with analyzing, understanding and generating the languages that humans use naturally in order to interface with computers in both written and spoken contexts using natural human language instead of computer languages.

NLP goals are as following:

- Have some understanding based on communication with natural language.
- In order to receive and send information in ways easily understandable by human users.

II. PHONETIC

The study of the speech sounds that appear in all human languages that represent the meanings. In phonetics we introduce individual sounds never letters. Most sounds are produced by an air stream from lungs through one or more speech organs. Phonetics plays a very important role in improving our communication. Alphabets and the words must sound correctly. There are three main branches of phonetics are:

a. *Articulatory phonetic*

This tells us how speech sounds are made by the organs. It identifies the sounds of human language. Particular parts of the human body referred to as "organs of speech," are used to articulate words. The organs of speech include lungs, tongue, voice box, teeth and the lips.

b. *Acoustic phonetic*

In this how speech waves are transmitted between speakers. While articulatory phonetics focuses on the speech organs, acoustic phonetics focuses on the sound properties of human speech. These are the characteristics of sound waves which carry speech sounds between ear and mouth.

c. *Auditory phonetic*

Study of the response to speech sounds through ear, nerve, brain. Articulatory phonetics is mainly concerned with the speaker, auditory phonetics deals with the listener.

III. ALGORITHMS OF PHONETIC

A. *Soundex algorithm*

This algorithm is used for indexing words based on their phonetic sound. Words with similar pronunciation but different meaning are coded similarly so that they can be matched regardless of trivial differences in their spelling.

B. Metaphone and Double metaphone

It discovers on the Soundex algorithm by using information about variations in English spelling which gives a better job of matching words. As with Soundex, similar sounding words should share the same keys. Metaphone is available as a built-in operator in a number of systems, including later versions of PHP. A new version of the algorithm, which he named Double Metaphone. The Double Metaphone phonetic algorithm is the second generation of this algorithm. It is called "Double" because it can return both a primary and a secondary code. Third version named Metaphone 3, which gives an accuracy of approximately 99% for English words.

C. Match Rating Approach (MRA)

The algorithm has a simple set of encoding rules but more lengthy set of comparison rules. The main mechanism being the similarity comparison which calculates the number of unmatched characters by comparing the strings from left to right and then from right to left and removing identical characters.

D. Daitch-Mokotoff Soundex

This algorithm has little in common with the original Soundex, eliminate that the result is still a sequence of digits. It has a much more complicated conversion rules. Calculation of resulting code also includes not only single characters, but the groups of characters.

E. New York State Identification and Intelligence System(NYSIIS)

This algorithm gives better results relatively to the Soundex using more experienced rules for transforming the original word to the result code. This algorithm is designed to work specifically with American names.

IV. APPROACHES OF PHONETIC

A. Taxonomic and scientific approach: Taxonomic approach provides two basic tools dealing with speech sounds. First agreement in naming and classifying speech sounds and second designing them. The other form of phonetics is 'scientific phonetics' explore to understand how speech works at all levels from the brain of the speaker to the brain of the hearer.

B. Traditional phonetic approach : There are various steps in TPA

- 1) Isolation: Teach a client to produce a sound in a syllable.
- 2) Words: Produce sound in meaningful units. Begins once client can produce target sound in nonsense syllable.
- 3) Nonsense syllables: teaching client to produce a sound in a syllable.
- 4) Phrases: once client can easily produce words shift from single-word to target sound in two-to-four word phrase.

C. Instrumental approach: Researchers learned to describe speech articulation by reflecting on their own utterances and observing the speech of others using simple devices such as mirrors. Over time, more sophisticated approaches to viewing the vocal tract began to appear. The instrumental approaches that allow researcher to study the configurations.

- 1) *Electropalatography:* In this research participant wears a pseudo plate, a thin plastic construction that fits over the top teeth and covers the roof of the mouth.
- 2) *Magnetic resonance imaging (MRI):* For viewing structure inside the body. Unlike traditional x-rays, MRI images clearly show tissue and bones. Very sharp images are possible. During the procedure the patient lies inside a chamber and is exposed to a powerful magnet.

V. CONCLUSION

This paper presented a study on various types of phonetics algorithms. Considerable work has been done in the area of English and a related language but there is very little work done in Punjabi language. So, In future, we will design and implement new dhunivisheshan for Punjabi language. Various rules can be made for increasing its accuracy. For this we have to create a big database. Accuracy depends on the size of the database.

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