EasyChair Preprint

№ 2153

String Similarity Based on Phonetic in the Gujarati Language Using Gujsim Algorithm

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December 12, 2019

STRING SIMILARITY BASED ON PHONETIC IN THE GUJARATI LANGUAGE USING GUJSIM ALGORITHM

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Abstract
Searching with top 10 search engine[1] to find "ગાન્ધીજી" or "ગાંધીજી" and surprised to see the result which far differs from one to another. As in the Gujarati language, both strings are correct. Therefore, String similarity algorithm is useful for text mining applications. Basically, string similarity compares each character from both strings but it may not give the accurate result on highly rich Gujarati language due to different kinds of writing styles which depend on matras, reph, vatu and diacritics on simple and compound alphabets. GUJSIM (GUJarati SIMilarity) algorithm is the hybrid approach to do strings similarity for Gujarati language. Here, the author compares 70 strings pairs and GUJSIM algorithm gives good percentage result.

Keywords: String Similarity, Phonetic, String Distance, Gujarati Language

ISO 639-3 codes: guj, eng

1 Introduction
In definition, a similarity is a comparison of commonality between different objects. An object can be two strings or corpus or knowledge. Here, an author's concentrate on string similarity approach. (Wandelt et al. 2014) A string which is generally needed to search while processing in the search engine. (Patel 2017; Patel and Modi 2015; Patel and Patel 2015) A research community already represented a list of string similarity algorithm for non-Indian language. For Indian languages, there is space to research to this domain. A string similarity algorithm working in NLP shown in **Figure *I*** are useful, questions & answering system, text summarization, speech recognition, spelling correction, word sense disambiguation, short answer grading as well as for stemmer. (Patel and Patel 2015) Generally, we consider the only comparison for strings with side by side characters. These kinds of comparison may give a different result due to matras & diacritics for Indian languages and it may not fruitful for that language which is highly rich and free order such as Gujarati. Exa. નીંદર (to sleep) and નિન્દર (to sleep).

2 Gujarati Language
Indian is a cosmopolitan country with languages. As per Indian government records, for scheduled language in descending order of speakers strength who written the Gujarati as mother tongue in 2001, a Gujarati language at Seven position with 4.48% of total population and as per record of CIA 54.6 million speaks Gujarati in India and 65.6 million speakers of Gujarati World Wide in 2011 census. By the way, Gujarati was the first language of the father of India called as Gandhi (Mohandas K. Gandhi) and father of Pakistan called as Jinnah (Mohammed Ali Jinnah).(Bhensdadia 2010)

[1] http://www.ecloudbuzz.com/top-10-best-search-engines-in-the-world/

2.1 Features

Gujarati is morphological rich and free order language. It is the native language of Gujarat state and a member of Indo-Aryan family of languages. The Gujarati alphabets have two kinds: Simple and Compound. A simple alphabet which is represented by a single letter while compound alphabets are conjunction by two or more letter with diacritics and/or matras. A list of conjunction letter studied from "Bhagavadgomanal[2]" and listed in Table II. A hierarchical structure Table I of Gujarati language could be like this:

Table I The hierarchy of Gujarati syntax

Sentences	અયોધ્યામાં રામ રાજ્ય ચાલતું આવ્યું છે
Phrase	અયોધ્યામાં + રામ રાજ્ય + ચાલતું આવ્યું છે
Word	અયોધ્યામાં + રામ + રાજ્ય + ચાલતું + આવ્યું + છે
Morpheme	અયોધ્યા + માં + રામ + રાજ્ય + ચાલતું + આવ્યું + છે

The features of Gujarati language (Bhensdadia 2010) (Panchal 2015) (Patel and Patel 2016) are as follows:

1. It has no articles and capital letters follow the Devanagari script and decedent from the Sanskrit language.

2. Its vocabulary contains four kinds of words: Tatsam (accept from the Sanskrit language), Tadbhav (adopt from Sanskrit with the change in phonetics), Native (original words of Gujarati language), Loan words (adopt from others languages).

3. Gujarati alphabet has 34 consonants and 14 vowels with independent (અ ,આ ,એ...) and dependent (ા, ી, ુ...).

Table II Sample of Compound Letter

Sr. No.	Conjunction forms	Example(s)
1	**Half-form of consonants**	મ+ ્ + ય = મ્ય
2	**Upper-based form of Reph**	ર+ ્ + થ = ર્થ
3	**Lower-based form of Reph**	પ+ ્ + ર = પ્ર
4	**Vattu Variants**	દ્ર = દ + ્+ ર
5	**Matra, Reph, vowel modifications**	ગે= ે+ ગ + ્+ ર

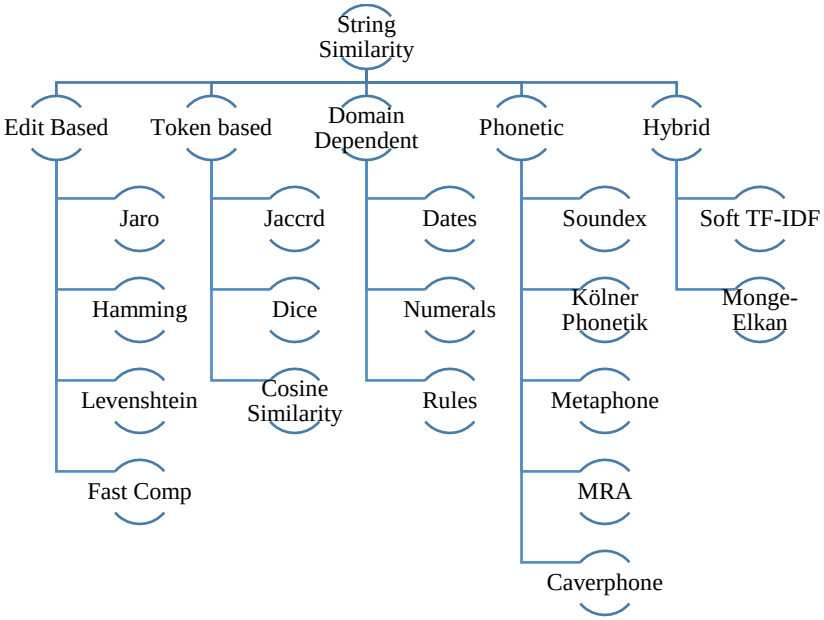
3 Literature Review

Through literature review in Table I, we focus on two types of algorithm for this research paper: Edit Distance algorithm and Phonetic algorithm. We found that few of algorithms developed in phonetic based (Sheth 2015) string similarity and there is no directly applicable algorithm for the Gujarati language which highly rich and free order form. The Soundex algorithm considering the first algorithm to matching the string based on sounds for the English language. It was represented by Robert C. Russell in 1918.3 It is a code which represents a letter with 3 digits.

The variants of Soundex algorithm are reverse Soundex introduced by NYSIIS (New York State Identification and Intelligence System) in 1970. It is used a long time ago (no device were present) in the US. It has not enough accuracy. It mostly depends on initial letter. D-M Soundex proposed by Gary Mokotoff in 1985.

[2] http://www.bhagavadgomandalonline.com/conjuct_charactars.html
[3] US Patent 126167 (issued 1918-04-02)

Figure I Overview of String Similarity Algorithm (Hamming 1950)(Parmar 2014)

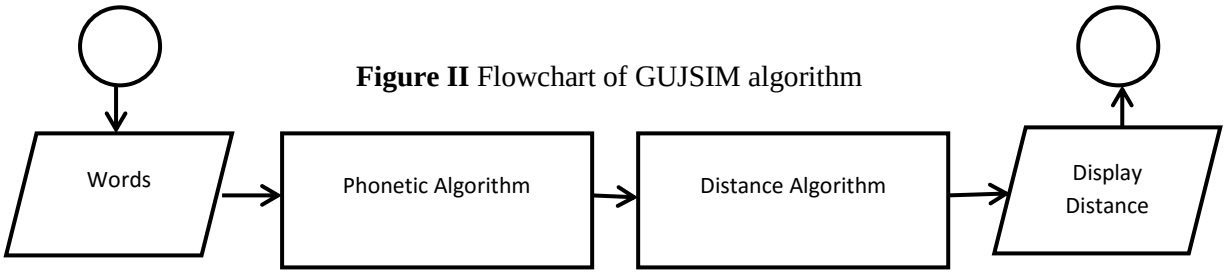


It may fail to misspelled words and slower than Soundex. Kölner phonetics proposed in 1969 for German words, only. The Soundex algorithm has little bit deficiencies which introduced a new algorithm in 1990 by Lawrence Phillips with two variants Double Metaphone in and Metaphone-3 which got high accuracy i.e 99% in the English language. The Caver phone algorithm (Hood 2002) developed by David Hood in 2002 and modified in 2004 for English language only. So, this literature review, we couldn't apply these algorithms for Gujarati language words in Table IV.

4. Proposed Algorithm: GUJSIM (String1, String2) : float (0.0 to 1.0)

Using following basic model which is motivated from (Abbasi 2015) in Figure II which can easily applicable to Gujarati language and author hope – it may work on other Indian languages, also.

Figure II Flowchart of GUJSIM algorithm



GUJSIM algorithm:

Input: String 1 and String 2.

Process: Phonetic algorithm (4.1) follows by Distance algorithm (4.2)

Output: Distance of String 1 and String 2.

4.1 Phonetic algorithm

Step 01: Start.

Step 02: Tokenization the strings using NLTK in python.

Step 03: This process replace and generate an encoded string for both string with following rules.

Step 03.01: Repeat of each character for both string.

Step 03.02: Skip the character in both string such as… ્(Halant-હલન્ત)

Step 03.03: Replace the occurrences for each character with code as per **Table** III.

Table III Encode character with Gujarati alphabets

Characters	code	Characters	Code
“અ આ ા”	**A**	"પ ફ બ ભ"	**K**
"ઇ ઈ િ ી"	**B**	"મ ન ં ણ"	**L**
"ઉ ઊ ુ ૂ ૃ"	**C**	"ય"	**M**
"એ ઐ ે ૈ ૅ ૉ"	**D**	"ૄ ઋ ર ૢ"	**N**
"ઓ ઔ ો ૌ ૉ"	**E**	"લ ળ"	**O**
"ક ખ ગ ઘ"	**F**	"વ"	**P**
"ઙ ઞ"	**G**	"શ ષ સ"	**Q**
"ચ છ જ ઝ"	**H**	"હ"	**R**
"ટ ઠ ડ ઢ"	**I**	"ઁ ઃ ૄ ૠ ૐ "	**0**
"ત થ દ ધ"	**J**		

Step 03.04: Store both string as encoded results.

Step 04: Send encoded string to distance algorithm.

Step 05: Stop.

4.2 Distance Algorithm

Step 01: Start

Step 02: Input encoded strings.

Step 03: Apply distance algorithm to find distance between strings.

Step 04: Calculate the string similarity using following formula.

StrDist = 1 – (Max (DA)/ Max (len (String1), len (String2)))

Here, DA – stands Distance Algorithm value such LEVENSHTEIN, SORENSEN, JACCRD, FAST_COMP, HAMMING

Max() – function provide maximum value from input numbers,

Len() – function provide the length of given string.

Step 05: Store the result and review it.

Step 06: Stop

5 Result Analysis with future scope

The hybrid approach algorithm tested on Python language using NLTK, Distance and Jellyfish package for counting the string distance algorithm for Gujarati words. We got the optimum result which is display in Table V and we tested 70 string pairs. Using, wrongly identification of stemming words are nearly 2% to 5% of the strings which need to improve the result using string similarity approach. The GUJSIM hybrid approach implemented, tested and got enough result on Gujarati words

with similar phonetic words and differently written due to the rich morphology of Gujarati language. Thus, in a future algorithm can test on large corpus for better accuracy.

6 Acknowledgements

The author extremely thanks to institute Acharya Motibhai Patel Institute of Computer Studies (MCA Department) of Ganpat University. The author thanks from bottom of heart to Guide Dr. Jayesh M. Patel whose help when stuck to solve issue regarding algorithms and students of MCA for language writing (Gujarati Words), also. Thanks to wife Anita and son Sarthak to provide healthy environment.

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Table IV Distance value of algorithms on Gujarati words

STRING-1	STRING-1	JACCARD	SORENSEN	LEVENSHTEIN	FASTCOMP	HAMMING
નીંદર	નિન્દર	**0.57**	**0.40**	**3.00**	**-1.00**	**5.00**
અનુસંધાન	અનુસન્ધાન	**0.25**	**0.14**	**2.00**	**2.00**	**5.00**
કંતાન	કન્તાન	**0.33**	**0.20**	**2.00**	**2.00**	**5.00**
સંસોધન	સંશોધન	**0.17**	**0.09**	**1.00**	**1.00**	**1.00**
ગાંધીજી	ગાન્ધીજી	**0.38**	**0.23**	**2.00**	**2.00**	**6.00**
પ્રતિક	પ્રતીક	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
તાલીમ	તાલિમ	**0.33**	**0.20**	**1.00**	**1.00**	**1.00**
સમજુતી	સમજૂતી	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
અનુકરણીય	અનૂકરણીય	**0.22**	**0.12**	**1.00**	**1.00**	**1.00**
ગુહિણી	ગુહીણી	**0.17**	**0.09**	**1.00**	**1.00**	**1.00**
કમિટી	કમીટી	**0.20**	**0.11**	**1.00**	**1.00**	**1.00**
આલ્બમ	આલબમ	**0.20**	**0.11**	**1.00**	**1.00**	**3.00**
ખુશનુમા	ખુસનુમા	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
મંજુર	મન્જુર	**0.43**	**0.27**	**2.00**	**2.00**	**5.00**
અંકુર	અન્કુર	**0.43**	**0.27**	**2.00**	**2.00**	**5.00**
કેરોસીન	કેરોશીન	**0.25**	**0.14**	**1.00**	**1.00**	**1.00**
આજ્ઞવિકા	આજ્ઞવીકા	**0.14**	**0.08**	**1.00**	**1.00**	**1.00**
ફરજીયાત	ફરજિયાત	**0.25**	**0.14**	**1.00**	**1.00**	**1.00**
સંતોષ	સંતોશ	**0.33**	**0.20**	**1.00**	**1.00**	**1.00**
ચંદ્રકાંત	ચન્દ્રકાન્ત	**0.22**	**0.12**	**4.00**	**-1.00**	**10.00**
દિવાળી	દિવાલી	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
પરમાત્મા	પરમાતમા	**0.17**	**0.09**	**1.00**	**1.00**	**3.00**
ઈશ્વર	ઈસ્વર	**0.50**	**0.33**	**2.00**	**2.00**	**4.00**
જિન્દા	જીંદા	**0.62**	**0.45**	**3.00**	**-1.00**	**5.00**
નીંદર	નિન્દર	**0.57**	**0.40**	**3.00**	**-1.00**	**5.00**
નિરપેક્ષ	નિરપેકશ	**0.33**	**0.20**	**2.00**	**2.00**	**2.00**
અનુસંધાન	અનુસન્ધાન	**0.25**	**0.14**	**2.00**	**2.00**	**5.00**
કંતાન	કન્તાન	**0.33**	**0.20**	**2.00**	**2.00**	**5.00**
સંસોધન	સંશોધન	**0.17**	**0.09**	**1.00**	**1.00**	**1.00**
સાર્થક	સારથક	**0.17**	**0.09**	**1.00**	**1.00**	**3.00**
પત્ની	પતની	**0.20**	**0.11**	**1.00**	**1.00**	**3.00**
વિશ્વાસુ	વિસ્વાસુ	**0.14**	**0.08**	**1.00**	**1.00**	**1.00**
પ્રસાદી	પરસાદી	**0.14**	**0.08**	**1.00**	**1.00**	**6.00**
કર્ણ	કરણ	**0.25**	**0.14**	**1.00**	**1.00**	**2.00**
ઓમકારેશ્વર	ઓમ્કારેશ્વર	**0.00**	**0.00**	**1.00**	**1.00**	**9.00**
રૂપિયા	રૂપીયા	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
જાલેસ્વર	જાળેશ્વર	**0.40**	**0.25**	**2.00**	**2.00**	**2.00**
ક્ષત્રિય	કશત્રીય	**0.44**	**0.29**	**3.00**	**-1.00**	**7.00**
નિરપેક્ષ	નીરપેકશ	**0.40**	**0.25**	**2.00**	**2.00**	**2.00**
આવરદા	આવ્રદા	**0.17**	**0.09**	**1.00**	**1.00**	**4.00**
ભૂલ	ભુલ	**0.50**	**0.33**	**1.00**	**1.00**	**1.00**
દિન	દીન	**0.50**	**0.33**	**1.00**	**1.00**	**1.00**

ધર્મ	ધરમ	**0.25**	**0.14**	**1.00**	**1.00**	**2.00**
કર્મ	કરમ	**0.25**	**0.14**	**1.00**	**1.00**	**2.00**
ગ્લાની	ગલાની	**0.17**	**0.09**	**1.00**	**1.00**	**5.00**
પાણી	પાની	**0.40**	**0.25**	**1.00**	**1.00**	**1.00**
ગુણવતા	ગુનવતા	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
અનીતા	અનિતા	**0.33**	**0.20**	**1.00**	**1.00**	**1.00**
કાંતિ	કાન્તિ	**0.25**	**0.14**	**2.00**	**2.00**	**4.00**
દિવસ	દીવસ	**0.40**	**0.25**	**1.00**	**1.00**	**1.00**
ક્ષેત્ર	કષેત્ર	**0.00**	**0.00**	**1.00**	**1.00**	**6.00**
અર્થ	અરથ	**0.25**	**0.14**	**1.00**	**1.00**	**2.00**
જોઈન્ટ	જોઈંટ	**0.43**	**0.27**	**2.00**	**2.00**	**3.00**
પુત્ર	પુનર	**0.20**	**0.11**	**1.00**	**1.00**	**2.00**
પેન્સિલ	પેનસિલ	**0.14**	**0.08**	**1.00**	**1.00**	**4.00**
પૃથ્વી	પૃથવી	**0.17**	**0.09**	**1.00**	**1.00**	**3.00**
શિવ	શીવ	**0.50**	**0.33**	**1.00**	**1.00**	**1.00**
કોમ્પ્યુટર	કોમપ્યુટર	**0.00**	**0.00**	**1.00**	**2.00**	**7.00**
ગણેશજી	ગનેશજિ	**0.50**	**0.33**	**2.00**	**2.00**	**2.00**
શિકાર	સીકાર	**0.57**	**0.40**	**2.00**	**2.00**	**2.00**
શીમંત	સીમંત	**0.33**	**0.20**	**1.00**	**1.00**	**1.00**
જમરૂખ	જમ્રુખ	**0.43**	**0.27**	**2.00**	**2.00**	**4.00**
શાંતિ	સાંતી	**0.57**	**0.40**	**2.00**	**2.00**	**2.00**
શિવાલા	સીવાળા	**0.75**	**0.60**	**3.00**	**-1.00**	**3.00**
લક્ષ્મીજી	લકશમીજી	**0.38**	**0.23**	**3.00**	**-1.00**	**6.00**
મેઘદૂત	મેગદૂત	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
વેદાંત	વેદાન્ત	**0.38**	**0.23**	**2.00**	**2.00**	**3.00**
ગ્યાની	ગયાની	**0.17**	**0.09**	**1.00**	**1.00**	**5.00**
જ્ઞાની	જ્ઞાનિ	**0.29**	**0.17**	**1.00**	**1.00**	**1.00**
આવરદા	આવ્રદા	**0.17**	**0.09**	**1.00**	**1.00**	**4.00**

Table V Distance value of GUJSIM on Gujarati words

STRING-1	STRING-2	Encoded-1	Encoded-2	JACCARD	SORENSEN	LEVENSHTEIN	FASTCOMP	HAMMING	GUJSIM
નીંદર	નિન્દર	LBLJN	LBLJN	0.00	0.00	0.00	0.00	0.00	1.00
અનુસંધાન	અનુસન્ધાન	ALCQLJAL	ALCQLJAL	0.00	0.00	0.00	0.00	0.00	1.00
કંતાન	કન્તાન	FLJAL	FLJAL	0.00	0.00	0.00	0.00	0.00	1.00
સંસોધન	સંશોધન	QLQEJL	QLQEJL	0.00	0.00	0.00	0.00	0.00	1.00
ગાંધીજી	ગાન્ધીજી	FALJBHB	FALJBHB	0.00	0.00	0.00	0.00	0.00	1.00
પ્રતિક	પ્રતીક	KNJBF	KNJBF	0.00	0.00	0.00	0.00	0.00	1.00
તાલીમ	તાલિમ	JAOB	JAOBL	0.00	0.00	0.00	0.00	0.00	1.00
સમજુતી	સમજૂતી	QLHCJ	QLHCJB	0.00	0.00	0.00	0.00	0.00	1.00
અનુકરણીય	અનૂકરણીય	ALCFNLM	ALCFNLBM	0.00	0.00	0.00	0.00	0.00	1.00
ગુહિણી	ગુહીણી	FCRBLB	FCRBLB	0.00	0.00	0.00	0.00	0.00	1.00
કમિટી	કમીટી	FLBIB	FLBIB	0.00	0.00	0.00	0.00	0.00	1.00
આલ્બમ	આલબમ	AOKL	AOKL	0.00	0.00	0.00	0.00	0.00	1.00
ખુશનુમા	ખુસનુમા	FCQLCLA	FCQLCLA	0.00	0.00	0.00	0.00	0.00	1.00
મંજુર	મન્જુર	LLHCN	LLHCN	0.00	0.00	0.00	0.00	0.00	1.00
અંકુર	અન્કુર	ALFCN	ALFCN	0.00	0.00	0.00	0.00	0.00	1.00
કેરોસીન	કેરોશીન	FDNEQBL	FDNEQBL	0.00	0.00	0.00	0.00	0.00	1.00
આજીવિકા	આજીવીકા	AHBPBFA	AHBPBFA	0.00	0.00	0.00	0.00	0.00	1.00
ફરજીયાત	ફરજિયાત	KNHBMAJ	KNHBMAJ	0.00	0.00	0.00	0.00	0.00	1.00
સંતોષ	સંતોશ	QLJEQ	QLJEQ	0.00	0.00	0.00	0.00	0.00	1.00
ચંદ્રકાંત	ચન્દ્રકાન્ત	HLJNFALJ	HLJNFALJ	0.00	0.00	0.00	0.00	0.00	1.00
દિવાળી	દિવાલી	JBPAOB	JBPAOB	0.00	0.00	0.00	0.00	0.00	1.00
પરમાત્મા	પરમાતમા	KNLAJLA	KNLAJLA	0.00	0.00	0.00	0.00	0.00	1.00
ઈશ્વર	ઈસવર	BQPN	BQPN	0.00	0.00	0.00	0.00	0.00	1.00
જિન્દા	જીંદા	HBLJA	HBLJA	0.00	0.00	0.00	0.00	0.00	1.00
નીંદર	નિન્દર	LBLJN	LBLJN	0.00	0.00	0.00	0.00	0.00	1.00
નિરપેક્ષ	નિરપેકશ	LBNKDFQ	LBNKDFQ	0.00	0.00	0.00	0.00	0.00	1.00
અનુસંધાન	અનુસન્ધાન	ALCQLJAL	ALCQLJAL	0.00	0.00	0.00	0.00	0.00	1.00
કંતાન	કન્તાન	FLJAL	FLJAL	0.00	0.00	0.00	0.00	0.00	1.00
સંસોધન	સંશોધન	QLQEJL	QLQEJL	0.00	0.00	0.00	0.00	0.00	1.00
સાર્થક	સારથક	QANJF	QANJF	0.00	0.00	0.00	0.00	0.00	1.00
પત્ની	પતની	KJLB	KJLB	0.00	0.00	0.00	0.00	0.00	1.00
વિશ્વાસુ	વિસ્વાસુ	PBQPAQC	PBQPAQC	0.00	0.00	0.00	0.00	0.00	1.00
પ્રસાદી	પરસાદી	KNQAJ	KNQAJB	0.00	0.00	0.00	0.00	0.00	1.00
કર્ણ	કરણ	FNL	FNL	0.00	0.00	0.00	0.00	0.00	1.00
ઓમકારેશ્વર	ઓમ્કારેશ્વર	ELFANDPN	ELFANDQPN	0.00	0.00	0.00	0.00	0.00	1.00
રૂપિયા	રૂપીયા	NCKBMA	NCKBMA	0.00	0.00	0.00	0.00	0.00	1.00
જાલેશ્વર	જાળેશ્વર	HAODQPN	HAODQPN	0.00	0.00	0.00	0.00	0.00	1.00
ક્ષત્રિય	કશત્રીય	FQJNBM	FQJNBM	0.00	0.00	0.00	0.00	0.00	1.00
નિરપેક્ષ	નીરપેક્શ	LBNKDFQ	LBNKDFQ	0.00	0.00	0.00	0.00	0.00	1.00
આવરદા	આવ્રદા	APNJA	APNJA	0.00	0.00	0.00	0.00	0.00	1.00
ભૂલ	ભુલ	KCO	KCO	0.00	0.00	0.00	0.00	0.00	1.00
દિન	દીન	JBL	JBL	0.00	0.00	0.00	0.00	0.00	1.00

ધર્મ	ધરમ	**JNL**	**JNL**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
કર્મ	કરમ	**FNL**	**FNL**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
ગ્લાની	ગલાની	**FOALB**	**FOALB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
પાણી	પાની	**KALB**	**KALB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
ગુણવતા	ગુનવતા	**FCLPJA**	**FCLPJA**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
અનીતા	અનિતા	**ALBJA**	**ALBJA**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
ક્રાંતિ	ક્રાન્તિ	**FNALJB**	**FNALJB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
દિવસ	દીવસ	**JBPQ**	**JBPQ**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
ક્ષેત્ર	કષેત્ર	**FQDJN**	**FQDJN**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
અર્થ	અરથ	**ANJ**	**ANJ**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
જોઈન્ટ	જોઁટ	**HEBLI**	**HEBLI**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
પુત્ર	પુતર	**KCJN**	**KCJN**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
પેન્સિલ	પેનસિલ	**KDLQBO**	**KDLQBO**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
પૃથ્વી	પૃથવી	**KCNJPB**	**KCNJPB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
શિવ	શીવ	**QBP**	**QBP**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
કોમ્પ્યુટર	કોમપ્યુટર	**FELKMCIN**	**FELKMCIN**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
ગણેશજી	ગનેશજિ	**FLDQHB**	**FLDQHB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
શિકાર	સીકાર	**QBFAN**	**QBFAN**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
શીમંત	સીમંત	**QBLLJ**	**QBLLJ**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
જમરૂખ	જમ્રુખ	**HLNCF**	**HLNCF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
શાંતિ	સાંતી	**QALJB**	**QALJB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
શિવાલા	સીવાળા	**QBPAOA**	**QBPAOA**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
લક્ષ્મીજી	લકશમીજી	**OFQLBHB**	**OFQLBHB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
મેઘદૂત	મેગદૂત	**LDFJCJ**	**LDFJCJ**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
વેદાંત	વેદાન્ત	**PDJALJ**	**PDJALJ**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
જ્ઞાની	ગયાની	**FMALB**	**FMALB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
જ્ઞાની	જ્ઞાનિ	**HGALB**	**HGALB**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**
આવરદા	આવ્રદા	**APNJA**	**APNJA**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**