North- Central Dialect Of Bodo Vowel : An Acoustic Analysis

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Abstract : Bodo is a Sino- Tibetan Language spoken primarily by the Bodo people of North-EastIndia .It is an official language of the state of Assam and the Bodoland Territorial Region of India. Since 1975 the language has been written using Devanagari Script . The Bodo has 7 vowel. These are - /a, u, w, e, o, i, Á/ but in their standard language form there are only 6 vowels . these are- /a, u, w, e, o, i/. In this topic i am trying to analysis the acoustic value (F1,F2,energy) of Bodo vowel .

Keywords: Acoustic analysis, vowel, F1,F2,energy.

Introduction:

Bodo is a Sino- Tibetan Language spoken primarily by the Bodo people of North-East India. The Bodos are known by different names in some regions of Assam and its few adjacent areas. In this Brahmaputra valley, the Bodo native speakers identity themselves asBodo while the Hindu Asamiya Speakers and speakers of other linguistic communities address them as Kachari or Boro Kachari.

Since 1975 the language has been written using Devanagari Script . . The Bodo has 7 vowel. These are - /a,u, w, e, o, i, Á/ but in their standard language form there are only 6 vowels.

Aims and objectives

- Acoustic analysis of vowel of the Bodo language.

- Wave image analysis of vowel:-

    a) Energy -Minimum energy

        Maximum energy   Mean energy

    b) Pitch - Minimum pitch

        Maximum pitch

    c) Frame length

- Finding F1 and F2 value .

3. Literature Survey

Here , the selected thesis , books and articles are considered for the purpose of view Pratima Brahma, Ph.D. thesis "phonology and Morphology of Bodo and Dimasa : Acomparative study (2013)", here she discusses shortly about Bodo phonological and morphological structure.

Phukan Basumatary , he has published many books on language . Among them " A Introduction to the Boro Language (2005)", here he discusses descriptively about Bodo phonology.

Swarna Prabha Chainary , She has published many books on language and literature. Among them Boro Raothanthi(2006), Tibeto- Burman language of North-East India (2014), she discusses shortly about Bodo language

Aleendra Brahma , he has published many books which is related with Bodo language . In his book ' An introduction to Bodo phonology ' he discuss shortly about Bodo phonology .

4. Methods:

- In this research work Descriptive and Acoustic Analysis methods have been applied.

- The data for the proposed study has been collected from both primary and secondary sources.
  For Primary data the researcher has visited different places of the Bodo Language speaking dominated areas .
  Secondary data has been gathered from various sources like the Bodo texts, lexicons, Bodo Dictionary , monthly and annual magazines , journal etc.

5. Discussion

Acoustic analysis of vowel

Phonetic Descriptions

/a/ Low central un-rounded vowel

/ u/ High back rounded vowel

/w/ high back un-rounded vowel

/ e/ Front mid un-rounded vowel

/o/ back mid rounded vowel

/i/ High front un – rounded vowel

/Á/ Low back rounded vowel

In Bodo ,all vowel phonemes have occurrences in initial, medial and final position of word . Examples are as follows :

	Initial	Medial	Final
/i/	ising (inner part)	bir (fly)	bi(to beg)
/u/	un(back)	bung(speak)	bu (beat)
/w/	wi(addressing)	zwng(we)	bw(to pull)

/e/ eu(fry)	beng(to protect)	be(it)
/o/ or (fire)	bon(fire wood)	zo(to be torn)
/a/ ang(I)	bar(wind)	za(eat)
/Á/ Áma(pig)	pʰarÁi (study)	---------- Wave image analysis of vowel:
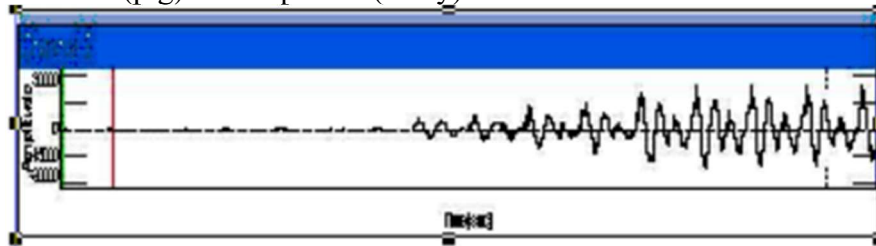
Word   'ising'
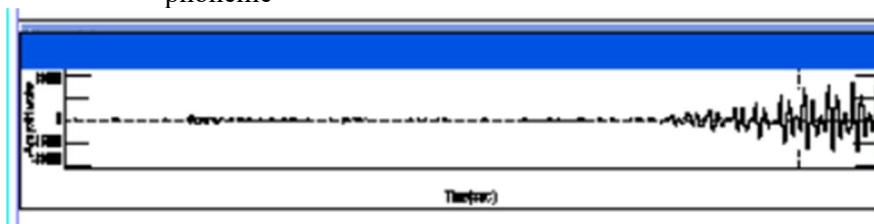
/i/ image

Here , Results are –

a) Energy

Minimum   energy 46.48dB   Maximum energy 71.60dB Mean energy 61.29dB

b) Pitch

Minimum   pitch 118.57Hz   Maximum pitch 120.05Hz

c) Frame length 25 M.sec, mean Period 8.38 M.sWave image analysis of initial position of /u/ phoneme

Word 'un'

/u/ image

Here , Results are –

a) Energy

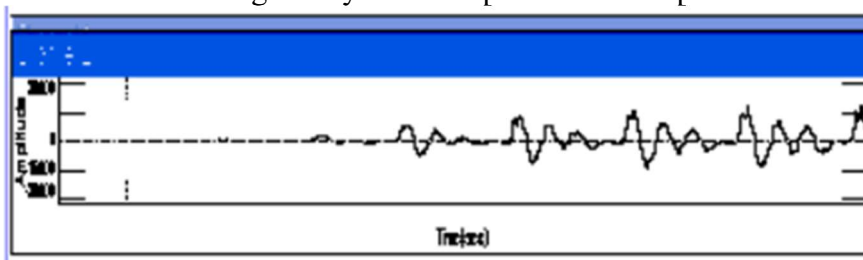Minimum   energy 51.73dB   Maximum energy 78.32dB Mean energy 68.26db

b) Pitch

Minimum pitch 126.61 Hz Maximum pitch 126.81 Hz

b) Frame length 25 Msec Mean period 7.89Msec Wave image analysis initial position of /w/ phoneme

Word 'wi'

/w/ image

Here , Results are –

d) Energy

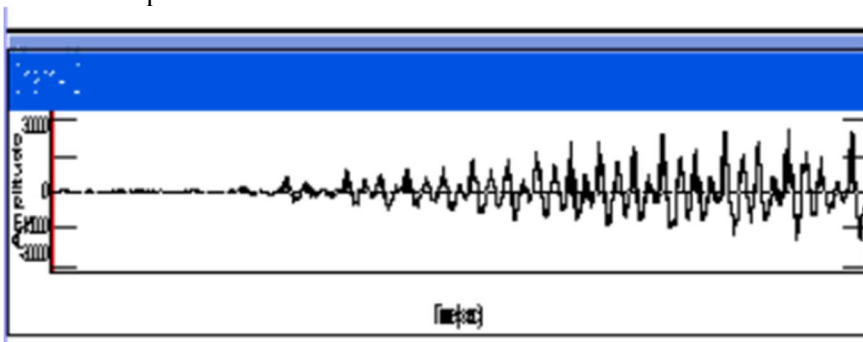Minimum energy 63.47dB Maximum energy 73.20dB Mean energy 71.14dB

e) Pitch

Minimum pitch 123.08Hz Maximum pitch 124.77 Hz

f) Frame length 25 M.sec, mean Period 8.07 M.seWave image analysis of initial position of /e/ phoneme

Word 'eu'

/e/ image

Here , Results are –

c) Energy

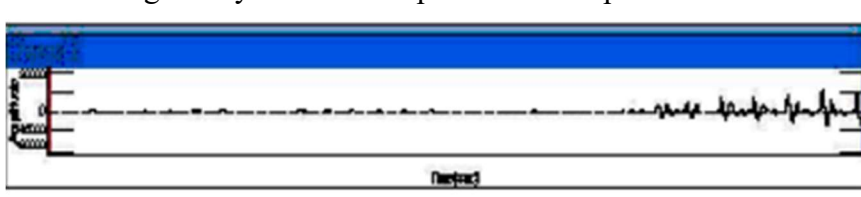   Minimum   energy
   60.99dB   Maximum
   energy 76.33dB Mean
   energy 70.88db

d) Pitch

   Minimum   pitch
   122.83Hz   Maximum
   pitch 140.10Hz

b) Frame length 25 Msec Mean period 7.64Msec

Wave image analysis of initial position of /o/ phoneme

Word   'or'

/o/ image

Here , Results are –

e) Energy

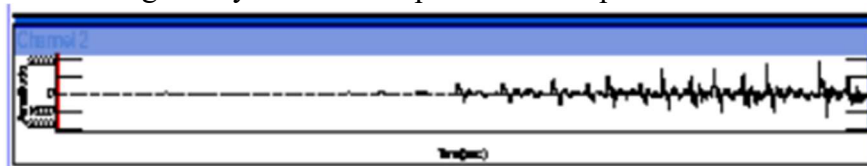   Minimum   energy
   46.69dB   Maximum
   energy 71.05dB Mean
   energy 63.57db

f) Pitch

   Minimum   pitch
   121.11Hz   Maximum
   pitch 144.25Hz

b) Frame length 25 Msec Mean period 7.76Msec

Wave image analysis of initial position of /a/ phoneme

Word   'ang'

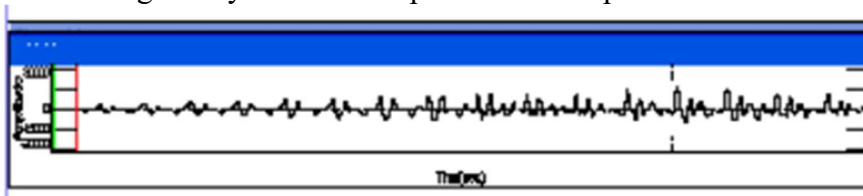/a/ image

Here , Results are –

g) Energy

Minimum energy 60.13dB Maximum energy 72.67dB Mean energy 69.10db

h) Pitch

Minimum pitch 137.92Hz Maximum pitch 137.99Hz

b) Frame length 25 Msec Mean period 7.25Msec

Wave image analysis of initial position of /Á/ phoneme

Word 'Áma'

/Á/ image

Here , Results are –

i) Energy

Minimum energy 60.51dB Maximum energy 73.07dB Mean energy 68.89db

j) Pitch

Minimum pitch 116.25Hz Maximum pitch 130.45Hz

b) Frame length 25 Msec Mean period 8.15Msec**6.Conclusion**

Finding F1 and F2 value of Bodo vowel / a,i/

a/

F1

$$জন ১— M = \frac{\sum X}{N}$$

$$M = \frac{3392.747}{4}$$

$$M = 848.18675$$

$$জন ২— s = \sqrt{\frac{\sum (x - x^-)^2}{n - 1}}$$

$$S = 3.2879508689557$$

$$F_n[v]N \quad (F_n[v] - MEAN_n)/S_n$$

$$F_n[v]N = 773.90458416679$$

F2

$$জন ১— M = \frac{\sum X}{N}$$

$$M = \frac{6246.264}{4}$$

$$M = 1561.566$$

$$জন ২— s = \sqrt{\frac{\sum (x - x^-)^2}{n - 1}}$$

$$S = 33.5108679035999$$

$$F_n[v]N \quad (F_n[v] - MEAN_n)/S_n$$

$$F_n[v]N = 1334.3418575209$$

V

F1

$$জন ১— M = \frac{\sum X}{N}$$

$$M = \frac{1109.294}{4}$$

$$M = 27.7316$$

$$खन ३— s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

$$S = 3.28944439803711$$

$$F_{ni}[v]N \quad (F_{ni}[v] - MEAN_{n_i})/S_{ni}$$

$$F_n[v]N = 252.91447580950$$

F2

$$खन २— M = \frac{\sum X}{N}$$

$$M = \frac{9333.671}{4}$$

$$M = 2333.41775$$

$$खन ३— s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

$$S = 3.4685158089111$$

$$F_{ni}[v]N \quad (F_{ni}[v] - MEAN_{n_i})/S_{ni}$$

$$F_n[v]N = 2018.2272867303$$

In this topic researcher fined the actual acoustic value of Bodo vowel

Here are the Findings-

- /a/ Low central un-rounded vowel
- / u/ High back rounded vowel
- /w/ high back un-rounded vowel

- / e/ Front mid un-rounded vowel

- /o/ back mid rounded vowel

- /i/ High front un – rounded vowel

- /Á/ Low back rounded vowel

- F1and F2 value /a, u, w, e, o, i, Á /

	F1	F2
i	252.91447580950	2018.2272867303
e	338.19011921256	2267.2843622698
a	773.90458416679	1334.3418575209
ɯ	391.72446128518	1669.0461986236
u	356.78	896.23735362322
ɔ	503.82332752100	790.09678545400
o	672.5319952702	1404.8913132782
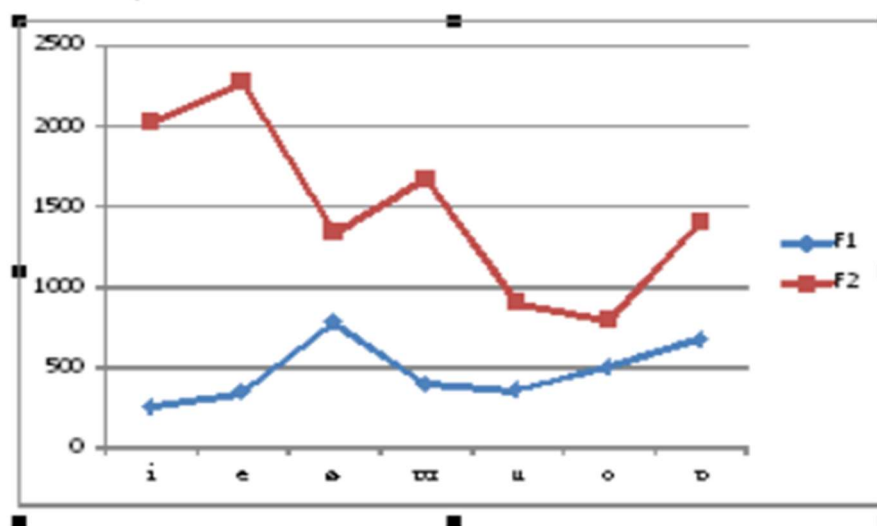
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