

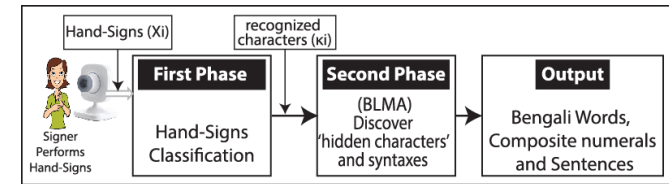
Bangla language modeling algorithm  
for automatic recognition of hand-sign-  
spelled Bangla sign language

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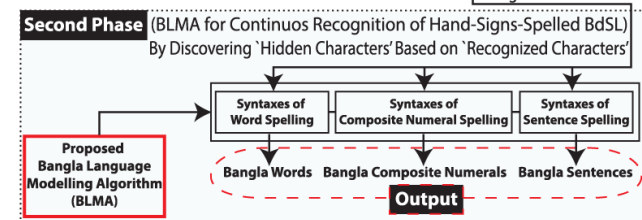
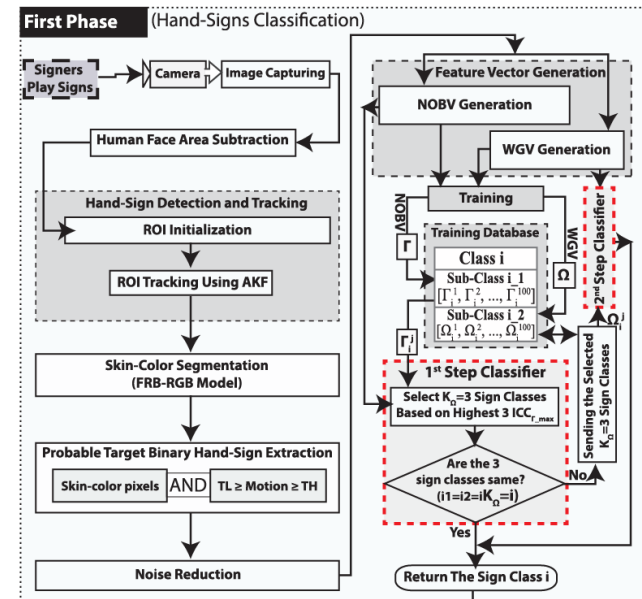
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# Problems & Ideas

- Problems of Bangla sign language recognition
  - Selection of appropriate hand-signs classification methods is challenging
  - Modeling of Bangla language is also challenging to interpret hand-sign-spelled Bangla sign language because only 36 sign alphabet is used to represent 51 Bangla written characters
- Ideas: (Proposed Method)
  - A two-steps classification technique is proposed based on WGV and NOBV for hand-signs classification
  - We have proposed Bangla language modeling algorithm (BLMA) to interpret the hand-sign-spelled BdSL into Bangla text



(a)



(b)

Fig. Architecture of the proposed system, (a) block diagram and (b) details view.

# Main Contributions

- **Hand-sign classification**
- ✓ Proposed two-steps classifier is faster and simpler with keeping high accuracy as shown in following figure.

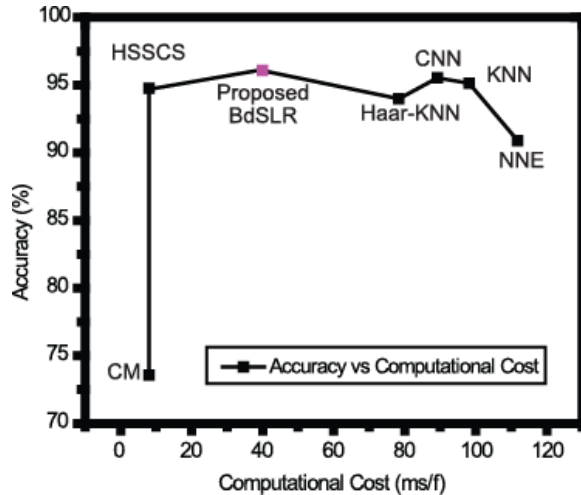


Fig. Comparative analysis of different systems where red color indicates our proposed two-steps classifier based method.

- **Performance of BLMA**
- ✓ The system achieves the mean accuracy of 93.50% for hand-sign-spelled words, 95.50% for composite numerals and 90.50% for sentences recognition as shown in following tables for selected sample results respectively.

Bangla words	hand-sign spelling	accuracy (%)
ঈদ /iid/ ( Eid )	ই+দ	95
মূক /mUUk/ ( Dumb )	ম+উ+ক	93
শীত /ShhIt/ ( Winter )	স+ই+ত	89
সংঘ /sNgGhh/ ( Organization )	স+ং+S5+ঘ	93
মৃত্যু /mRItjU/ ( Death )	ম+S5+র+S5+ই+ত+S5+জ+উ	87
হঠাৎ /hTHhaTt/ ( Sudden )	হ+ঠ+আ+ত	95
রাজ্য /rAj/ ( State )	র+আ+জ+S5+জ	88
ডাক্তার /DAktAr/ ( Doctor )	ড+আ+ক+S5+ত+আ+র	87
জ্বর /Jbr/ ( Fever )	জ+S5+ব+র	87

Bangla composite numerals	hand-sign spelling	accuracy (%)
১০০ ( 100 )	১+০+০	92
১০০০ ( 1000 )	১+S1	97
১০০০০০ ( 100000 )	১+S2	97
৯০০০০০০০ ( 90000000 )	৯+S3	96

Bangla sentences	hand-sign spelling	accuracy (%)
ডাক্তার ডাক।/DAktAr DAK./ (Please call Doctor.)	ড+আ+ক+S5+ত+আ+র+S4+ড+আ+ক+S6	87
আমাকে ৯০০০ টাকা দাও। /aAmAkE 9000 TAKA dAo./ (Please give me 9000 taka)	আ+ম+আ+ক+এ+S4+৯+S1+S4+ট+আ+ক+আ+S4+ দ+আ+ও+S6	93
জ্বর জ্বর লাগছে।/Jbr Jbr lAgChhE./ (I feel fever.)	জ+S5+ব+র+S4+জ+S5+ব+র+S4+ল+আ+গ+ছ+এ+S6	87
বাথরুমে যাব।/bATHhrUmE jAb./ (I feel to toilet.)	ব+আ+থ+র+উ+ম+এ+S4+জ+আ+ব+S6	90