

*Software for Conversion
of
Bangla Text to Sign Language*

*Kaushik Datta,
Computer & Informatics Group, VECC*

Topics to be Covered:

- **Sign Language & Bangla Sign Language**
- **Difficulties of Hearing-impaired Persons**
- **Software Architecture**
- **Functional Description of The Software**
- **Usefulness of The Software**
- **Conclusions**

Sign Language:

- **A visual language consisting of various signs, gestures, finger spelling and facial expressions.**
- **Most common and natural means of communication for the hearing-impaired persons.**

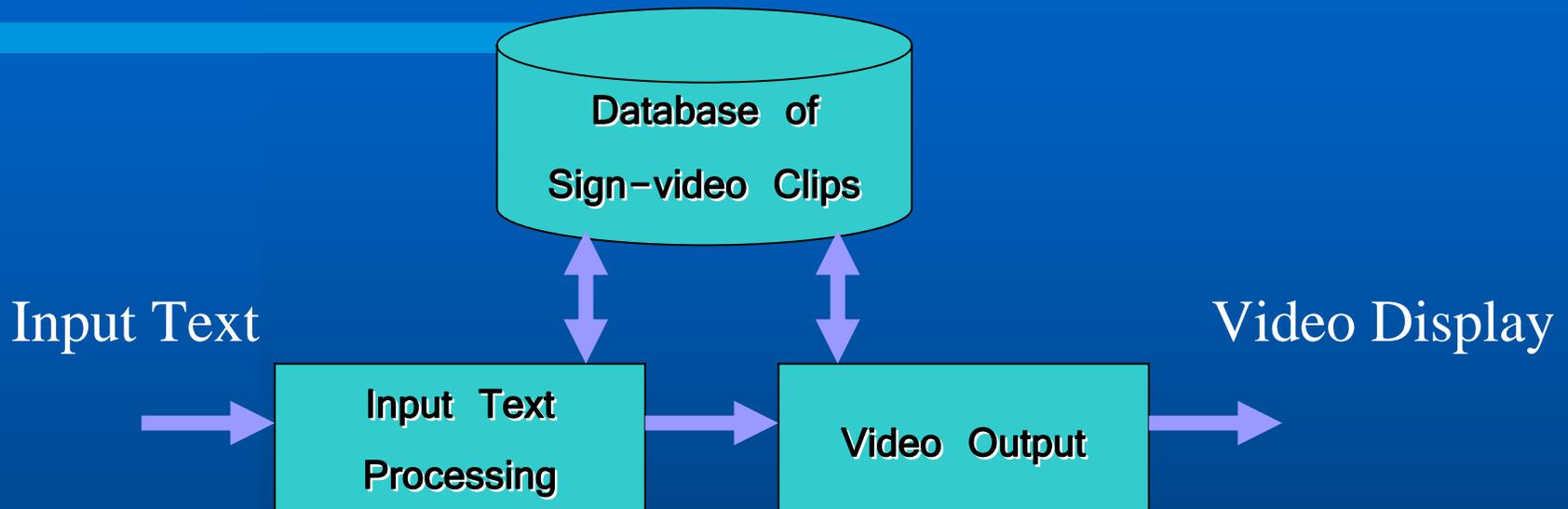
Bangla Sign Language: (BaSL)

Sign language practiced by the Bangla speaking community in and around the state of West Bengal.

Difficulties of the Hearing-impaired Persons:

- Inability to orally communicate with others and indifference of others to learn their language i.e. sign language.
- Traditional education system lacks proper tools to fulfill special requirements.
- Language learning w.r.t written text is quite problematic.

Software Architecture:



➤ Created in Visual Basic. Net and MS Access.

Input Text Processing Module:

➤ Scans the input Bangla text and rearranges (if necessary) the words of the input text in accordance with the accepted practice of BaSL.

➤ Formulated Rules:

1) To express some words, signs of two or more words need to be enacted successively.

Ex. Hotel = Eat + Money

2) A “wh-” word comes at the end of a sentence.

Ex. তুমি কোথায় যাচ্ছ? (Where are you going?)
(You) (**Where**) (Going)

তুমি যাচ্ছ কোথায় ?

(You) (Going) (**Where**)

Contd.

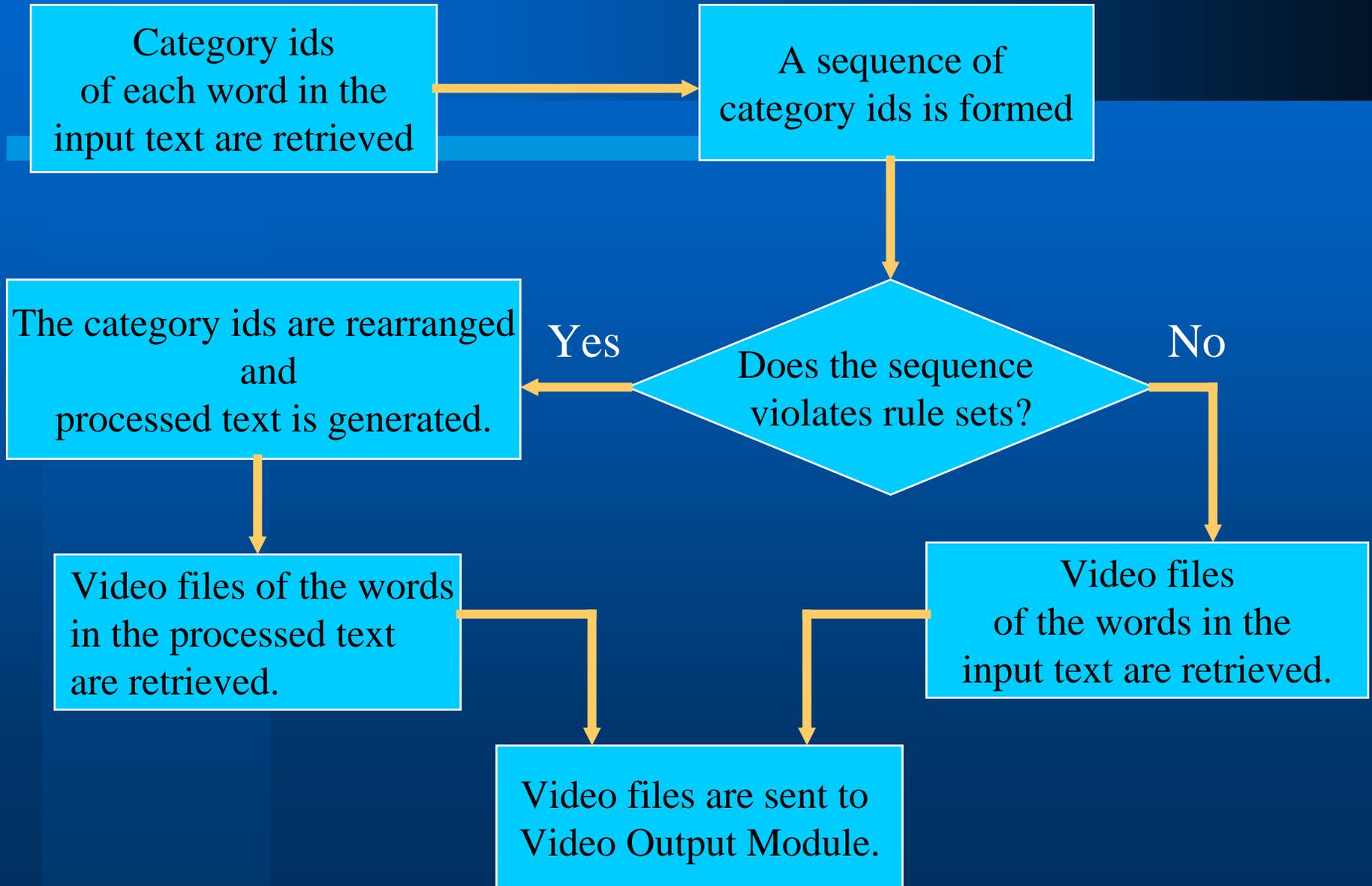
3) If a verb is in the past or in future tense, a tense marker gets added before verb.

Ex. আমি স্কুলে যাব . (I will go to school)

(I) (School) (Go) => I School (Future Marker) Go

4) In BaSL, there is no sign for words like কিন্তু (“But”), এবং (“And”), নতুবা (“Otherwise”).

Flowchart:



Database Module:

- A large set of Bangla words and their sign-videos.
- Developed in MS Access.
- Attributes:
 - i) Word
 - ii) Word Id
 - iii) Category Id
 - iv) Filename of video file
 - v) Sign description
- Rule sets and Category Id determine the position of a word in the processed text.
- Word Id of processed text sent to video output module.

Video Output Module:

➤ Customised media player. (Using Winmm.dll)

➤ Video clips (.avi) of words are retrieved corresponding to the received word Ids.

➤ Video clips are concatenated and displayed in as continuous movie in the video window.

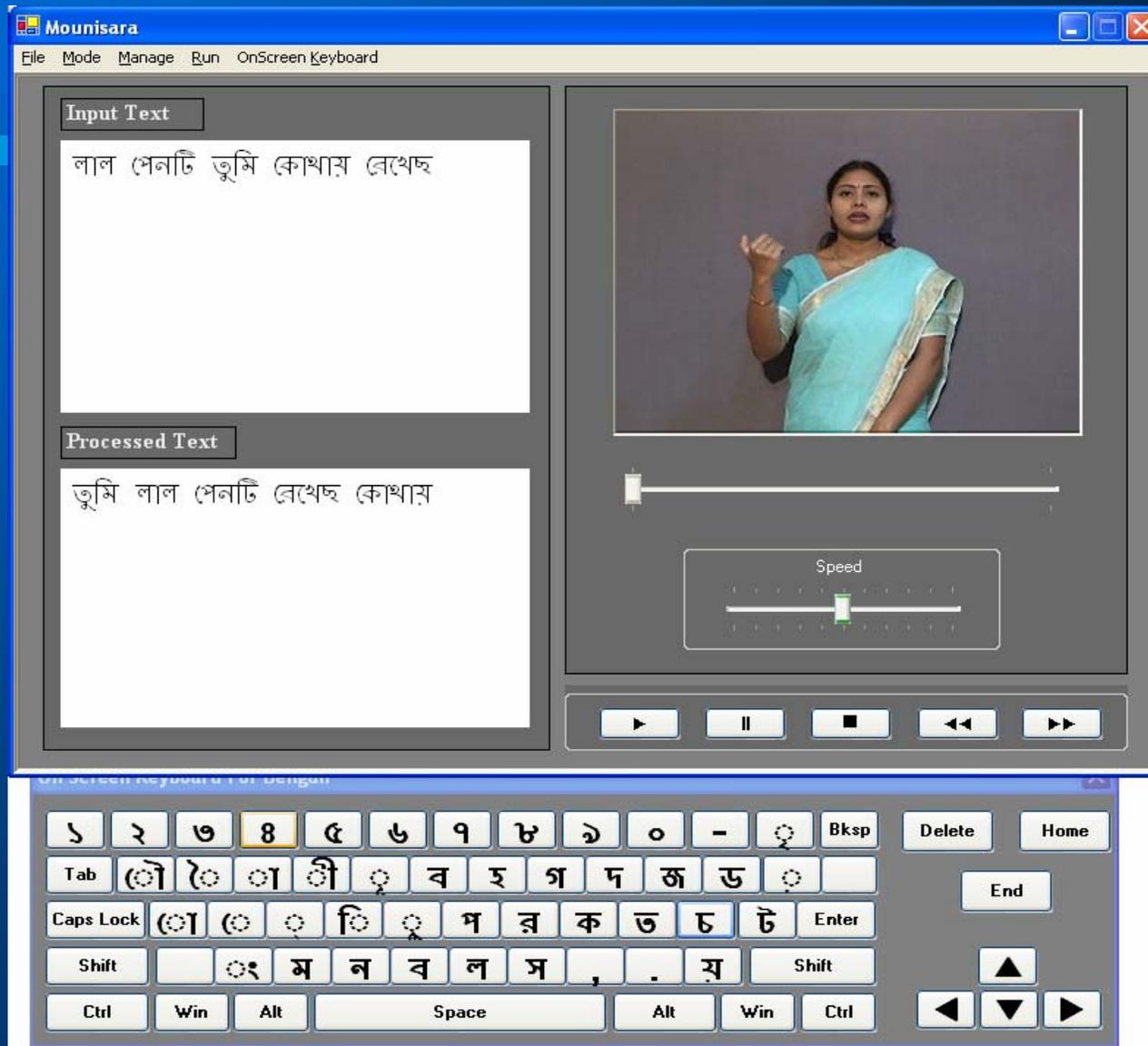
Joining Steps:

- Extract all images (BMP) from Sign video clips (AVI).
- Join BMP images.
- Make a composite AVI file.

Functional Description:

- **User Mode & Admin Mode**
(Default) (Authenticated)
- **User Mode:** i) **Word Mode**
ii) **Sentence Mode**
- **Admin Mode:** i) **Add**
ii) **Delete**
iii) **Update**

User Interface: (In Sentence Mode)



User Interface: (In Word Mode)

Mounisara
File Mode Manage Run OnScreen Keyboard

Search Word: পিপাসা

Input Text
পিপাসা

Sign Description
ডান হাত আধখোলা অবস্থায় মুখের কাছে নিয়ে এসে ডান হাতের চার আঙুল জুড়ে গলার উপর বোলাতে হবে

Speed

Navigation: Play, Pause, Stop, Previous, Next

Add Panel : (*Admin Mode*)

Add Word

Add

Category: বিশেষ্য

Word: কিরণ

Video: D:\Program Files\ **Browse**

Sign Description :
আধখোলা ডান হাত ডান
কানের পাশে নাডাতে হবে

Preview



Preview **Add** **Cancel**

Delete Panel : (*Admin Mode*)

Delete Word

Admin

Category: दिन

Word: बुधवार

Preview

Preview Delete Cancel



Update Panel : (Admin Mode)

Modify Word

Admin

Category: ক্রিয়া

Word: অনুশীলন

Video: practice.avi **Browse**

Sign Description: থোলা ডান হাত গলার কাছে নিচে থেকে উপরের দিকে পুনঃপুন উঠাতে হবে

Preview



Preview **Modify** **Cancel**

Utility of the Software:

➤ Sign Language Learning Tool.

➤ Teaching Aid in Deaf Schools.

Chapters can be stored in sign video and played in the class.

➤ Tool for Developing Language Skills in Deaf Students.

Sessions can be created for a particular word, its usage and the context of using the word.

Conclusions:

- **Similar development is possible in other languages following present architecture.**
- **A first version of the software has been developed and distributed in different deaf schools, clubs and associations to get feedback.**

Acknowledgement:

VECC

D. Sarkar

C.D. Datta

Biswajit Sarkar

Suva Sarkar (Sign Language Consultant)

WML

A. Bandyopadhyay

S.J. Datta

Indranil DasRoy

Amalesh Paul

J.U. Mollah

Anirban Paul



THANK YOU