

Ekushe Keyboard

A Bangla keyboard for Desktop Environment.

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Introduction

- Ekushe Keyboard is a transliteration based phonetic keyboard software.
- For ease of use, word suggestion and next word prediction is added.
- A native lightweight application for regular use.

Technical description

- Language : C#
- Library dependency : user32.dll
- Requirements : Windows 10 64-bit / 32-bit,
Microsoft .NET framework 4.6 or above.

Input

Communication with Hardware

- Windows DLL API is used, to collect and block user input before it can be processed.
- Converted keyboard inputs (key Up – key Down signal) into virtual key codes .
- Virtual key codes are used as input for parser.

Parsing

Processing Method

- Word-by-Word processing.
- Pre-mapped Bangla letters , kars and juktakkhors .
- A word is decomposed as sequence of letters , applied conversion logics and recomposed as a Bangla word.

Word suggestion

Word suggestion

- Trie/prefix tree data structure is used for providing word suggestion.
- Best matching word can be found in a faster way.
- Dictionary data is always on memory.

Word suggestion

Incomplete word	Suggested words
আ	আম, আমাদের, আমাদেরকে
র	রক্ত, রক্তশূন্য, রক্তপাত
বাং	বাংলা, বাংলার, বাংলাদেশ
দে	দে, দেখ, দেখা, দেখার

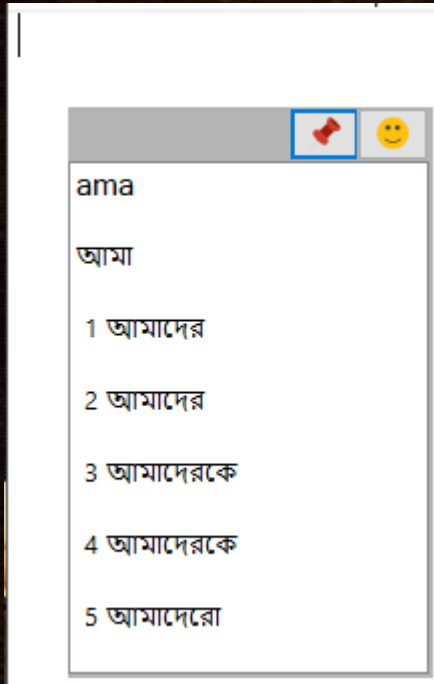
Word suggestion using Trie

Graphical user interface

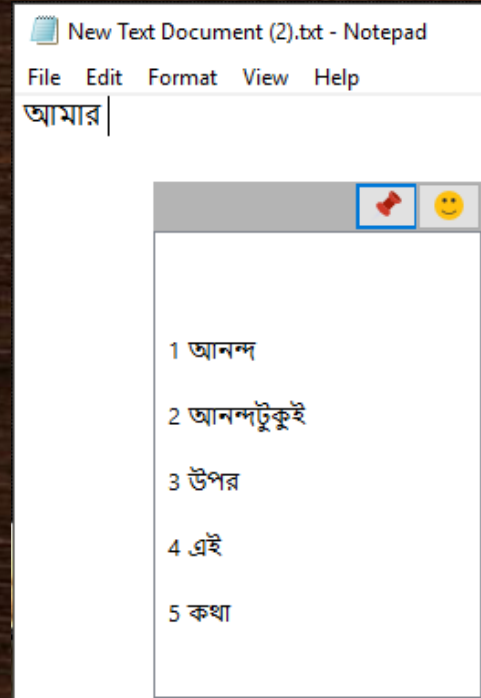
Graphical user interface

- Language toggling interface.
- Positioning suggestion box dynamically.
- Suggestion box disappears.
- Numbering word suggestions.
- Numbering word prediction.

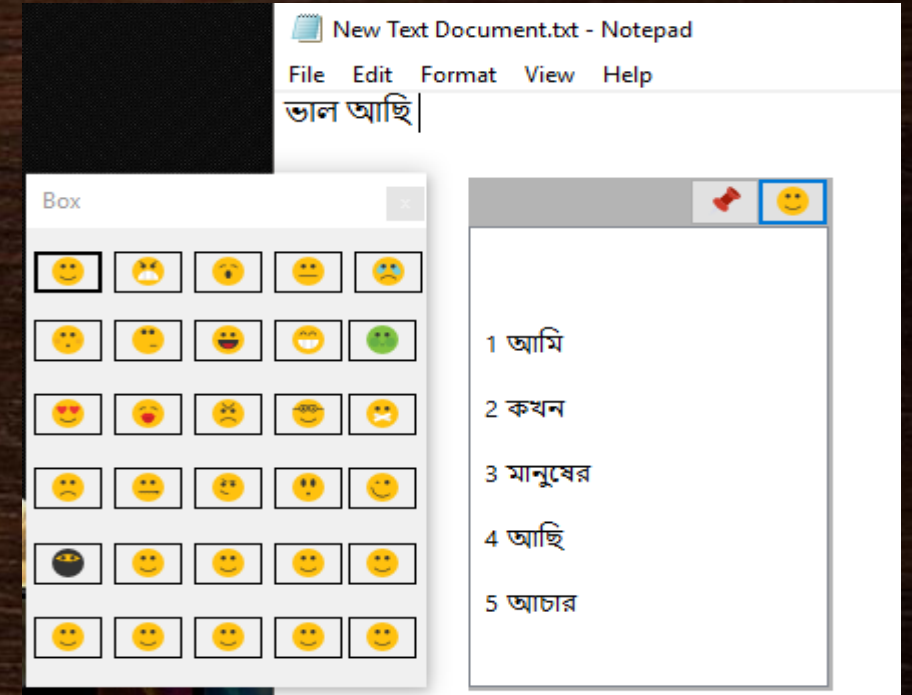
Graphical user interface



Word suggestion



Word prediction



Emoji adding

Word Prediction

Word prediction

- Two different types of approaches has been tested.
 - LSTM
 - N-Gram
- LSTM provides better result, but inefficient for real-time word prediction.
- N-gram is faster but doesn't provide best result.
- 2-gram is used for word prediction.

Word prediction results comparison

Given Word	Predicted Words
আমরা	জানি, এই, বলছি, সবাই, কিছু
আজ	পহেলা, দুই, যাঁরা, হরতাল, তৈরি
একুশে	বাংলা, ফেব্রুয়ারি, ভেতর, কাছে, তীব্র
বাংলা	কিবোর্ডের, ভাষায়, আগে, যাদের, বন্যার

LSTM result

Given Word	Predicted Words
আমরা	জানি, অর্জন, আশা, এই, একটা
আজ	দুই, পহেলা, আজকালকার
একুশে	ফেব্রুয়ারি, বাংলা, একুশ, একাত্তরে
বাংলা	কিবোর্ডের, ভাষায়, বাংলাদেশ, বাংলাদেশের, বাংলাদেশে

N-gram result

Thank You