Project 10c

Hindi Vocalizer on Heterogeneous Multicore Architecture

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Contents

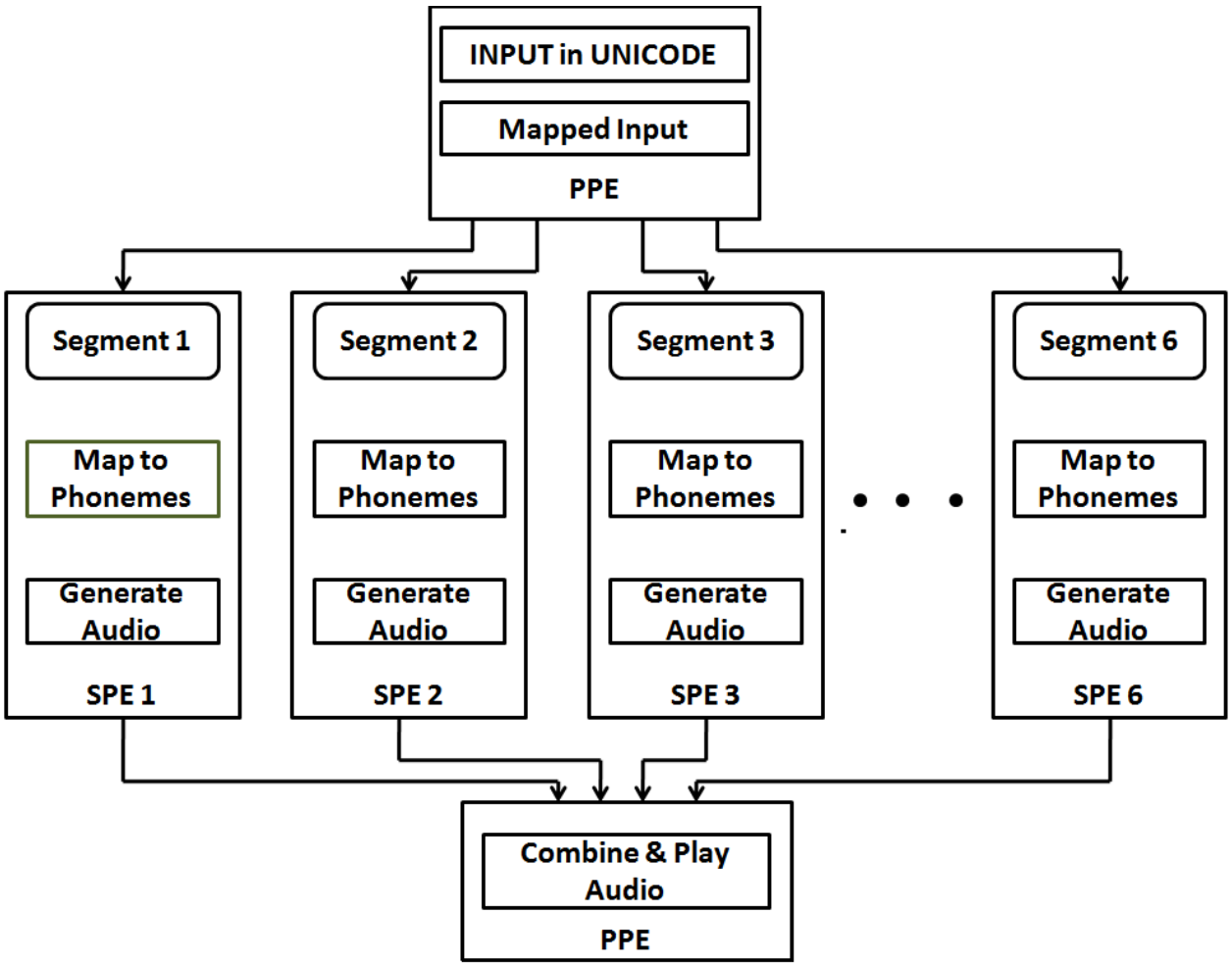
Objective

Implementation of Hindi Text-to-Speech (TTS) system on heterogeneous multicore architecture of Cell Broadband Engine(CBE).

Features

- Multicore
- Data parallelism
- Efficiency
- Platform Independence

Architecture



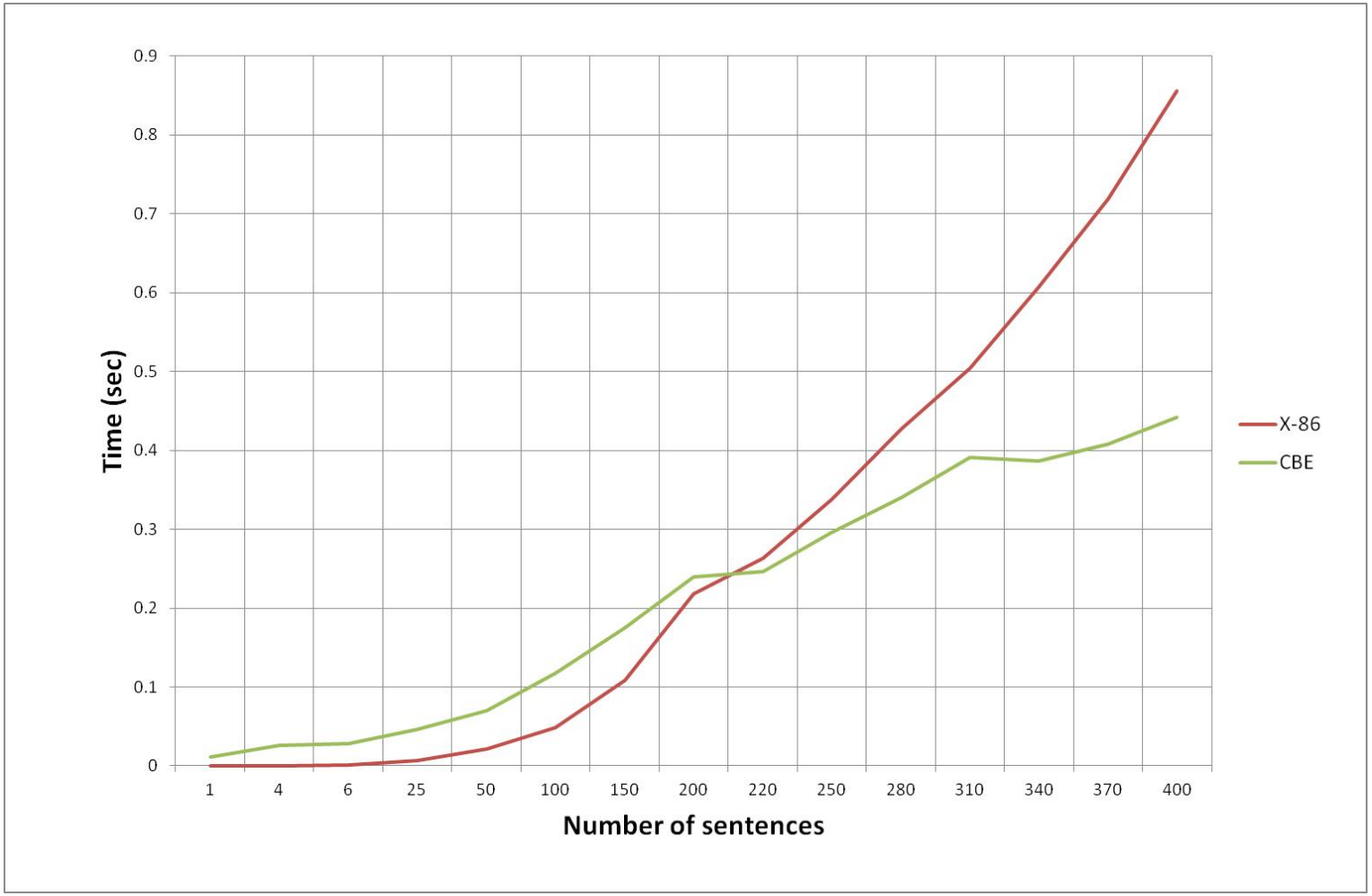
Implementation Modules

- Input in Unicode
- Mapping of Input
- Mapping to Phonemes
- Generation of Audio
- Combine and Play Audio
- Sound Repository

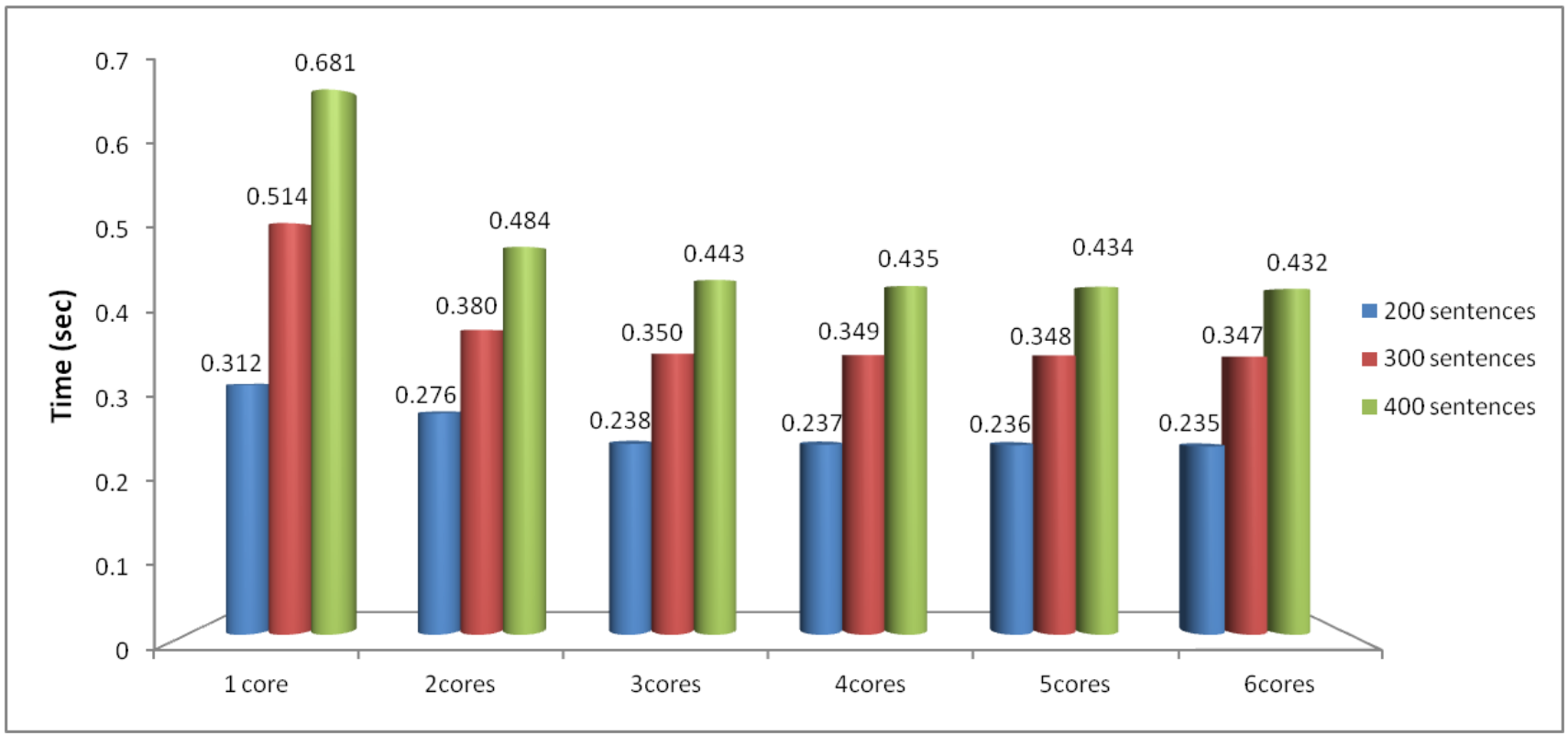
Results

- Able to generate fairly legible pseudo human audio output.
- Performance gain of the CBE over x86 was marked when the system was scaled to large input size.
- The degree of parallelism was also measured.

CBE vs x86


0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Time (sec)
1
4
6
25
50
100
150
200
220
250
280
310
340
370
400
Number of sentences
X-86
CBE

Degree of Parallelism



Challenges faced

- Lack of a JVM for heterogeneous multicore architecture.
- Withdrawal of support for CBE by IBM.
- Recording Halants(Half-Words) in our Speech repository

Conclusion

- System is suitable for applications which require high throughput.
- Modular structure of the system makes it adaptable for any similar architecture.

Future Scope

- Further work can be done on the DSP of the system to improve the prosody.
- System can be implemented on other multicore architectures like GPU etc.

Individual Contribution

- Gaurangi: Design, Documentation, Java Implementation
- Jayati: DB Creation and Curation, Java Implementation
- Puneeth: Background Study, Implementation on CBE, Integration of various modules
- Pushpendra: Implementation on CBE, Design, Sound library
- Sindhu: Testing and Performance analysis, Java Implementation

धन्यवाद