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|----------------------|---------------------|---------------------|---------------------|
| <b>DocNo:</b>        | CT-TEC002A-20140323 | <b>Pages:</b>       | 1/3                 |
| <b>Development:</b>  | OWLNEST Corp.       | <b>Module:</b>      | Paramount Indexer   |
| <b>Product Name:</b> | Paramount Indexer   | <b>Version:</b>     | 1.1.2               |
| <b>Delievery:</b>    | ??/??/2014          | <b>Author(s):</b>   | Minsu Ko; Hwon Ihm  |
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# 1 Product Introduction

## 1.1 Algorithm

Parallel algorithm is essential for tasks such as job sequencing, scheduling, channel assignment. Paramount Indexer utilizes fast parallel algorithm based on the shared memory model. Single instruction stream, multiple data stream model is used for this algorithm.

## 1.2 Characteristics

Parallel computing speedup is limited by the time needed for the sequential fraction of the processing time. If a single processor core is needed to process the data in 10 hours, and a particular fraction of one hour cannot be parallelized, while the remaining portion of 9 hours can be parallelized, then no matter how many processors we devote to a parallelized execution of the program, the minimum execution time cannot be smaller than the critical 1 hour.

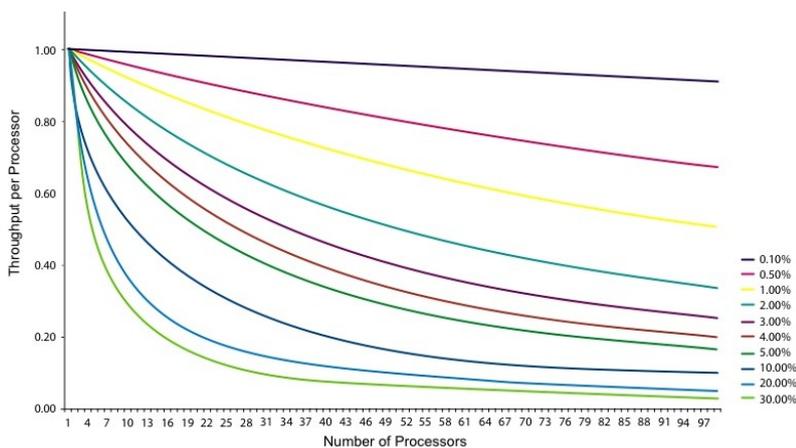


Figure 1

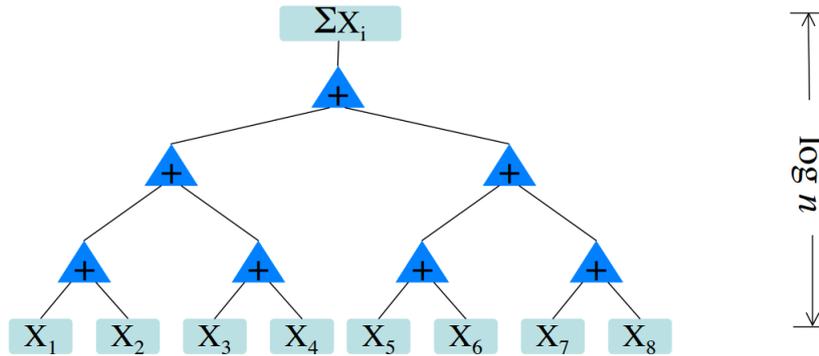
## 1.3 Time Complexity

Adding  $n$  numbers can be carried out in  $O(\log n)$  steps using  $O(n)$  processors. Connected components of a graph can be found in  $O(\log^2 n)$  steps using  $n^2$  processors.

# 2 Functional Specification

## 2.1 Dependencies

The following dependencies are required for the installation of the Paramount Indexer in a Linux(Debian/Redhat/CentOS/Ubuntu) 32/64bit environment: gcc version 4.6.3, Cython version 0.15.1 The installation of Owlneast nlpstat mathematical statistics library is also required. (provided upon installation)



**Figure 2:** Time complexity of parallel computing

## 2.2 Methods

- nGramTextDecoder(String inline) :
- nGramTextEncoder(FILE InputFile) :
- IndexMaker(FILE InputFile, List classification, Hash Index) :
- setPartition(int partition) :
- RunPartitioner(File InputFile, int PartNum) :
- PartitionerByCoreForBigData(FILE InputFile, int PartNum) :
- PartitionerByFileSize(FILE InputFile, int nCPU) :
- PartitionerByLineNumberCustomized(FILE InputFile, int PartLineSize) :
- PartitionerByCoreMapper(FILE InputFile, int PartNum) :
- PartitionerByCore(FILE InputFile, int PartNum) :
- readLine(FILE Segment) :
- Merger(String tail, String mergedFileName) :
- MergeCleaner(FILE InputFile) :
- findMostRecent(String directory, String partialFileName) :

## 3 Technical Support

### 3.1 Policy

Paramount Indexer must be installed by a technician from OwlneSt on site/via remote. Policies on the source code is not included in the Free Limited license.

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## Referências

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