CptS 411: Welcome to Parallelism 101

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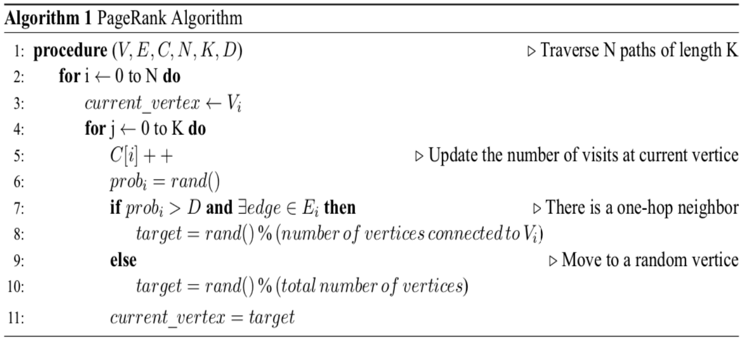

Algorithm 1 PageRank Algorithm

```
procedure $(V, E, C, N, K, D)$                              ▷ Traverse N paths of length K
    for i ← 0 to N do
        $current\_vertex \leftarrow V_i$
        for j ← 0 to K do
            $C[i]++$                                        ▷ Update the number of visits at current vertice
            $prob_i = rand()$
            if $prob_i > D$ and $\exists edge \in E_i$ then        ▷ There is a one-hop neighbor
                $target = rand()\,\%\,(number\ of\ vertices\ connected\ to\ V_i)$
            else                                            ▷ Move to a random vertice
                $target = rand()\,\%\,(total\ number\ of\ vertices)$
            $current\_vertex = target$
```

A Brief look into parallel programming regarding a Page Ranking algorithm

Proposed Approach

I will be targeting a shared memory approach to the algorithm, using the openMP system.

Mainly the project is focused on recognizing that randomly traversing through the graph should result in a convergence of rankings given enough trials.

Problem and challenges

PROBLEM STATEMENT:

Input: A graph G, represented as an adjacency list

Damping Factor D, path length K, N Trials

Output: Top five most heavily visited vertices in G

SIGNIFICANCE: Its anticipated that the end results will converge to the serial results. The reason is because they will have the most links.

CHALLENGES: Figuring out load balances, synchronization, conversion of sequential to parallelism.

Main Outcomes

We will be presented evidence in the usefulness of parallel programming through runtime, speedup, and efficiency analysis.

We will have a deeper understanding of the different ways parallel programming is used today.

Overall, we will be able to see and recognize many different things that have been parallelized today.

Hopefully this piqued your interest in parallel programming. See you out there!

Date Prepared