Pre Conference Tutorial on Parallel Data Analytics

organized during

INTERNATIONAL CONFERENCE ON INFORMATICS AND ANALYTICS

(ICIA ' 16)

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In the recent years the overall processing power is increasing, thanks to the new model of chip manufacturing. This model increases the overall processing power by adding additional processing cores to the microprocessor package. The processors will gradually come in heterogeneous configurations such as combination of high and low power cores, GPU's etc. These are being termed as many core architecture. Currently, only a very small proportion of developers have expertise in parallel programming. For computer science faculty this also requires a radical shift in the way computer science subjects are taught. Even though high performance computing area has programmers working in parallel applications for years, very few people have got the understanding of issues involved in developing multicore applications. What is very important is to begin the transition to "thinking in parallel" immediately, whether or not the mechanisms for doing so are ideal. This tutorial will survey why the parallel programming landscape is needed, summarize the OpenMP approach to multi-threading, and illustrate how it can be used to introduce parallelism into the lower-level curriculum.

The Graphics Processing Unit or GPU is nowadays a mainstream component in Scientific Computing and Data Analytics . For relatively little money one can have supercomputer performance. However, some extra work has to be done to make an ordinary sequential program suitable for use on the GPU. One of the most important tools for using GPUs is currently "CUDA" (Compute Unified Device Architecture). This is basically an extension to the C programming language, which can be used to program the GPU in an easy way.

Course Goal This tutorial will survey why the parallel programming landscape is needed, summarize the OpenMP approach to multi-threading, and illustrate how it can be used to introduce parallelism into the lower-level curriculum. Similar mechanisms using GPU's will also be discussed for Scientific Computing and Data Analytics.

Preliminaries

1. We recommend having a understanding of C programming language . Java or Python should be fine as well. Interest in iterative solvers and similar work loads can be helpful.

2. Participants should carry their laptops with GCC compiler and should have GPU's to practice Labs of advanced Session

Schedule

Session I - Introduction (Pre Lunch)
1.Why Parallel Computing? Need for parallel Computing 2. Multi-Core processors - Architecture and Design 3. Introduction to Threads, Thread Basics and Basic concepts of parallel programming 4. OpenMP- A Standard for Directive based Parallel Programming 5. Hands on / Demonstration of various programs on multicore machines

Session II - Advanced (Post Lunch)
6. GPU's for parallel Computing 7. GPU's Programming Model 8. Hands on / Demonstration of various programs on GPU useful for Data Analytics 9. GPU's for Deep Learning 10. Demonstration of Deep Learning Tool with Sample Programs

Instructor : Prof. Dr. Satyadhyan Chickerur

Note : The number of participants is restricted to **35**.

Registeration / Cost : Kindly contact the conference organizers.

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