Introduction to Programming in CUDA C

Timothy Lanfear
NVIDIA, UK

ABSTRACT

Starting with a background in C or C++, learn everything you need to know to begin programming NVIDIA GPUs in CUDA C.
The architecture of a graphics processing unit (or GPU), although conceived for rendering graphics also suits the needs of many more general applications that can be conceived in a data parallel form. We shall describe the underlying CUDA architecture used in NVIDIA GPUs and the associated programming model. The CUDA C programming language extends the syntax of C so that the data-parallel concepts of the CUDA architecture can be easily expressed. To guide the programmer towards extracting optimal performance from the hardware, we shall look at key aspects of the underlying hardware. The CUDA eco-system includes variety of tools, such as debuggers, performance profilers, libraries to support the programmer in his work.

Biography

Timothy Lanfear is a Solution Architect in NVIDIA's Professional Solutions Group, promoting the use of the NVIDIA Tesla™ computing solution for high-performance computing. He has nearly twenty years' experience in HPC, starting as a computational scientist in British Aerospace's corporate research centre, then moving to technical pre-sales roles with Hitachi, ClearSpeed, and most recently NVIDIA. He has a degree in Electrical Engineering and a PhD for research in the field of graph theory, both from Imperial College London.

Geographic Information Systems

J. Rodrigues, C. Rebelo and S. Madeira
Algarve University

ABSTRACT

There is now an increasing demand and use of spatial data with diverse purposes and application domains. Scientific areas as diverse as the Geosciences, Engineering, Economics, Sociology and Health, among others, increasingly use geographic information technologies. The Geographic Information Systems (GIS) technology is a potential tool for problems as modeling, analysis and simulation scenarios. The fact that the vast majority of the information is geo-referenceable, the spatial elements constitute an integrator allowing for correlation of different variables (before hardly comparable) and technological change are some of the aspects that allow us to understand this interest in geographic information science in general and the implementation and exploitation of geographic information systems in particular.

The implementation and operation of these systems are carried out using specific software, equipped with functionalities for editing data, spatial analysis and production of thematic maps. The main purpose of this tutorial is to show the key stages and operations in the creation and use of thematic geographic information systems. The presentation will include a strong practical component in the computer lab to operate several examples involving vector and raster data. WebGIS technology, digital surface models and 3D visualization will also be addressed.

Biography

Jose Rodrigues is professor of GIS at University of Algarve, Portugal. He holds a PhD degree in Discrete Mathematics (Computational Geometry) and his research activities are focused on computational methods and spatial algorithms for GIS and 3D/GIS applications.

Carla Rebelo is professor at the University of Algarve. She teaches undergraduate and postgraduate courses in the Geomatics field. She holds a Master's degree in Geographical Engineering from the University of Lisbon. She is currently an Geographical and Territorial Planning Ph.D Student and collaborator member at the e-GEO (UNL). Research interests are active remote sensing (LiDAR and SAR), digital photogrammetry and spatial data modeling for 3D GIS.

Sara Madeira teaches Geographical Information Systems (GIS), Photogrammetry and Surveying in the Department of Civil Engineering Institute of Engineering (University of Algarve) and collaborates on GIS projects. Promotes and teaches training courses and workshops such as the "Course of initiation to Geographic Information Systems, using free software: gvSIG". Currently attends Masters in Geomatics (Geographic Information Sciences Branch) at the University of Algarve.