

New Chip Produces Real-Time, High-Quality Graphics

German researchers have developed a chip that can render complex graphics in real time. The chip could allow individuals or small organizations to easily perform complex graphics work. Currently, they must either use a single computer, which takes a long time to produce sophisticated graphics, or they must spend the money to have a cluster of computers yield results quickly.

Saarland University scientists have developed an algorithm that lets a chip rapidly perform ray tracing. This approach is an alternative to the rasterization techniques—used in most of today’s graphics chips—that convert mathematical and digital information into a matrix of pixels.

Ray tracing is a sophisticated approach that renders images in 3D environments by tracing the paths that light rays would take through a scene and calculating the reflection, refraction, or absorption that would occur when they hit an object. Unlike rasterization, ray tracing yields the information needed to compute shadows, reflections, and other effects necessary for high-quality images.

However, ray tracing is resource intensive and thus, with complex graphics, takes a long time to work on a single PC or requires a cluster of machines to produce quick renderings.

The Saarland researchers developed an algorithm and chip architecture that let a ray-tracing processor render simple graphics at 20 frames per second and complex scenes at 10 fps using a 66-MHz field-programmable gate array (FPGA).

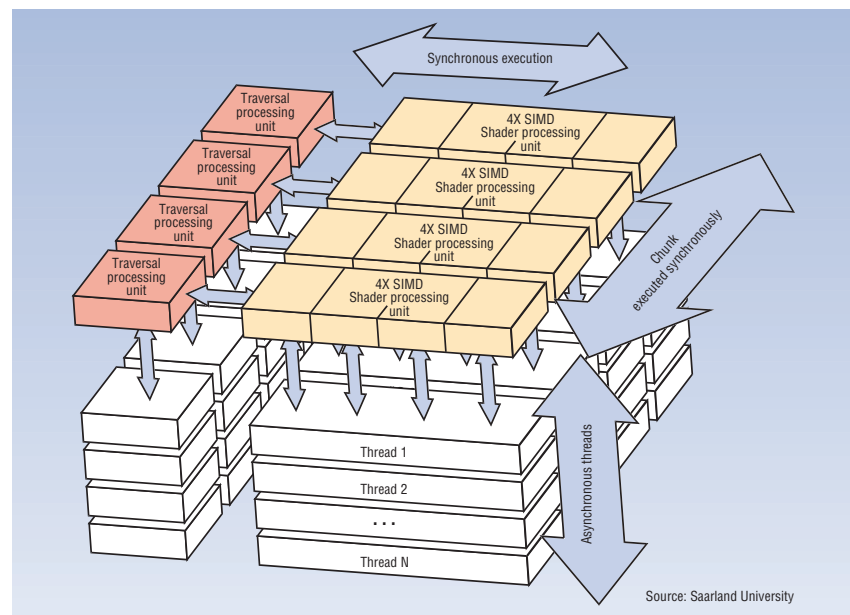
This is a tenfold increase over previous Saarland ray-tracing chips and would let a PC render complex scenes—in which many elements frequently move or otherwise change—in real time. Multiple FPGAs could be combined to increase performance further, noted Saarland Professor Philipp Slusallek.

He said the chip’s architecture is highly parallel and its dedicated circuits could execute the ray-tracing algorithms more quickly than a CPU could. The FPGAs were suitable for prototyping because of their programmability, he explained.

Now, Slusallek noted, the researchers are developing ray-tracing application-specific integrated circuits. He said the ASICs, although more expensive and complex to design and produce, would be faster and could host more functionality than the FPGAs. The researchers have already simulated an ASIC design that runs at more than 300 MHz, he added.

The Saarland team has shown that inexpensive hardware can support ray tracing with very impressive performance, according to Nathan Carr, a postdoctoral researcher at the University of Illinois at Urbana-Champaign. “The research gives a glimpse into where the future of graphics might lead,” he added.

Researchers have spun off a company, inTrace, to commercialize the new technology. Airbus, Daimler-Chrysler, Škoda Auto, and Volkswagen are already using Saarland ray-tracing software for design projects. ■



Saarland University's chip renders sophisticated graphics in real time via dedicated circuits, a specially developed algorithm, and an architecture that handles multiple threads in parallel. The shader processing units perform some graphics computations. The traversal processing units handle ray-tracing calculations. Ray tracing renders complex images in 3D environments by tracing the paths that light rays would take through the scene and calculating the reflection, refraction, or absorption that would occur when they hit an object.

Companies, Schools Encourage Joint Research Projects

In a move that could help remove long-standing obstacles to joint research in the US, four leading technology companies and seven universities have agreed to guide-

lines that, if adopted, would make software developed by collaborative projects freely available.

Cisco Systems, Hewlett-Packard, IBM, and Intel developed the plan

with Carnegie Mellon University; the Georgia Institute of Technology; the Rensselaer Polytechnic Institute; Stanford University; the University of California, Berkeley; the Universi-

Module Makes Walking Away with Mobile Devices Harder

Finnish researchers have developed a security system for mobile devices that recognizes the rightful owner's walking style and freezes the device upon detecting that someone with a different gait is carrying it, making it more difficult to use stolen mobile devices.

The technology, patented but not yet on the market, could discourage the theft of millions of laptops, cell phones, and other mobile devices each year, said Heikki Ailisto, research professor at Finland's VTT Technical Research Center (www.vtt.fi/?lang=en). It could even be used in such niche products as couriers' high-security suitcases.

VTT's technology uses a 0.1 inch x 0.1 inch x 0.1 inch, 50-gram module that can be integrated into mobile devices. The heart of the system is an accelerometer sensor, explained Ailisto.

During a half-day period, the accelerometer makes 3D measurements of the device owner's gait and records them in flash memory or some other type of storage. "The

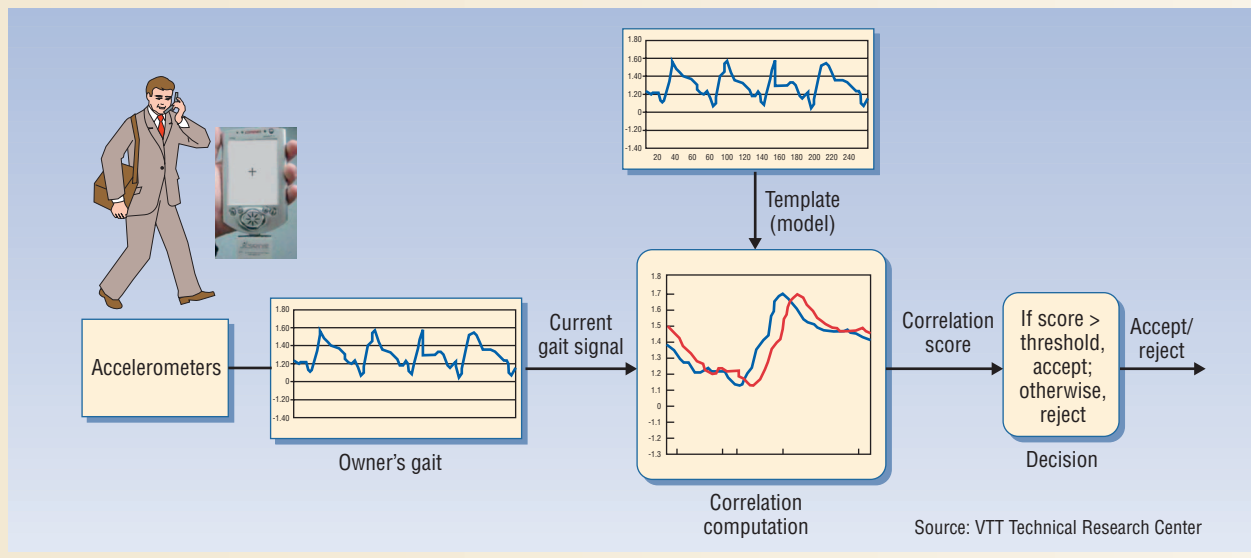
amount of data to be stored is reasonably small, on the order of a couple of kilobytes," Ailisto noted.

The technology then monitors the walking style of whoever is carrying the device and checks it against the saved information. If the gaits differ, the user must enter a password to operate all or some parts of the system, depending on the owner's preference.


This becomes an example of *two-factor authentication*, a security method widely recommended by experts because it provides more trust than just passwords. It requires something a user has, in this case a walking style, and something the user knows, in this case a password.

Because the technology confirms user identity and provides security as a background process, it is simple to use, Ailisto said.

VTT will not make or market the technology but instead is looking for a partner to manufacture and sell it, perhaps to device vendors. ■



Finland's VTT Technical Research Center has developed a security system for mobile devices that is based on the owner's walking style. An accelerometer first measures the device owner's gait. The system then stores the data. The technology subsequently monitors the walking style of anyone carrying the device and compares it to the owner's gait. If the difference is more than a threshold amount, the user must enter a password to operate the device.



ty of Illinois; and the University of Texas.

The National Science Foundation and other government agencies also participated, noted Gina Poole, IBM's vice president of innovation and university relations.

The new plan (www.kauffman.org/pdf/open_collaboration_principles_12_05.pdf) could help end the long legal intellectual-property arguments that typically delay research projects involving companies and universities by providing frameworks for contracts concerning the use of collaborative projects' results.

For example, the guidelines say that if a collaborative effort would use a participant's patented technology, the participant should, if possible, make the technology available without charge.

The proponents are still developing some of the plan's details and are currently focusing on open source software. When the software phase of the work is done, they plan to address other technology areas.

Concern about intellectual-property restraints on collaborative research has been growing, particularly among US academic and corporate scientists.

Some of the problems grew from US policies meant to encourage schools to make their research available for commercial uses and thereby stimulate innovation and economic growth, explained Lesa Mitchell, vice president for advancing innovation with the nonprofit Ewing Marion Kauffman Foundation (www.kauffman.org), which works to encourage entrepreneurship and education. An example is 1980's Bayh-Dole Act, which let universities patent federally funded research and license the resulting intellectual property to companies.

A key problem is the misperception that research is restricted to this patent-and-license model, said Mitchell. This limits cooperative research, she contended.

For example, intellectual-property concerns frequently entail lengthy ne-

gotiations between potential collaborators, all of whom want to make money from the results, explained Poole. This delays research, sometimes for so long that companies look outside the US for academic partners, she noted. The new guidelines are designed to offer templates that will facilitate the negotiations.

This could help US universities, which need to encourage collaborative research with companies because federal funding is shrinking, explained Lou Masi, IBM's manager of university relations. Companies would profit by building their own products based on the results of cooperative work, noted Poole.

The new guidelines should particularly help research in fast-moving fields such as information technology, predicted Professor Pradeep K. Khosla, dean of Carnegie Mellon's College of Engineering. "I'm very bullish about this," he added. "It will have a positive impact on the way we do IT research in this country."

Masi said IBM has already been contacted by schools interested in the new guidelines.

"We're hoping other companies and universities [worldwide] will adopt these principles," said Poole. "These templates are open for everyone's use." ■

Sploggers Make Money by Inflating Search Rankings

The many people trying to influence online search results for financial gain are increasingly turning to a new weapon: the spam blog, a fake Web-log site also known as a *splog*.

There has been an explosion of splogs, many of which use keywords and links to affect search engines' findings. Sploggers hope that getting their fake blog sites on the first page of search results will entice people to visit and click on the advertisements they contain.

The ads' sponsors pay all sites, even those that host fake blogs, for each click-through. Some splogs thus increase advertisers' expenditures, particularly because some sploggers click or hire other people for small fees to click on advertisements repeatedly just to generate revenue.

Splogs can inflate the number of blogs by as much as 18 percent and, on the average, comprise 5.8 percent of the total 26.3 million blogs, noted

David Sifry, CEO of Technorati, which operates a blog-tracking search engine.

Some splogs are written like articles, while others feature either gibberish or content copied from other sites.

Sploggers set up their schemes in several ways. First, they get either companies or advertising-placement services to place ads on the blog sites. Some free blogging sites pay people just to host ads on their blog.

The sploggers then load their fake blogs with keywords for topics that relate to the types of advertisements for which companies would pay high rates for click-throughs. The keywords could involve gambling, pharmaceuticals, or herbal remedies. A particularly popular topic is asbestos-related diseases for which attorneys are filing lawsuits, explained Sifry.

In some cases, sploggers have Web syndication services feed information about these topics to their blogs,

thereby giving them a large and steady supply of relevant keywords. A large number of keywords relating to a subject on a site can make search engines rate it as particularly relevant to the topic.

By creating multiple fake sites that link to one another, a splogger can generate the kind of link volumes that also improve their fake blogs' search engine relevancy ratings.

Sploggers are beginning to script bots to automate splog creation, vastly increasing the problem's scope. A recent major incident used Google's popular Blogger blog-creation tool and BlogSpot hosting service.

The splog explosion is due in part to blogging's increased popularity, said Sifry. Also, unlike e-mail programs, blogging services don't have tools that easily filter out their version of spam.

Because the problem is growing, blog-tracking services such as PubSub might decide to halt feeds from blog hosts that can't control the splogging problems they're experiencing, noted Bob Wyman, PubSub's chief technical officer and cofounder.

Jason Goldman, product manager for Google's Blogger, said, "We're very much aware of the problem and are working on several things. We don't, for example, index spamming blogs."

Google has implemented a feature that lets users easily inform the company about suspicious blogs. Google also works with Captcha technology, which prompts users to manually transcribe a set of distorted words that are displayed when creating blogs. This requires human interaction and eliminates automatic splog creation. ■

News Briefs written by Linda Dailey Paulson, a freelance technology writer based in Ventura, California. Contact her at ldpaulson@yahoo.com.

Editor: Lee Garber, Computer,
l.garber@computer.org



The 2006 IEEE International Conference on Information Reuse and Integration (IEEE IRI-2006) **Heuristic Systems Engineering**

September 16-18, 2006

Hilton Waikoloa Village, Waikoloa, Hawaii, USA

<http://www.sis.pitt.edu/~iri06>

Sponsored by the IEEE Systems, Man and Cybernetics Society

日本からの研究者様へ：リサーチの資料をご提出して下さい。

This year's conference theme addresses all aspects of **Heuristics** as they relate to the **Engineering** design and operation of scalable **Systems**. This theme was selected to reflect the ever-increasing role played by intelligent systems in the engineering design process as well as the ever-increasing need to integrate mathematical logics with heuristic search in complex industrial systems (e.g., heuristic solutions of the TSP). The common problem confronting such systems is the acquisition and evolution of heuristics. In particular, the evolution of heuristics can be formalized in the context of reuse and integration. The IEEE International Conference on Information Reuse and Integration will feature contributed as well as invited papers. Theoretical and applied papers are both included in this call. The conference program will include special sessions and open forum workshops. Several funding agency program directors – including NSF, ONR, et al. – will present an open panel discussion entitled, "Funding Opportunities in Information Reuse and Systems Engineering".

Instructions for Authors:

Papers reporting original and unpublished research results pertaining to the above and related topics are solicited (see conference website for details). Full paper manuscripts must be in English of length 4 to 6 pages (using the IEEE two-column template). Submissions should include the title, author(s), affiliation(s), e-mail address(es), tel/fax numbers, abstract, and postal address(es) on the first page. Papers should be submitted at the conference web site: <http://www.sis.pitt.edu/~iri06>. If web submission is not possible, manuscripts should be sent as an attachment via email to one of the Program Chairs on or before the deadline date of **May 1, 2006**.

The attachment must be in .pdf (preferred) or word.doc format. The subject of the email must be "IEEE IRI 2006 Submission." Papers will be selected based on their originality, timeliness, significance, relevance, and clarity of presentation. Authors should certify that their papers represent substantially new work and are previously unpublished. Organizers of prospective special sessions and panels are invited to submit proposals and should contact one of the Program Chairs directly as soon as possible, but no later than March 15, 2006. Paper submission implies the intent of at least one of the authors to register and present the paper, if accepted. Authors of selected papers that are also presented at the conference will be invited to submit expanded versions of their papers for review for publication in an approved special issue of the IEEE SMC Transactions, part C, on IRI to be published in 2008.

Important Dates:

March 15, 2006	Proposals for special sessions, panels, tutorials, and workshops
May 1, 2006	Paper submission deadline
June 10, 2006	Notification of acceptance
June 30, 2006	Camera-ready paper due
July 5, 2006	Author (paper presenter) registration
July 30, 2006	Advance (discount) registration
August 21, 2006	Hotel reservation (special discount)

General Chairs:

Stuart Rubin, SPAWAR Systems Center, (stuart.rubin@navy.mil)
Shu-Ching Chen, Florida International University, (chens@cs.fiu.edu)

Program Chairs

Du Zhang, California State University (zhangd@ecs.csus.edu)
Taghi M. Khoshgoftaar, Florida Atlantic University (taghi@cse.fau.edu)
James B. D. Joshi, University of Pittsburgh (jjoshi@mail.sis.pitt.edu)