

# Vaibhav Saxena

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## Profile

- 3 yrs of experience in all phases of software development cycle - design, development, testing, packaging, release process and maintenance.
- Solid background in developing cross-platform, high performance and scalable 3D graphics applications using graphics technologies e.g. OpenGL and different graphics APIs.
- Good experience in working and developing software on wide range of Computer Platforms, Linux (x86, x86-64, IA64), MS Windows (x86), SGI IRIX and Sun Solaris.
- Technology driven with ability to multi-task effectively.

## Education

### Indian Institute of Technology Delhi (IIT), New Delhi, India

- Five year Integrated Master of Technology in *Mathematics and Computing*, May 2003
- Coursework included all aspects (theoretical and practical) of Computer Science and Mathematics.
  - Recipient of GATE assistantship for securing All India Rank 21 with percentile of 98.07 in Graduate Aptitude Test in Engineering (GATE) 2002 in Mathematics.

### UP Intermediate and High School Board Allahabad, Uttaranchal, India

- Senior Secondary School Examination (XII), 1998  
Secondary School Examination (X), 1996

## Technical Expertise

<b>Computer Languages</b>	C, C++, Java, MATLAB, perl, SML, HTML, JavaScript
<b>Compilers/Dev. Framework</b>	GCC, ICC (Intel Compilers), VC++ (MFC), Visual Studio .NET
<b>APIs/Libraries/Tools</b>	OpenGL, OpenML, OpenSG, Xlib/GLX, Win32/WGL, Qt, Imlib
<b>Performance/Debugging</b>	Intel VTUNE, pfmon, gprof, gdb, valgrind
<b>Languages</b>	Hindi, English
<b>Computer Platforms</b>	<ul style="list-style-type: none"><li>▪ <b>Operating System and Hardware Architecture</b> - Windows, Linux (x86, x86-64, IA64) Redhat/FC/SUSE/SLES, IRIX, Sun Solaris.</li><li>▪ <b>System Structure</b> - <i>Single Processor</i> desktop system, Workstation level <i>SMP system</i> to high-end multiprocessor, multi-pipe <i>ccNUMA</i> based systems.</li><li>▪ <b>Processor</b> – Intel Pentium (IA32), Itanium2 (IA64) and AMD Athlon 64 / Opteron (x86-64)</li><li>▪ <b>Graphics Hardware</b> – ATI (FireGL, Radeon), NVIDIA (Geforce), both AGP and PCI Express based versions.</li></ul>

## Professional Experience

### Employment Summary

Darshan Solutions, Gurgaon, India	- Dec 2005 till present.
Silicon Graphics (SGI) Gurgaon, India	- April 2004 – Dec 2005
Read-Ink Technologies, Bangalore, India	- July 2003 – April 2004

**Darshan Solutions (A spin-off from SGI)**  
Software Consultant

Gurgaon, India  
Dec 2005 - Present

Darshan Solutions is a Spin-off Company from SGI and as part of this new company, for sometime I continued working on SGI's software products OpenGL Multipipe SDK (MPK) and OpenGL Volumizer. (Look under '*Silicon Graphics*' for overview about these APIs)

**Tasks and Responsibilities:**

- Adding support for SLES10 Linux (x86, x86-64 and IA64 version) to MPK and Volumizer.
- Responsible for porting MPK to 32-bit Windows.

**Keywords:** Visual Studio .NET, Win32/WGL programming, Xlib, GLX, OpenGL, SUSE RPM build  
**Platform** – Linux, Windows, **Language Used**– C/C++, VC++/Visual Studio

There were some other client specific projects:

**Client: SGI India**

Bangalore, India  
April - Aug, 2006

**Project Description**

The project was for one of the SGI's customers in India. SGI's customer wanted to interactively visualize their large Aircraft model data on SGI's multiprocessor-multipipe visualization system Onyx4. The aim of the project was to demonstrate that SGI's hardware can perform up to customer's expectation and can fulfill their requirements.

**Tasks and Responsibilities:**

- Developed application to *interactively* visualize customer's large Aircraft data managing multipipe processors, multiple graphics pipes and SGI's Scalable Graphics Capture (SGC) cards available on the system.

**Keywords:** SGC (Vanier) Cards, OpenML, speedshop, ogldebug, OpenGL Performer, runon/dplace, **Platform** – IRIX, **Language Used**– C/C++

**Client: A software product company in CAD/CAM/CAE Area**

Bangalore, India  
July 2006 - Present

**Project Description**

The Aim of the project is to find the replacement of Cosmo3D/OpenGL Optimizer API and move away to some other SceneGraph based API depending upon client's requirements.

**Tasks and Responsibilities:**

- Investigating about available SceneGraph APIs like OpenSG, OpenSceneGraph, nvSG etc and determining their pros & cons based on feature set needed by the client.
- Porting of some Cosmo3D/Optimizer based applications to other SceneGraph APIs demonstrating same features and capabilities in the ported application.

**Platform** – Windows, **Language Used**– VC++/Visual Studio .NET

**Silicon Graphics (SGI)**  
Member of Technical Staff (MTS)

Gurgaon, India  
April 2004 – Dec 2005

As part of SGI's Engineering Team in India, I was involved with following graphics software products:

## ❑ OpenGL Volumizer

OpenGL Volumizer is a cross platform, high level volume rendering C++ API for interactive, high quality, scalable visualization of large volumetric data sets.

### Tasks and Responsibilities:

- Responsible for managing various aspects of the API
  - Extending the API by developing new and desired features
  - Adding support for different and newer platforms (Linux RHEL/FC/SUSE/SLES and Windows) for keeping the API cross-platform
- Ported the Volumizer API to Windows from Linux. This task included
  - Debugging and helping with port of core Volumizer Library.
  - Porting existing sample applications and writing new sample applications.
  - Providing a build and test environment for sample code.
- Managed Volumizer release related work, which involved
  - Fixing platform specific build and packaging issues.
  - Providing input to technical writers for updating end user documentation based on the features added and other changes made in the product.
  - Providing input to product release team to ensure accuracy of public download web page for the product.
- Performed optimizations and added new features to a Volumizer based volume rendering demo application, which was used to demonstrate scalability features of SGI's *Multipipe Visualization System 'Prism'* during its launch at IEEE Visualization 2004 conference at Austin, Texas, US.

**Keywords:** VC++, MFC, Win32/WGL Programming, OpenGL, ICC (Intel C/C++ Compilers), Visualization, Volume Rendering, AGP, PCI Express, GPU Programming, GLSL, Performer, VTK, Xerces, gSOAP

**Platform** – Linux, IRIX and Windows, **Language Used**– C, C++, VC++/Visual Studio .NET

## ❑ OpenGL Multipipe SDK

OpenGL Multipipe SDK (MPK) is an API that provides a C/C++ framework for developing scalable graphics applications.

### Tasks and Responsibilities:

- Added new features and fixed bugs in MPK for better performance and scalability on IA64 Linux based SGI's multiprocessor and multipipe *Prism Visualization System*.
- Added support for 32-bit Linux to MPK
  - Ported core library, fixed build issues, tested the software and fixed bugs.
  - Added FLEXIm based Licensing for 32-bit Linux version of the software.
- Responsible for managing MPK 3.2 release work for 32-bit and IA64 Linux
- Contributed to MPK's IEEE Visualization 2005 conference paper "*OpenGL Multipipe SDK: A Toolkit for Scalable Parallel Rendering.*"

**Keywords:** Xlib, GLX, OpenGL, GLUT, runon, cpuset, libnuma, multipipe, multiprocessor, multicore, scalability, FLEXIm, RPM, compositor, ccNUMA, SMP, cscope, amd64, Perforce

**Platform** – Linux and IRIX, **Language Used**– C, C++

## Read-Ink Technologies Pvt. Ltd.

Software Engineer

Bangalore, India  
July 2003 – April 2004

An ex-Stanford professor had started this R&D Company. The company used to work in the field of *online handwriting recognition*.

**Tasks and Responsibilities:**

The online handwriting recognition system used to work in various modules analyzing features and characteristics of a handwriting. My responsibilities included:

- Design, development and analysis of some of the modules in the recognition system.
- Determination of Error and Accuracy estimates of these developed modules.

**Platform** –Windows, **Language Used**– Matlab, VC++

## Project Experience

**Girona Graphics Group, Universitat de Girona**

Volume Visualization Intern

Girona, Barcelona, Spain

May 2002 - July 2002

**Project** – Volume Visualization of Medical Imaging Dataset using 3D Texture Mapping.

**Tasks and Responsibilities:**

- Designed and implemented an application along with its GUI to obtain the 3D volume visualization of medical imaging (CT/MRI scan) raw dataset using the 3D texture mapping in OpenGL.
- Project involved all the software development steps like problem definition, design, analysis, implementation, testing etc.
- Implementation was done in C++ and GUI was created using Qt library.

**Platform** – Linux and Windows, **Language Used**– C/C++, VC++/Visual Studio