Stephen Brooks

Senior Software Engineer (embedded programming and optimization).

Springfield, OH - Email me on Indeed: indeed.com/r/Stephen-Brooks/dd623f1a2d1503e6

I've done a lot of SIMD optimization work in the video/audio codec industry. I also enjoy embedded, low-level programming. However, if you think my resume signals skills you are looking for and isn't strictly embedded programming or optimization, let's talk.
Willing to relocate: Anywhere
Authorized to work in the US for any employer

WORK EXPERIENCE

Software Engineer (Optimization)

Freelance - November 2015 to November 2015

-- Optimized some of Google's VP9 scaling code (written in C) with Intel SIMD intrinsics. This code is in now part of the VP9 code repository.

Senior Software Engineer

Vidyo, Inc - Hackensack, NJ - January 2012 to March 2015

-- Optimized H.264 AVC/SVC and H.265 HEVC/SHEVC encoder/decoder software using SIMD techniques with Intel's compiler intrinsics. SIMD technologies included SSE2, SSSE3, SSE4.1. Optimized software included block-based transforms, 2D spatial filters, temporal filters, intra prediction, deblocking, motion estimation and compensation, the H.265 SEVC SAO (sample-adaptive offset) filter, resampling filters (down- and upsampling), background detection, distortion metrics such as sum-of-absolute-differences, sum-of-squared- differences, and the Hadamard transform, block-based arithmetic functions, and other video-related processes.
-- Performance analysis and benchmarking of video codec software for 32-bit and 64-bit x86 processors running Windows, Linux, or Mac.
-- Optimized H.265 AVC/SVC functionality for the Nintendo Wii U (PowerPC).
-- Created DirectX-based Windows application which played YUV video on two monitors in sync without tearing.
-- Audio processing optimization.
-- Wrote and maintain unit test software for optimized codec functionality.
-- Wrote utility scripts in Perl and Lua.
-- Devised and implemented instruction-set-extension-based function pointer table scheme to handle dispatch of optimized functions on different CPUs with different ISA extension availability.
-- Assisted in hardware design of video filter encoder front end.
-- Wrote custom JPEG library and optimized using Intel SIMD technology.
-- Wrote YUV-space pixel change detection software for Microsoft Windows RDP.
-- Utilized MS Visual Studio 2008/2010/2013, CVS, WinCVS, WinMerge, Perl, Lua, YUV playback and analysis software, video bitstream playback and analysis software, AMD CodeXL, Intel SDE (Software Development Emulator).

Developer

SkyHawke Technologies, LLC - Ridgeland, MS - September 2008 to August 2010

-- Developed C++ hardware-agnostic software platform for running SkyHawke's GPS-based graphical golf rangefinder application. Platform included graphical display of text, polygons, images, and other graphics primitives; low-level functionality such as LCD drivers, button input, serial I/O; animation engine.
-- Optimized graphics engine written in C++ with ARM and x86/MMX optimizations.
-- Transitioned software platform from C++ to the Lua scripting language.
-- Utilized MS Visual Studio 2008, SVN (Subversion), IAR Workbench, Lua.

Senior Support Engineer Contractor

Qualcomm, Inc - Boulder, CO - February 2008 to May 2008

-- Analyzed code and fixed bugs in Windows Mobile Graphics driver.
-- Wrote optimized bit blit which handled RGB888 to RGB565 format conversion.
-- Used industry benchmarks and tests to measure graphics driver performance.
-- Utilized Platform Builder, Perforce, Notepad++, Trace32 JTAG, Microsoft CETK (LTK),SPB Benchmark.

Research Contractor

Thomson, Inc - Princeton, NJ - March 2005 to September 2007

-- Ported and speed optimized H.264 video decoder for a Symbian OS SmartPhone (Nokia 6630) on ARM hardware platform (ARM926EJ-S).
-- Developed an ARM assembly language translator in C++ to convert from GAS (the GNU assembler) syntax to ARMASM syntax.
-- Implemented speed-optimized ARM assembly language YUV-to-RGB565 color conversion for cell phone video player application.
-- Implemented YUV-to-RGB color conversion in Microsoft DirectX Pixel Shader language version 3.0.
-- Implemented the luma subpixel interpolation filter from the H.264 specification in MS Pixel Shader language 3.0.
-- Implemented speed-optimized color conversion, pixel-replication scaling, and bilinear up-sampling filter using Intel wirelessMMX (wMMX) technology for a PocketPC video player application (Windows Mobile 2003 and WM5).
-- Speed optimized motion compensation, deblocking filter, and other critical H.264 video decoding algorithms using wMMX.
-- Speed optimized film grain technology PC application using MMX. (film grain is an optional item the HD-DVD spec).
-- Speed optimized AAC (Advanced Audio Codec) using wMMX and division optimization.
-- Speed optimized real-time, multithreaded software H.264 encoder PC application.
-- Wrote a library which interfaced with Windows to determine the CPU time of a process in a multiprocessor system.
-- Speed optimized motion-compensated temporal (and spatial) filtering in PC filtering application.
-- Wrote Perl script to translate from NASM (the netwide assembler) syntax to MASM (the Microsoft assembler) syntax.
-- Performed speed optimization research of H.264 video decoder for Texas Instruments DaVinci ARM+DSP Multimedia system-on-chip. This included writing a Perl script to roughly simulate the instruction cache effects of calling

functions considering the size and placement of these functions in memory.
-- Other related activities such as debugging C/C++/assembly, benchmarking, documentation, codec conformance testing, etc. on H.264 decoder, AAC decoder, multimedia player and real-time, multi-threaded software H.264 encoder applications.
-- Utilized MS Visual Studio .NET 2005, MSVS .NET 2003, MSVS 6, ARM RVDS (RealView Developer Suite consisting of ARM Debuggers, ARM compiler/ assembler/linker), Metrowerks CodeWarrior, Symbian OS Series 60 dev kit (including GCC), CVS, Subversion(SVN), Intel C/C++ compiler, WindowsXP, Linux, Cygwin, Perl, Intel VTune (both PC and PocketPC), MS Embedded Visual C++ 4.0, AAC audio conformance test tools.

Freelance

GameBoy Advance - April 2003 to October 2004

Developed Pro-Motion plugins for GameBoy Advance game development. These plugins were used for map development in the Game Boy Advance titles "Robotz" and "Lego Star Wars"
-- Utilized Microsoft Visual Studio .NET, C++, DDE (Dynamic Data Exchange), Pro Motion plugin architecture.

GameBoy Advance Programmer

Amaze Entertainment - Kirkland, WA - September 2002 to April 2003

Programmer on baseball game: implemented menu logic and effects, managed integration of data into the game, implemented save-game system, code optimization (ARM7).
-- Developed tool for player data integration with game code, developed animation tool plugin which exports graphics to Game Boy Advance hardware.
-- Developed ARM7 assembly language code profiler for in-studio use.
-- Programmer on James Bond title: implemented menu logic and effects, maintained makefile system.
-- Utilized C, MS Visual Studio 6, ARMv4 assembly, GCC, GAS, makefiles, linker scripts, embedded programming, debugging, 2D graphics,code optimization, team environment, fast-paced environment, emulator, profiler, user interface, fonts, sample-based audio, battery-backed SRAM, Dynamic Data Exchange, C++, Pro Motion.

Lead GameBoy Advance Programmer

Handheld Games, LLC - Mill Creek, WA - November 2000 to May 2001

Coordinated team of artists and designers as pertains to the programming aspect of Game Boy Advance application development. Worked personally with publisher representatives.
-- Developed multi-layered, scrolling background map metatile engine for GameBoy Advance.
-- Developed simple, object-based adventure/mystery game engine with dynamic object interaction including dialog, highlighting, animation, state manipulation, inventory, and depth-based scaling for Game Boy Advance.
-- Developed multi-language, character font-based text engine which supported any number of languages for Game Boy Advance.
-- Developed script-based tool to construct data for metatile engine which scanned a graphic image and created necessary tile sets, metatile sets, map data, and in-game data structures.

-- Developed script-based tool to accommodate sprite construction and optimization which scanned an animation file, frame by frame, to find the
largest encompassing bounding box as well as optimize the frame for the smallest number of composite hardware sprite objects. Tool also searched
each frame for handling point (registration point) and could detect specially
set rectangular regions within each frame for custom use by the application
(collision detection, etc.). Tool also output in-game data structures.
-- Developed tool to parse a UNICODE text file into internal in-game data
format. Included ability to parse UNICODE Latin, some Extended Latin,
Hiragana, and Katakana UNICODE values.
-- Integrated Factor 5's MusyX sound system into product.
-- Utilized C, MS Visual Studio 6, ARMv4 assembly, GCC, GAS, makefiles, linker
scripts, embedded programming, debugging, 2D graphics, code optimization,
team environment, fast-paced environment, emulator, profiler, user interface,
fonts, sample-based audio, battery-backed SRAM, Dynamic Data Exchange, C++,
UNICODE, client interaction, leadership, windows bitmaps (BMPs), Pro Motion.

GameBoy Color/GameBoy Advance Programmer

Vicarious Visions, INC - Troy, NY - December 1999 to October 2000

Lead Programmer/Lead Designer/Project Lead on Barbie Magic Genie
Adventure for Game Boy Color. Designed game mechanics and story.
Added functionality to existing game engine: dialog, collectible item
interaction, real-time radial lighting effect around player. Also coded
password system and all in-game objects, title effects. Coordinated team of artists and programmers and also interacted with publisher/client.
-- Programmer on Spider-Man for Game Boy Color. Coded approx. half of the AI including bosses, coded the cut scene engine for story
advancement, coded password system, aided in design of object oriented
AI engine.
-- Two months as Lead Programmer for Spider-Man: Mysterio's Menace for
GameBoy Advance. Developed multi-layered scrolling engine and object oriented system for AI.
-- Utilized C, MS Visual Studio 6, ARMv4 assembly, GCC, GAS, makefiles,
linker scripts, embedded programming, debugging, 2D graphics,
code optimization, team environment, fast-paced environment,
emulator, profiler, user interface, fonts, sample-based audio,
battery-backed SRAM, Dynamic Data Exchange, C++, client interaction,
leadership, game design, story writing, girls software, z80 assembly

Intern

Engineering Animation, INC - Ames, IA - June 1999 to August 1999

-- Worked on film-noir-style black-and-white mystery game for PC.
-- Used proprietary in-house scripting language, scripted interactions between player character and in-game objects/characters including dialog.
-- Wrote bilinear filter code (intel x86 assembly).