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INVENTIONS Awarded Patents

US Patents Granted

- **8,244,003 - CBF Crude But Fast Noise Reduction** – solely by AUTHOR 2009 for Graphcomp. Fast despeckler tuned for haar-like detection. Assigned to Apple.
- **8,244,004 - YUV Chroma Score** – solely by AUTHOR 2010 for Apple. Analogous to IHC, using UV coordinates for faster sorting and searches. Assigned to Apple.
- **8,254,646 - UV Skin Detection** – solely by AUTHOR 2010 for Apple. Analogous to CSD, using UV coordinates optimized for digital video. Assigned to Apple.
- **8,315,461 - Light Source Detection from Synthesized Objects** – solely by AUTHOR 2010 for Apple. Determining light source vectors based on surface normals.. Assigned to Apple.
- **8,326,001 - Low Threshold Face Recognition** – solely by AUTHOR 2010 for Apple. Face recognition optimized for low-security use cases. Assigned to Apple.
- **8,358,812 - CSD Chromatic Skin Detection** – solely by AUTHOR 2009 for Graphcomp. Optimized skin-tone filtering; reduces false positives and improves detection performance. Assigned to Apple.
- **8,358,813 - Face Noise Reduction** – solely by AUTHOR 2009 for Graphcomp. Fast despeckler tuned for face detection. Assigned to Apple.
- **8,451,346 - Optically Projected Mosaic Rendering** - created by AUTHOR 2010 for Apple. Correlation-less panoramic stitching. Assigned to Apple.
- **8,559,708 - UV-based Skin-tone Filtering** - created by AUTHOR 2010 for Apple. Fast segmentation for face/body detection. Assigned to Apple.
- **8,660,323 - Human Presence Detection** - created by AUTHOR 2009 for Graphcomp. Fast detection of likely skin tone presence. Assigned to Apple.
- **8,824,747 - Hue-based Skin-tone Filtering** - created by AUTHOR 2009 for Graphcomp. Fast segmentation for face/body detection. Assigned to Apple.
- **8,855,422 - Lighting Attenuation based on Synthesized Objects** - created by AUTHOR 2010 for Apple. Identify light source locations to attenuate lighting artifacts for object recognition. Assigned to Apple.
- **9,076,029 - Low Threshold Face Recognition extension** - created by AUTHOR 2010 for Apple. Extension of AUTHOR's patent 8,315,461. Assigned to Apple.
- **9,437,035 - Light Source Detection from Synthesized Objects extension** - created by AUTHOR 2010 for Apple. Extension of AUTHOR's patent 8,315,461. Assigned to Apple.
- **10,733,797 - Skeleton Estimation From Body Mesh** - supported by AUTHOR 2017 for Naked Labs. Assigned to Naked Labs.

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Source code and visual presentation

- **VIEWER** - Copyright **1973-1974** by AUTHOR. 3D perspective viewing system with hidden line removal and 3D vector fonts. Written in APL for the IBM 360 platform and Tektronix display systems.
- **PRMLIB** - Copyright **1982** by AUTHOR. Virtual graphics programming library. Written in FORTRAN for the PRIME/PRIMOS platform and Tektronix display systems.
- **gcDECLIB(tm)** - Copyright **1986** by AUTHOR. Virtual graphics and windowing programming library. Written in FORTRAN for the VAX/VMS platform and Tektronix display systems.
- **gcDOSLIB(tm)** - Copyright **1986-1990** by AUTHOR. Virtual graphics and windowing programming library. Written in MASM for the DOS platform, supporting MDA, CGA, EGA, VGA, SVGA and TARGA display adapters.
- **gcVIEW(tm)** - Copyright **1986** by AUTHOR. 3D perspective viewing system. Written in FORTRAN and gcDOSLIB.
- **gcVIS(tm)** - Copyright **1986** by AUTHOR. Automated 2D to 3D conversion package. Written in FORTRAN for the VAX/VMS platform.
- **gcTERRAIN(tm)** - Copyright **1986** by AUTHOR. Automated 2D contour to 3D terrain model conversion package written in FORTRAN for the VAX/VMS platform.
- **gcSLIDE(tm)** - Copyright **1987** by AUTHOR. Vector-based slide presentation system. Written in MASM and gcDOSLIB.
- **gcTGRPCX(tm)** and **gcTGRPIC(tm)** - Copyrights **1987** by AUTHOR. Optimized TGRAF to PCX/PIC conversion utilities. Written in MASM and gcDOSLIB.
- **gcSCANBIF(tm)** - Copyright **1988** by AUTHOR. Optical scanning to GDS CAD conversion package. Written in FORTRAN for the VAX/VMS platform.
- **gcSCAN(tm)** - Copyright **1988** by AUTHOR. DMA-based optical scanning, display and compression system. Written in MASM and gcDOSLIB.
- **gcCOGO(tm)** - Copyright **1989** by AUTHOR. HP to PC COGO file conversion package. Written in MASM and gcDOSLIB.
- **gcVIEW(tm)** - Copyright **1990** by AUTHOR. 3D perspective viewing system. Written in C and MSW SDK.
- **MUTT(tm) Lite** - Copyright **1994-1995** by AUTHOR; Trade Mark held by AUTHOR. MUD client with hotkey, automated scripting and trigger support. Written in C and MSW SDK.
- **MUTT(tm) Live** - Copyright **1994-1995** by AUTHOR; Trade Mark held by AUTHOR. MUTT(tm) Lite, plus ANSI color, multi-media and animation support. Written in C++ and MSW SDK.
- **MUTTAPI(tm)** - Copyright **1994-1995** by AUTHOR; Trade Mark held by AUTHOR. A MUD DLL and SDK. Written in C++ and MSW SDK.
- **MUTT(tm) Elite** - Copyright **1994-1995** by AUTHOR; Trade Mark held by AUTHOR. MUTT(tm) Live, plus MUTTAPI(tm) support. Written in C++ and MSW SDK.
- **MUTT(tm) Esprit** - Copyright **1994-1995** by AUTHOR; Trade Mark held by AUTHOR. 3D MUD client. Written in C++ and MSW SDK.
- **gcMIME(tm)** - Copyright **1996** by AUTHOR. C API and C++ Class Libs for Multipart-MIME, Base64 encode/decode, UUENCODE and UUDECODE support.
- **gcMATX(tm)** - Copyright **1996** by AUTHOR. C API and C++ Class Libs for n-dimensional matrix arithmetic; includes determinant and matrix inversion.

- **Grafman Filters -- Render:MEDIA(tm)** - Copyright **1996** by AUTHOR; Trade Mark held by AUTHOR. Photoshop plugin filter module that provides 7 image-processing filters and their inverses.
- **RFC Indexer & Search Engine** - Copyright **1996-1997** by AUTHOR. A Web-enabled indexer and search engine optimized for RFC keyword searches.
- **Java Navigator** - Copyright **1997** by AUTHOR; Trade Mark held by AUTHOR. Java applet controls for navigation.
- **MUTT-Java** - Copyright **1997** by AUTHOR; Trade Mark held by AUTHOR. A Java MUD Client with interactive web support.
- **gcPoser(tm)** - Copyright **1997** by AUTHOR; Trade Mark held by AUTHOR. A Java/VRML/EAI Avatar poser.
- **VRML/FS** - Copyright **1997** by AUTHOR; Trade Mark held by AUTHOR. An ISAPI plugin that supports 3D/VRML navigation of file systems.
- **gcDBX(tm)** - Copyright **2001** by AUTHOR; Trade Mark held by AUTHOR. A collection of dbi-based, abstracted DB object classes and subclasses. Written as **Perl** modules.
- **gcAuth(tm)** - Copyright **2003** by AUTHOR. A object class that implements an optimized, secure, self-validating session key, with a specified lifespan between renewals. Requires no Cookies, nor a DB-hit after initial authentication. Written as a **Perl** module.
- **gcSite(tm)** - Copyright **2003** by AUTHOR. A base class that that creates a brandable web engine, which partitions code, templates and content - allowing engineers, designers and artists to work independently. Templates may be applied to multiple sites; multiple templates can be applied to a given site. Leverages CSS; requires no Cookies, or other client-side scripting. Written as a **Perl** module.
- **gcData(tm), gcMembers(tm), gcCommunity(tm), gcAdmin(tm)** - Copyright **2003** by AUTHOR. Subclasses of gcSite, which provides (respectively) a) data read/right (via XML) and gcDBX, b) authentication and session management (via gcAuth), and access control, c) bulletin boards, messaging and d) tools for creating, editing, managing content. Written as **Perl** modules.
- **gcSoap(tm)** - Copyright **2003** by AUTHOR. Abstracts local object/method calls with remote object/method calls via SOAP. Written as a **Perl** module.
- **wabLookup** - Copyright **2003** by AUTHOR. Validates an email address from distributed Outlook Express WAB addressbooks on an intranet; used for "whitelist" validation. Written in **C++** as a DLL/COM object.
- **wabFetch** - Copyright **2003** by AUTHOR. A distributed object that updates a central DB with email addresses from Outlook Express WAB addressbooks from an entire intranet. Written in **C++** as a DLL/COM object.
- **gcSpam(tm)** - Copyright **2003** by AUTHOR. A object class that provides methods to effectively block spam through the use of blacklists, whitelists and heuristic graylists. Written as a **Perl** module.
- **gcString(tm)** - Copyright **2003** by AUTHOR. A utility class that provides string tools; in particular, it provides a Diff method to determine the delta between the content of two files. Written as a **Perl** Module.
- **gcKeyword(tm)** - Copyright **2003** by AUTHOR. An object class that digests a body of text and performs a statistical analysis on word frequency - for use in indexing the content of text files. Written as a **Perl** module.
- **gcRepo(tm)** - Copyright **2003** by AUTHOR. A base class that provides methods to transfer deltas to/from a file repository. Written as a **Perl** module; uses gcSoap.
- **gcSync(tm), gcPush(tm), gcPull(tm)** - Copyright **2003** by AUTHOR. Respectively subclasses gcRepo to provide differential syncing, pushing and pulling of files, to/from a repository. Written as **Perl** Modules.

- **gcPlaylist(tm)** - Copyright **2004** by AUTHOR. Subclasses gcRepo to generate a random list of files from a repository that fit within a specified footprint, creates a differential list based on what already exists on the client, downloads the new files and constructs a playlist for use with a media player. Written as a **Perl** Module; works on a PocketPCs.
- **gcUUID(tm)** - Copyright **2004** by AUTHOR. An object class that generates universally unique IDs. Reproducible UUIDs can be generated from user parameters; randomly unique UUIDs can be automatically generated from NIC, time and random keys. Provides a GenGUID method which produces MS-compliant GUIDs. Written as a **Perl** module.
- **gcTV(tm)** - Copyright **2004** by AUTHOR. An object class that implements TiVo's Home Media Option Music & Photos, and Discovery specifications. Implements image caching, rotation and scaling, and song streaming. Written as a **Perl** module.
- **TiVoBeacon, TiVoServer** - Copyright **2004** by AUTHOR. Respectively, a UDP discovery server for TiVo recorders, and a lightweight HTTP server that support queries and media serving for TiVo recorders. Written in Perl, using **gcTV**.
- **gcSpooler(tm), gcJob(tm), gcMailer(tm)** - Copyright **2005** by AUTHOR. Respectively provides a) a spooler base class, b) a job management subclass and c) an email-specific job class for sending email notification. Written as **Perl** modules.
- **gcNewsLetter(tm)** - Copyright **2005** by AUTHOR. Subclasses of gcAdmin(tm), which provides an interface for uploading/managing mail groups and to send email to groups of members. Written as **Perl** modules using gcDBX(tm).
- **gc3D(tm), gcMaterial(tm), gcTransform(tm), gcMesh(tm), gcPrimitives(tm), gcNodeFormat(tm)** - Copyright **2005** by AUTHOR. Classes supporting the generation of 3D scene graphs and primitives. Written as **Perl** modules.
- **gcVRML(tm), gcNVSG(tm), gcDirectX(tm)** - Copyright **2005** by AUTHOR. Subclasses of gc3D(tm), which provides output for (respectively) VRML, NVSG and DirectX Written as **Perl** modules.
- **Video3D** - Copyright **2005** by AUTHOR. GPU technology to alter camera angles in real-time, within post-process video. Written DirectX/C++.
- **gcCaptcha(tm)** - Copyright **2007** by AUTHOR. 3D Captcha and authentication system. Written as **Perl** modules.
- **OpenGL::Server** - Copyright **2007** by AUTHOR. Scalable, distributed OpenGL server. Written as a **Perl** module.
- **POGL(tm) OpenGL-Image** - Copyright **2007-2008** by AUTHOR. Optimized imaging abstraction for OpenGL. Written in C.
- **POGL(tm) OpenGL-Shader** - Copyright **2007-2008** by AUTHOR. OpenGL shader abstraction. Written in C.
- **gcStitcher(tm)** - Copyright **2008** by AUTHOR. GPU-based panoramic stitcher used to harvest video scenegraphs. Written in POGL.
- **Clydomania(tm)** – Copyright **2009** by AUTHOR. GPU-based kaleidoscope iPhone app. Written in Objective-C.
- **BugEyes(tm)** – Copyright **2009** by AUTHOR. iPhone app that superimposes OpenGL eyes over faces from a camera photo, using haar-like detection of faces/feature. Written in Objective-C.
- **Tiveras(tm)** – Copyright **2009** by AUTHOR. TiVo Home Media server implemented on an iPhone that shares peer-to-peer photos. Written in Objective-C.
- **Grafman's Media 1(tm)** – Copyright **2009** by AUTHOR. A suite of imaging filters implemented on an iPhone app. Written in Objective-C.

- **Stitcher** – Copyright **2009** by AUTHOR. GPU-based panoramic stitcher implemented as an iPhone app. Written in Objective-C.
- **gcHaar(tm), gcObjectDetect(tm), gcFaceDetect(tm)** – Copyright **2011** by AUTHOR. GPU-enhanced 2D object detector for mobile devices, desktop and server-side applications. 2x-17x faster than OpenCV, depending on optimization features. Written in portable C, optimized for iOS (iPhone/iPad).
- **Heximetric Color System** - Copyright **2012** by AUTHOR. A parametric method for defining color spaces.
- **pLUV** - Copyright **2012** by AUTHOR. A heximetric color space that approximates LUV.
- **cHL** - Copyright **2012** by AUTHOR. A dynamic color model based on the pLUV color space. Chroma defines the significance of the Hue and Luma components.
- **pLWC** - Copyright **2012** by AUTHOR. A heximetric color space based on Luma, Wavelength distribution and Chroma.
- **cWL** - Copyright **2012** by AUTHOR. A dynamic color model based on the pLWC color space. Chroma defines the significance of the Wavelength and Luma components.
- **RayCaster** - Copyright **2013** by AUTHOR. GPU-enhanced medical imaging mobile application. Written in Objective-C using OpenGL.
- **Shnozzle(tm)** - Copyright **2013** by AUTHOR. GPU-enhanced facial distortion mobile application. Written in Objective-C using OpenGL.
- **MedChroma(tm) Render** - Copyright **2014** by AUTHOR. 3D rendering farm for scalable 3D GPU-enhanced medical imaging. Using OpenGL.
- **MedChroma(tm) Server** - Copyright **2015** by AUTHOR. Backend REST service to support both front-end browser-side services and mobile apps. Written in C, XS and POGL.
- **gcREST(tm)** - Copyright **2015** by AUTHOR. Angular.JS modules for secure access to backend servers. Written in JavaScript and JQuery.
- **gcDICOM(tm) and gcWorkerDICOM(tm)** - Copyright **2015** by AUTHOR. Angular.JS modules for parsing DICOM files. gcWorkerDicom is a threaded Worker script for gcDICOM. Written in JavaScript and JQuery.
- **gcWebGL(tm)** - Copyright **2015** by AUTHOR. Angular.JS modules for supporting WebGL. Written in JavaScript and JQuery.
- **gcRectOrient(tm)** - Copyright **2016** by AUTHOR. Optimized, in-place orthogonal rotations of images. Written in portable C.
- **gcComplex(tm) and gcFFT(tm)** - Copyright **2019** by AUTHOR. Complex number and FFT functions. Written in portable C.
- **gcCorrelate(tm)** - Copyright **2020** by AUTHOR. FFT-based phase-correlation and LogPolar image processing functions. Written in portable C.
- **gcHotspot(tm)** - Copyright **2020** by AUTHOR. WiFi hotspot manager. Written in C++ for Windows.
- **gcGeo2D(tm)** - Copyright **2020** by AUTHOR. 2D polygon functions for detecting/processing overlap. Written in portable C and as a portable Node/Browser Javascript module.
- **vizCat(tm) Virtual Camera** - Copyright **2020** by AUTHOR. Virtual Camera plugin and configuration app - with background removal and compositing. Written in Objective-C.
- **Lucidym(tm) Lucidcam(tm) Bench** - Copyright **2024** by AUTHOR. 3D Depth Camera using monocular, stereo reconstruction, and structured IR techniques. Written in Node.js and C/C++.

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- **VR Bunny** - Copyright 1996-1997 by AUTHOR. CGI-based VRML generator.
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- **Tiveras(tm): iPhone App Site** – Copyright 2009 and Trademarked by AUTHOR.
- **South Bay Fusion(tm): Blues Dance Community** – Copyright 2011 and Trademarked by AUTHOR.
- **MedChroma(tm): 3D Medical Imaging** – Copyright 2014 and Trademarked by AUTHOR.
- **VizCat(tm): Image Processing Service and Plugin Provider** - Copyright 2020 and Trademarked by AUTHOR. Also provided a vaccination verification and contact-tracing service via scanning of digitally-signed QR Codes during the Covid pandemic. Node-based site, online scanning.
- **Lucidym(tm): 3D Depth Cameras Products & Custom Development** - Copyright 2024 and Trademarked by AUTHOR. Node-based site, mobile apps.

OPEN SOURCE

Personal Contributions

- **FFMPEG Logo vhook - 2006** - conceived/implemented in C by AUTHOR; contributed by Fabrik Inc. Video compositing plugin.
- **CPAN OpenGL module – 2007** - upgraded to support over 50 OpenGL extensions in C by AUTHOR; contributed by AUTHOR. 3D/GPU Rendering Interface.
- **PerlMagick - 2007**- conceived/implemented in C by AUTHOR; contributed by AUTHOR. Added new APIs for optimized access to image buffers.
- **CPAN OpenGL::Image module - 2007** - upgraded to support over 50 OpenGL extensions in C by AUTHOR; contributed by AUTHOR. 3D/GPU Rendering Interface.
- **CPAN OpenGL::Shader module – 2007** - conceived/implemented in Perl by AUTHOR; contributed by AUTHOR. Abstracted interface for OpenGL shading languages such as ARB (assembly), Cg and GLSL.
- **CPAN OpenGL::Array Extensions – 2008** - conceived/implemented in C by AUTHOR; contributed by AUTHOR. GPU-optimized interface for common image processing effects (affine transforms, scaling, blur, etc).
- **CPAN OpenGL::Matrix Extensions – 2014** - conceived/implemented in C by AUTHOR; contributed by AUTHOR. Matrix APIs optimized for use with shaders.

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- **GDS CAD System Managers Manual** - Copyright 1986 by AUTHOR. CAD system managers manual.
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- **GDS Executive Seminar** - Copyright 1986 by AUTHOR. Seminar booklet.
- **Automated Optical Scanning and Vectorization** - Copyright 1987 by AUTHOR. Seminar booklet.
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