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## **SKILLS SUMMARY**

Contract engineer with 27 years of experience in embedded engineering. Specialization in programming from kernel internals and device drivers to middleware APIs and applications. Language strengths in C, C++, Java and assembly. I started as a hardware designer so I am familiar with 32-, 16- and 8-bit processor architectures (ARM, PowerPC, x86, 8052, 6802, PIC) as well as DSPs and SOCs. Familiarity with PERL, Tcl/Tk, LISP, Fortran, and Python. Experience in various operating systems and environments (linux, Windows, VxWorks, pSOS, Solaris, Android OS, tru2way) including internals.

Familiar with the following development tools: eclipse, gcc, gdb, ICE, logic analyzer, oscilloscope, spectrum analyzer, and many other compilers, linkers, assemblers, and debuggers. Technologies include MPEG, MPEG-2 transport, OCAP/tru2way, network protocols (TCP/IP, etc.), MPEG, and neural networks.

## **EDUCATION**

- Master of Science - Computer Science and Engineering, UC San Diego, 1988-90
- Bachelor of Science - Physics, UC San Diego, 1977-83. Minors in Electrical Engineering and Mathematics

## **TECHNICAL EXPERIENCE**

**Coastal Senior Consulting, Inc.** 1/02 – Present

*President.* Contract programming for embedded systems. Customers include

- internal project Created Android OS application for tracking billable hours on the Droid platform. Continuing to explore Android OS internals, tools and environment in anticipation of industry growth and future work.
- Rovi (formerly Macrovision/Gemstar/TV Guide/Aptiv) (Oct 07-present). Java programming for porting of C++ cable Set Top Box guide application to OCAP/tru2way environment. Implementations of DVR, user interface, network utilities.
- Wind River (Jun 07-Sep 07). Testing and fixing of Linux drivers for handheld wireless phones.
- Verimatrix (Jul 05-May 07). Conditional Access system for MPEG Transport IPTV video delivery systems. Client code running on the Set Top Box, server code running on linux and Windows systems.
- Solekai Systems (Jul 04-Jul 05). DirecTV bitstream tool development.
- Pioneer (Jun 02-Jul 04). Cable TV Set Top Box development. Implemented PowerTV operating system on linux base. Modified linux device drivers for Broadcom chip. Implemented DVR filesystem. Implemented PowerKey conditional access API in linux.
- Personal Robotics, Inc. (Jan 02-Jun 02). Wrote simulator for vacuum cleaner robot vision system running on Linux. Simulator included creating random buildings with furniture in Virtual Reality Modeling Language (VRML). Displaying these worlds using OpenGL and POVray. Created user interfaces in gtk. Modeled movements and detected collisions with RAPID model library. Worked on mapping issues with robot.

**WIND RIVER SERVICES (formerly Doctor Design and Integrated Systems) 9/92 – 1/02**

Senior Member Technical Staff, Project Manager. Development, technical leadership and project management roles. Responsible for design and development of embedded computer and electronic systems. Tasks include: software and hardware implementation and debug; software and hardware architecture; design reviews, system specification; customer and vendor interface; proposal writing; formation and subsequent management of project teams.

Projects include:

- Microcoding and C code of Network Address Port Translation algorithm to C-5 Network Processor.
- C code to port multimedia middleware library to Set Top Box.
- Microcode for Motorola 8260 Communications Processor to assemble and route packets below the PowerPC level in a cell phone base station. Included writing a debugger in TCL/Tk.
- C code port of Bluetooth stack to VxWorks for Personal Digital Assistant. Architecture study for application manager for PDA.
- Architecture design and software specification for integration of TiVo consumer digital video recording system with DirecTV satellite reception.
- Cable Headend Transmitter – Architecture and management of team designing a rack-mounted device to receive messages over Ethernet and retransmit them over an RF cable-TV path.
- Set Top Box Software - Managed team of 15 engineers responsible for writing the software for second DirecTV Set Top Box on commercial market.
- Fingerprint Matching System – Cost reduction and performance enhancement of existing Automatic Fingerprint Identification System. Architected system, programmed Am29200 in C and assembly and three DSPs in C and assembly and design of two FPGAs.
- Wireless Cable Headend and Downconverter – Wrote C code and PIC assembly, architected and managed team responsible for design of a Wireless Cable (Microwave transmission) transmission and reception system. Design included MC68340, NTSC encoder, PIC16C65 and two custom FPGAs, DES Encryption/ Decryption.

Other projects include: architecture studies for various consumer devices, implementations of FPGA designs, design of network backup hardware, laptop security device, JAVA graphics porting, additional Set Top Boxes implementations, television Internet browser, bitstream generator capture system, fiber optic SCSI extender.

**UC SAN DIEGO, COMPUTER SCIENCE AND ENGINEERING 9/88 - 8/90, 9/97 - 5/00**

Ph.D. Candidate, Graduate Fellow. Research in Evolutionary Robotics. Used evolutionary algorithms to discover grammars that developed body plans and neural network control structures for robots. Master's project was a study of transitions to Chaos in Cellular Automata Rule Space. Coursework included Computer Architecture, Compilers, Operating Systems, Algorithms and Data Structures, Software Engineering, Imperative and Functional Programming Languages, Complexity Theory, Artificial Intelligence, Neural Networks, and Cognitive Science.

**DATA/WARE DEVELOPMENT 8/83 - 9/92**

Director of Engineering ('90-'92), Project Manager ('86-'88), Product Development Engineer ('83-'85). Development of mainframe channel peripherals and test equipment.

**TELEDYNE CONTROLS 2/85 - 10/85**

Member Technical Staff. Design and coding of bit-slice floating point coprocessor for data acquisition.

**SCRIPPS INSTITUTE OF OCEANOGRAPHY 9/81 - 8/83**

Jr. Development Engineer. Design of devices for support and maintenance of geophysical observatory.

## **AWARDS AND HONORS**

- Patent # 5,455,926 October 3, 1995 VIRTUAL ADDRESSING OF OPTICAL STORAGE MEDIA AS MAGNETIC TAPE EQUIVALENTS
- Patent #5,438,674 Aug 1, 1995. OPTICAL DISK SYSTEM EMULATING MAGNETIC TAPE UNITS.
- National Science Foundation Fellowship.
- Powell Foundation Fellowship.
- Graduated Cum Laude, Physics, UCSD 1983.
- UCSD CSE Award of Distinction for highest score on department Comprehensive exams.

## **PUBLICATIONS**

Craig Mautner and Richard K. Belew. "Evolving Robotic Bauplans". In *Fifth Joint Symposium on Neural Computation*, page 93, University of California, San Diego, 1998. Institute for Neural Computation.

Craig Mautner & Richard K. Belew. "Evolving Robot Morphology and Control". *Proceedings of the Artificial Life and Robotics Conference (AROB99)*.

Craig Mautner & Richard K. Belew. "Coupling Morphology and Control in a Simulated Robot". in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) 1999*.

Craig Mautner & Richard K. Belew. "Testing Simulated Controllers in Real Robots". *GECCO 99 Birds-of-a-feather Workshop on Evolution of sensors in nature, hardware and simulation*.