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Eduardo Gonzalez

Education

2011 - 2014 **M.S in Software Engineering**, *Texas State University*, San Marcos, TX.

2007 - 2011 **B.S in Electrical Engineering**, *Texas State Unversity*, San Marcos, TX.
Specialized in Communication Systems and Networks

Master thesis

title *Reducing SCTP's (Stream Control Transmission Protocol) Time-to-Complete by Manipulation of its Retransmission Time Out Minimum*

advisors Dr. Stan McClellan, Dr. Wuxu Peng, Dr. Mina Guirguis

description The Stream Control Transmission Protocol (SCTP) is a relatively young transport protocol that was originally designed to transfer SS7 signaling messages over packet switched networks but has since been standardized for general use. This thesis focuses on SCTP's retransmission mechanisms and how they're affected by network conditions, providing insight into optimization opportunities. For this purpose a research platform is presented that enables rapid prototyping of new algorithms and fast turnover of performance data which is then used to verify previous SCTP research. Finally, we present a novel algorithm for dynamically determining the optimum Retransmission Time Out Minimum (RTOmin) value of an SCTP association that significantly improves performance while avoiding spurious retransmissions.

Computer skills

basic Python, HTML, Java, Javascript, Linux Kernel, XML, CMake, Autotools, Qt,

intermediate MATLAB/Simulink, C++, Labview, MultiSim, TCP/IP, Linux Development, Lab Testing Equipment, WireShark, Git

advanced Assembly(Motorola 68k), SCTP, C, Shell

Publications

[1] Eduardo Gonzalez and Stan McClellan, "A hybrid VOX system using emulated hardware behaviors," in *Proc. 7th Int'l Conf. on Digital Telecomm.*, Chamonix, France, May 2012.

Experience

Aug 2013 - Present **Software Engineer**, *FlexRadio Systems*, Austin, TX.
Part of an interdisciplinary team writing software for high performance networked radio transceivers and one of several "full-stack" software engineers working with u-boot, Embedded Linux, DSP algorithms, network control, and user facing GUI components. Main duties include:

- Maintaining embedded Linux Kernel and modules
- Maintaining Audio CODEC binaries and modules
- Embedded software specification, design and implementation
- Improving software development tools and workflow
- Writing and maintaining Windows WPF GUI components (C#)

Apr - Jul 2013 **Contract Software Engineer**, *FlexRadio Systems*, Austin, TX.

- Characterized, modified and improved existing Audio DSP Algorithms
- Implemented DSP algorithms within existing C codebase
- Maintain and expand on Audio CODEC binaries and their respective Linux Kernel modules

Jan - Dec 2012/2013 **Research Assistant**, *Thesis*, Texas State University.

Spearheaded research on a relatively young transport protocol (SCTP).

- Performed a extensive literature review on current SCTP research.
- Designed and developed testing environment running on Linux that automated Kernel Module compilation, loading/unloading and logged relevant SCTP transfer parameters.
- Performed in-depth analysis of SCTP retransmission parameters including: Return Time Out, Round Trip Time and Return Time Out Minimum.
- Performed in-depth analysis of the effect of network parameters on SCTP performance including: Packet Loss, Packet Spacing and Packet Delay.
- Evaluated a proposed adaptive algorithm for managing the Return Time Out Minimum SCTP parameter.
- Discovered bug in SCTP Linux Kernel Module and submitted fix to developers mailing list.

Jul - Sep 2012 **GNURadio Module for Custom SDR Platform**, *FlexRadio Systems*, Austin, TX.

Developed a GNURadio module to control, receive and display samples from a custom high bandwidth radio receiver.

- Created C Library that used TCP sockets to send and receive custom control structures from SDR hardware and used UDP sockets to receive raw IQ samples from SDR hardware in VITA49 format over 10GbE.
- Created Python wrappings for C library using SWIG.
- Created graphical block for GNURadio Companion using XML.

Jun - Aug 2011 **Speech Detector**, *Flex-Radio Systems*, Austin, TX.

Created non-computationally intensive speech detector for existing Software Designed Radio System based on Motorola's MICOM circuit [1].

- Received and analyzed schematic for an analog speech detection system developed in the 70s for HAM Radio operators.
- Modeled analog circuit using Multisim with a speech audio file as input.
- Created a digital model of the analog speech detector using Simulink.
- Conducted a literature review to find applicable approaches for speech detection in audio.
- Combined features from the analog circuit and digital approaches to create a robust speech detection system that maintained very low computation overhead.

Jan - Apr 2010/2011 **Autonomous Robot**, *IEEE Student Chapter*.

Designed and constructed small autonomous robots (from scratch) for the IEEE Region 5 Student Robotics Competion.

- Programmed entirely in assembly (68k) on Freescale 68HC12.
- Small mobile robots completed specific taks, including locating, analyzing and transporting objects while avoiding obstacles.
- Used a variety of sensors (IR, UltraSonic, Pressure) to complete tasks.

Feb - Mar 2011 **CPU Pipeline Simulator**, *Class Project*.

Implemented a MIPS interpreter with a simulation of CPU Pipeline execution including collisions in C.

Jan - Dec 2010 **Real-Time Powerline DAQ**, *Capstone Project*.

Modified existing LabView DAQ System and created new system in order to capture, save and display real-time waveforms using Agilent U2353A DAQ.

- Designed as Queued-State Machine.
- Used primarily to capture voltage and current information from live power-line feeds.
- Allos the implementation of post caputre processing on live streams using Matlab.

Aug - Dec 2010 **Teaching Assistant**, *"Circuits and Devices"*.

Helped manage class lab section.

Activities

2010 - 2011 **President**, *IEEE Student Branch*.

- Awarded Outstanding Small Student Branch in Region 5 during term.
- Represented the TxState IEEE Student Branch in all external affairs
- Hosted "Future City" Competition for middle school kids
- Founding member of Student Branch

2010 - 2011 **Vice-President**, *Water Polo Club*.

- Help manage Club's operations and representation within school system.