#### DAS MIDDEPOGU

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Having 14years’ experience in embedded Firmware development on various Silicon’s, Device Drivers, Linux kernel, Graphics Driver, DSP, 4G, 5G, and Multimedia, Artificial Intelligence and Machine Learning:

* Experience in Micro controller (ARM, PIC) based Firmware implementation (I2C, PWM, SPI, ADC, DAC) and HW schematic understanding, BLE Firmware, Device Drivers implementation (USB3.0 for TI DSP, MIPI DSI, GFX), System programming, Linux Kernel (file system) for cloud storage domain and new product development (NPD).
* Implementing AI and ML algorithm on GPU and working on data science applications.
* Graphics driver (Direct3D11 Rendering) implementation on AMD GPU for Xbox and Sony play-station, QCOMM Adreno GPU Snapdragon processor for Desktop and Mobiles. Open GLES on ARM Mali-Norr GPU.
* DSP Algorithm implementation and optimization for Channel Estimation, SNR, FFT, Image Transport, bearing estimation TACAN receiver ATC Machine, LTE, 5G, video (H.264/MPEG4 part10 decoder), image, Dolby Digital Plus Audio Decoder, Automotive.Good Optimization Skills related to Memory and MIPS for DSPs, Floating to fixed-point conversion.
* Good experience WCDMA, LTE, IOT(CAT-M1), 5G Physical layer procedures on Fixed point DSP, 1xEVDO RNC middleware porting(3gpp2).

**Professional Experience:**

**Software engineer, Consultant at John Deere July 2023 – Till Date**

**Project Description** : Firmware implementation on image processing module used for all John Deere agriculture products.

* + - IPM is performing capture crop images from camera and doing image enhancement and pass data to next control module.
    - Done the Docker VM up and various IPM module. Virtualize image processing module in Docker.
    - Bring up the IPC between various IPM modules using open AMP Library and debugging the issues.
    - Debug and resolve driver issue for IPC to communicate between different modules,

# Environment : Ubuntu, Windows Docker VM, Python, C++, C, ARM53, MQTT, Free RTOS

**MTS Software Developer, AMD (Client Microsoft, Sony) Dec 2021, Mar 2023**

**Project Description** : Graphics driver implementation, porting graphics features, run the graphics benchmarks apps and traces to check the driver rendering functionality.

* + - Implemented the graphics direct3D11,12 rendering pipeline and Shader programming.
    - Boot up the windows on pre-silicon (emulator used virtual box) and install the graphics driver, running the graphics traces to check the graphics driver functionality. Some pre silicon RTL release graphics functionality is checking different modes and complaint same to RTL team. Checking same functionality on Post silicon.
    - Built the UMD deriver and bring up graphics functionality for Xbox and Play station. Implemented the graphics features like FSR on silicon and check rendering functionality using self-developed app with different Gen modes. Resolving the issue app non-functionality case.
    - Troubleshoot apps not running on GFX GPU, by checking PM4 packets and app exe (ACE/GFX engine), app using dx11 exe and QA team is configure (dxx, dxcp tool) the dx12 exe supposed to use. Conveyed to QA team and resolved some setting issue and app running fine.
    - Checked the graphics status, where PM4 packets are not generating, App is not picking graphics driver. Checked XCaptol tools issue for checking single frame rendering functionality for graphics driver.

# Environment : AMD Zen RAND GPU, C++, Windows 22h, Direct3D11, 12, Xcaptol tool

# Senior Engineer, TCS (Client Ericsson) May 2021 – Dec 2021

**Project Description**: Features development and porting of L2 modules and L2 to L1 layer interface for 5G. Multi gNB enhancement. Developed the Simulator and bypass the L1 for current experiment.

* Implement the firmware to connect as max as UE’s connectivity to gNB and combine more gNB to increase more UE’s connectivity.
* UE’s receives packet data from multiple gNB’s via Ethernet driver, need to extra data from Linux open-source Ethernet driver and check the corresponding gNB ip and data, acknowledge back to corresponding gNB. Extracted data need to send to Mac layer. Need to construct packet data from application layer and send back to corresponding gNB.

**Environment** : x86, C, Linux, Ethernet driver

**Lead/Sr. Engineer, Alif Semiconductor Nov 2019 – Mar 2021**

**Project Description** : Implemented LTE IOT CATM-1 Modem DSP Physical layer on x86 platform and porting on to Tensilica DSP Processor and Xilinx FPGA VCU118. Optimization DL channel using Tensilica DSP Processor and make sure each channel procedure took less than 1 millisecond.

* Used downlink channel Implement Channel Estimation Algorithm, SNR Algorithm, De-mapping, PDSCH RE's location index finding, de scrambling, OFDM.
* Optimized the cycles using DSP SIMD instructions.
* Integrated RTL for these modules “De-rate match, Turbo, HARQ combine, CRC” for FPGA initial validation by creating a separate thread. Fixed to floating point conversion.
* Integrated the changes in **UE** modem end to end stack (L1, L2, L3) and validated using amarisoft gNB by initiating the DL/UL traffic test and Attach procedure. Optimize the cycles using DSP SIMD instructions and ThreadX implementation.

**Environment :**C, Linux, Xtensa, ThreadX, Ten-silica DSP(LX7) Processor, Xilinx FPGA VCU118

**Lead Engineer, Altran Jan 2019 – Oct 2019**

**Project A Description**: Disease in plant identification using Artificial intelligence (CNN). Drones collected the image of agricultural fields and send data via IOT device to the Base station server. Collected images are processed via CNN AI and compared to existing database to identify the type of disease.

* Captured the image from drones from the fields, Used IOT device send the Drones capture data to the server. In server compare the leaf of drone capture images with the existing data base.
* Compared the drone caput data with existing data by using CNN Artificial intelligence. Implementation on GPU for more performance. As per disease is identified then corresponding Fertilizer Is used.

**Environment :** C, Convolution Neural Network, IOT, GPU

**Project B Description**: This project involves car autopilot mode and car safe driving. Car camera capture images are processing using CNN AI algorithm and depth sensor for neighbor object type and distance detection.

* Captured the image from car camera and processing CNN algorithm for object type identification.
* Used depth sensor measure neighbor vehicles speed. Using CNN and depth sensor information control the speed of current car for avoid accident. Sending the image identified data to the car display.

**Environment :** C++, Convolution Neural Network, Display

**Lead Engineer, Altran (Client Samsung) Apr 2018 – Dec 2018**

**Project Description** : Project involves Firmware implement for Display driver implementation for ADV 7535 and DSIM for Exynos 9 infotainment in automotives and openGLES driver bringup on Exynos 9.

* Worked with Samsung Exynos V9 architecture and board bring-up using boot loaders.
* Wrote device driver implementation for ADV 7535 and MIPI-DSI which is interface to Display module and Physical display. Debugged issues (EDID, HPD, I2C).
* Built the kernel code along with driver changes, Flash the bin onto the target board (Nor and NAND flashing), checking the logs for specific driver function is active or not by calling specific application for that driver.
* Used openGLES GPU code flow for ARM Mali-Norr GPU, EGL and OpenGLES application, built the openGLES .so lib file and build with kernel code and ran the eglGEARS application to check graphics functionality.

# Environment : Exynos V9, ADV7535, C and QNX 7.0, OpenGLES, ARM Mali GPU, Python

**Led Engineer, Altran (Client Qualcomm) Aug 2016 – Mar 2018**

**Project Description** : Graphics driver implementation on QUALCOMM Adreno GPU For Desktop and Mobile on QUALCOMM GFX processor using Direct3D11 pipeline.

* Used Adreno GPU architecture, Build, implement, debugging and fixing d3d driver and run the FTF and GEE application, fixing issue. Optimized to improve FPS.

**Environment :** Snapdragon 8998,845,8180**,** C++, C, Visual studio 2017, Python

**Sr. Engineer, Honeywell Aug 2015 – Jun 2016**

**Project Description** : Earmuff is a new product Firmware development. Earmuff (Hearing protection) and Hearing Dosimeter (dB recording). Input (gun fired), Process and pass to AGC and higher dB earmuff need to cut down the higher dB(>83dB). Same data is monitoring on mobile using BLE. Digital Volume control using I2Cprotocol.

* Designed, implement and debugging Firmware to cut down higher dB sounds, Implement the Volume control and Aux detection, Beeper function Attack time measurement.
* Integrated BLE module in Earmuff and monitoring the Mic input dB and Speaker out dB values in mobile using BLE communication.
* Dosimeter Design the Firmware to read Mic input and store the dB value into EEPROM. Collect the time stamp from RTC and store in EEPROM.

**Environment:**C, PIC Micro controller (PIC24F32KA302), MPLAB, CRO, ICD 3 JTAG, logic analyzer, I2C, CRO

**Sr. Engineer, Honeywell Feb 2015 – July 2015**

**Project Description:** Design, development and debugging Firmware for **Air** **Belt** is a new product development which is designed for who are working in Coalmines. This product is used to purify the air from contaminated air to the user. Here air purified filter is available. Through contaminated air is assed then motor pump that purified(filter) air to human. Design and implementing and debugging the firmware using motor control using PWM and times are playing very good role. Initiate the ADC, Ports, PWM, Timers for motor control is plays major roles.

**Environment:** C, PIC16, MPLAB, ICD 3 JTAG, PWM, ADC, Timer control, CRO, logic analyzer, debugging, CRO

**Sr. Engineer, Honeywell Jan 2014 – Jan 2015**

**Project Description** : Design and development and debugging firmware for level transmitter, which measure the level of the oil tanker, foam, and other parameters.

* Designed from display request (using Heart protocol) level of oil tanker layer using SPI. Completing communication between Application and senor, display level data.

**Environment :**C language, JTAG, MSP430, CrossWorks, CMX, CRO, logic analyzer, SPI, UART

**Sr. Software Engineer, Wipro (Client HP) Jun 2013 – Dec 2013**

**Project Description** : working on Linux file system cloud storage Domain. Storing User data on the cloud storage domain. In between involves file system to store the data on the storage domain and retrieve the data from the storage domain, as well as handle storage overflow.

* Installed the kernel and board bring up and crash analysis. Bug fixes
* Handled crash analysis for the file system kernel. Added traces to the file system module and to check kernel panics, Once modified file system code, generating the file system rpm and installing, run the application to check crash analysis and fixing.

**Environment**: Red Hat Linux, C language

**Sr. Software Engineer, Wipro (Client TI) Oct 2012 – May 2013**

**Project Description** : Firmware device driver for USB3.0 host controller. The configure parameter in PHY layer for USB etc. different mode of operation of USB to test different data speed operation of USB.

* Study the XHCI Spec, Implemented the API, and Design document.
* Implemented the LLD which configure the USB3 control register in different Modes and perform the data transfer using. Each API Implementation involves different functionality.
* Integrated the driver changes in end-to-end product and testing (Digital loop back) to check the data transfe.

**Environment :** CCS 5.2, C66xx, ARM(Cortex), C language

**Sr. Software Engineer, Wipro (Client NSN, ALU) Apr 2011 – Sep 2012**

**Project Description** : Maintained source code for Tx Module in Ultra site NodeB and addressing customer issues. WCDMA layer 1 /DSP Maintenance (NSN client) and 1xEVDO RNC Porting app.

* Fixed trouble reports from customer. HSDPA Through put issues.
* SWS (spreader ASIC) and FPGA issues, Memory pool corruption information to L2 from Codec, Buffer overflow between RAKE and CODEC DSPs for Soft-bit data through McBSP
* 1xEVDO RNC Application running on FMS architecture, porting all the packages FMS to ATCA architecture for the feature needs.

**Environment:**  C language, windows, DSP, Assembly language

**Sr. Software Engineer, Wipro (Client Qualcomm) Jun 2010 – Mar 2011**

**Project Description :** DSP firmware implementation for Dolby Digital Plus Audio Decode porting on QDSP5 -7400 Platform. Dolby audio decoder ported, unpacked function in Assembly Language on Qualcomm DSP processor.

* Used QDSP5 architecture, Audio coded modules to port, fixed to floating point conversion.
* Implemented the function in Assembly language on QDSP, Writing the C-Traceto check each module functionality and decoder playing with PCM samples.

**Environment:** QDSP5 -7400, C and Assembly language

**Software Developer, ESN Tech (Client Elemental Technologies) Apr 2009 – Dec 2009**

**Project Description :** Elemental Technologies video processing platform on NVIDIA’s GPU CUDA platform the objective of this project is to port this encoding technology to Linux**.**

* Analyzed, designed and implementation of the entire abstraction layer (converting the Windows API to equivalent Linux API).

**Environment :** Linux – CENTOS 5.2 with default kernel version (2.6.18-92. e15) CUDA 2.0, OpenGL 3.0 Intel x86, NVIDIA GeForce 9800 GT Graphics Card.

**Software Developer, ESN Tech (Client Ambric Inc.) Nov 2008 – Mar 2009**

**Project Description :** AVC Intra (H.264 / MPEG4 Part-10) Complete Decoder.

* Implementation of Input stage, Entropy (cavlc), Integer Transform and unit testing for this module.
* Performance testing of each & every module using profile timer and Multi timer for Coding and optimization in C and Assembly language End to end decoder to get 30 FPS on Am2045 DSP
* Wrote Test-App to verify all API functionality in Linux. Coding and Unit Testing.
* Debug and bug fixing for the Linux API application.

**Environment:** aDesigner Tool Suite (add on to Eclipse, aJava, aStruct), Ambric's Am2045 MPPA, C and Assembly language.

**Software Developer, ESN Tech (Client Ambric Inc.) Feb 2008 – Oct 2008**

**Project Description :**DSP Library implementation for 2048 FFT/IFFT (LTE, 3GPP), Turbo Encoder for LTE, Image Convolution (Noise filtering) design and implementation, Large Image Transpose.

* Implementation & Testing on aDesigner, Splitting the algorithm to run in parallel.
* Designed, development and testing. Coding and optimization in C and Assembly language.

**Environment:** MATLAB, aDesigner Tool Suite, Ambric's Am2045 MPPA, C, Assembly language

**Education:**

* **M. Tech** in **Embedded Systems** from **DOEACC** CENTER (formerly **CEDTI**) **CALICUT.**
* **B. Tech** in Electronics & Communication Engineering from **Vignan Engineering College**, Guntur AP.

**Technical Skills:**

**Data science** : Python, Spark, Hadoop

**Software Tools** : CrossWorks, Cadence Xtensa IDE, CCS, aDesigner (Eclipse), MPLAB, MSP430

**OS and RTOS** : WINDOWS, RTOS, Linux, QNX 7.0

**Languages, Protocol** : C, C++, ASEMBLY, MATLAB, Python

**DSP Processors** : Tensilica DSP (LX7), Ambric2045 MPPA, TI, QDSP, ARM(Cortex), Snapdragon 845

**GPU, FPGA** : AMD GPU RDNA GPU, Adreno GPU(QUALCOMM), ARM Mali-norr GPU, Xilinx VCU118

**General Tools** : Git and Perforce

**Protocol :** I2C, SPI, UART