

VINOTH KUMAR SEKAR

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OBJECTIVE

An efficient, dedicated senior embedded software engineering professional with extensive experience in distributed process controls. Background spans the entire software development cycle. Able to adapt quickly to new languages, technical skills and new business environments while completing assignments with timeliness and accuracy as priorities. A people person with a strong focus on helping others learn the basics, working as a team, and being considered an asset of a company



EXPERIENCE

Technical Lead | Path Partner Technologies Pvt Ltd - Automotive

2022 – PRESENT

- Project: Advanced AI-Driven ADAS Features
- **Description:** Led the development and implementation of sophisticated driver-assistance systems (ADAS) using advanced AI technologies, focused on enhancing driver safety and vehicle control. This project included the creation of detailed 3D visualizations and interactive elements using OpenGL, crucial for real-time decision support and vehicle monitoring.
- **Responsibilities:**
 - **Performance Optimization:** Employed advanced techniques in CUDA, cuDNN, and cuBLAS to ensure the smooth operation of AI algorithms and OpenGL graphics within the vehicle's embedded systems.
 - **Natural Language Processing:**
 - Utilized an LLM with 7 billion parameters to achieve high accuracy and responsiveness in understanding and executing voice commands.
 - Developed and optimized algorithms to ensure real-time processing and minimal latency in voice command recognition.
 - Collaborated with cross-functional teams to design and implement the voice command interface, ensuring seamless integration with existing ADAS features.
 - Conducted extensive testing and validation to ensure reliability and robustness of the voice command system under various driving conditions
 - **Voice Recognition using Voice-to-Text (VTT):**
 - Implemented voice recognition systems to enhance ADAS interactivity.
 - Utilized libraries and tools such as Google's SpeechRecognition, Microsoft Azure Cognitive Services, and IBM Watson for speech-to-text conversion.

- Developed and integrated VTT solutions to enable accurate and responsive voice command processing.
 - Ensured compatibility and high performance of VTT systems on the Renesas R-Car platform.
- **3D Visualization Development:** Utilized OpenGL ES to create immersive 3D visual elements, such as the 3D Virtual Wall, which provides drivers with a dynamic representation of obstacles around the vehicle. This feature enhances spatial understanding and assists in complex driving scenarios.
- **Interactive Graphics:** Developed Tire Guidelines and Model Wheel Animation using OpenGL. These features aid in precise vehicle maneuvering by visually representing tire trajectories and wheel positions in real-time, integrated into the vehicle's surround view system.
- **Achievements:**
 - Successfully implemented the '3D Bowl View' and enhanced it with a 3D Virtual Wall, providing a comprehensive, augmented reality-like visualization of the vehicle's surroundings, greatly improving navigation and obstacle avoidance.
 - Developed dynamic Tire Guidelines and animated wheel models that adjust in real-time based on steering inputs, significantly improving driver accuracy in tight spaces and during complex maneuvers.
 - Achieved a 40% improvement in system responsiveness by optimizing integration of CUDA, OpenGL ES, and machine learning technologies, leading to faster and more reliable ADAS functionalities.

Senior Software Engineer | Appasamy Associates Pvt Ltd.
2015 - 2022

- **Project: Advanced OCT Imaging Analysis Platform**
- **Description:** Pioneered the development of an Optical Coherence Tomography (OCT) imaging analysis platform, employing deep learning and high-performance computing to deliver real-time diagnostic insights. The project was enhanced by 3D visualization techniques using OpenGL to create detailed, interactive models of eye structures from OCT data, aiding in more accurate diagnoses.
- **Responsibilities:**
 - **3D Modeling and Visualization:** Developed sophisticated 3D models of eye structures using OpenGL. These models were dynamically rendered to show changes in eye tissues over time, providing clinicians with a powerful tool for diagnosis and treatment planning.
 - **Deep Learning Integration:** Utilized cuDNN and cuBLAS to accelerate the neural network operations essential for processing the OCT data. Integrated these models with OpenGL visualizations to provide real-time, interactive diagnostic capabilities.
 - **Software Optimization:** Enhanced the performance of the imaging analysis software by integrating CUDA with OpenGL, improving the real-time rendering of complex 3D models.
 - **Natural Language Generation:** Implemented LLM-based tools to automatically generate descriptive analysis of the 3D models, translating complex data into actionable medical insights.
- **Achievements:**

- Successfully reduced the time required for generating and rendering 3D models of eye tissues from minutes to just a few seconds, significantly speeding up the diagnostic process.
- Introduced innovative features such as real-time 3D visualization of intra-retinal layers, which are critical for diagnosing conditions like macular degeneration and diabetic retinopathy.
- Developed a highly praised user interface in Qt, allowing for seamless interaction with the 3D models and integration of machine learning insights, leading to enhanced user engagement and diagnostic accuracy.

FREELANCE PROJECTS

- **Creating GIS Software in QGIS:** Developed customized GIS software solutions using QGIS for various clients, enabling advanced spatial analysis and mapping capabilities.
- **Flight Gear Airport Setup & Creation:** Created detailed airport setups and simulations for the Flight Gear flight simulator, enhancing the realism and accuracy of virtual flight environments.
- **ROS2 Robotic Simulation:** Developed and tested robotic simulations using ROS2, enabling the testing of robotic algorithms and behaviors in a virtual environment.
- **Ontology:** Worked on developing and implementing ontology-based systems to improve data organization and retrieval across various projects.
- **Windows Porting of GIS Software:** Ported GIS software to the Windows platform, ensuring compatibility and performance optimization.
- **OpenGL Based Hillshade Algorithm:** Created a hillshade algorithm using OpenGL for visualizing terrain in 3D, providing a more intuitive understanding of topographic features.
- **Color Shade Algorithm:** Developed a color shading algorithm to enhance the visualization of different terrain types and features in GIS applications.
- **LiDAR Based DEM Generation:** Generated Digital Elevation Models (DEM) using LiDAR data, providing highly accurate terrain models for various applications.
- **SAR Based DEM Generation:** Developed DEMs from Synthetic Aperture Radar (SAR) data, offering detailed and reliable elevation data for remote sensing projects.
- **GPU Based Kubernetes Setup:** Implemented Kubernetes clusters optimized for GPU usage, facilitating the deployment and management of machine learning and data processing workloads.

SOFTWARE & HARDWARE PROFICIENCY

Software Used:

- Qt 5.15.1, QML, OpenCV 4.4, MS Visual Studio 2019, CUDA 11.5, C/C++, LabVIEW 2019, Keras, Python 3.7, TensorFlow, OpenGL, MATLAB

Hardware Used:

- Raspberry Pi 4, Jetson TX1, Jetson Nano, 7" inch LCD Touch

Key Skills:

- Qt, CUDA, OpenGL, C++, Python
- **Image / Video Processing:** OpenCV, CUDA, Python
- **Convolutional Neural Networks:** TensorFlow, PyTorch
- **CV Frameworks:** OpenCV, TensorFlow, PyTorch
- **Solution Architecture Design and PoC:** Visual Studio Code, Ubuntu
- **Edge Devices and Deployment:** Renesas R-Car, Ubuntu
- **ML Ops:** Docker, Kubernetes
- **Geospatial Information Systems:** QGIS, ArcGIS
- **Data Engineering:** SQL, Python, Pandas
- **Cloud Platforms:** AWS, Azure
- **Database:** MySQL, MongoDB
- **Business Intelligence (BI) Visualization:** PowerBI, Tableau
- **Data Science:** Python, R, Scikit-learn
- **3D Modeling and Graphics Design:** Photoshop, Illustrator, Blender



ONSITE WORK

Mabri Vision GmbH, Aachen, Germany (Apr 2018)

- Developed Image Processing Pipeline for Capture, Process, Render, Display of Real-time Imaging
 - CUDA Processing of Image Capture Engine.
 - Image Registration in OpenCV using C++.
 - Layer Segmentation using MATLAB.

e-Vision Optics, Sarasota, FL (USA) (Dec 2018)

- Medical Imaging System. Designed a MATLAB and C++ Program to identify the parameters of Imaging.

Embedded Engineer | Mirror Technologies Pvt Ltd

2012 -2015

- Developed a Labview platform for currency detection system. Vision based Watermark & Hologram detection of Currency.
- Oil Seal Inspection: Machine Vision is performed using Labview for Quality Inspection of Oil Seals.
- Developed a Control system for switching devices like Conveyor Motors, Focusing light, Pneumatic Solenoid valve, PLC, Pressure Switch via Labview. Synchronizing five system output data.
- Designed and developed a Material conveyor Robot for an Industry to carry Clutch plates weigh max. 600 Kgs. Robot is designed with Ultrasonic, High current Driver, GPS, and Proximity.
- Designed and developed a Wireless Home Automation System controlled via Android Smart phones. Developed Android software to communicate with a Bluetooth Device to control Home appliances ON/OFF, Dimmer Control.
- Designed a Smart Device for Automate Household Devices with powerful 8 bit AVR Master Microcontroller using NodeMCU.

- Designed and Developed a Two-legged Walking Robot to detect Radiation level in Nuclear Power Plant. Designed a 6 DOF Bi-pedal Robot to locate its position via GPS and sensing the Radiation level.
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Design Engineer | PS Electricals Pvt Ltd

2008 - 2010

- To design Transformer like Power Transformers, Earthing Transformers & Distribution transformer and Reactors according to the customer specification.
- Preparation of Bill of Materials for ONAN, ONAF, AN Transformers & Reactors.
- Preparation of Core Cutting Instruction. Winding instruction for distribution transformer up to 5 MVA 33 KV or 11 KV / 433V.
- Oil quantity calculation and Conservator selection, cooling calculation and radiator selection.
- Design the components of the transformer and produce the AUTOCAD drawing to Production, Internal Arrangements & End insulation arrangements.
- Study for improvement of the existing products, and new design of Transformer according to IS and BS.

Languages	Exp	Proficiency (1-5)
Qt	8 Years	4.5
C	11 Years	4.5
C++	11 Years	4
QML	7 Years	4.5
LabVIEW	8 Years	4
MATLAB	8 Years	4
Python	7 Years	4
DL, ML Tools	5 Years	4
OpenCV	7 Years	4
CUDA 12.3, CuDNN, CuBLAS, CuFFT, CUDA NPP	7 Years	4.5
Data Structures and Algorithm	7 Years	4
Design Pattern	5 Years	4
OpenGL, OpenGL ES	7 Years	4
Embedded C	7 Years	4.5
Embedded Controllers 8-bit, 16-bit, 32-bit	7 Years	4
PCB Designing	7 Years	4
3D Modeling	12 Years	4

Photoshop, Illustrator, Blender, Unity	7 Years	4
Unity	2 Years	4
Automotive	2 Years	4
LLM (Ilama 2)	4 Years	4



EDUCATION

Bachelor of Engineering (B.E) | Sri Ramanujar Engineering College, Vandalur.

2004 - 2008

Electricals and Electronics Engineering

Master of Engineering (M.E) | College of Engineering, Guindy.

2014 - 2016

Embedded System & Technologies



KEY SKILLS

- **Programming Languages & Tools:** 8051, PIC, STM32, AVR Assembler, Keil, Eclipse, Android Studio, Arduino, True Studio, MATLAB, LabVIEW, Mentor Graphics PADS, ARM7, Eagle, C, C++, Python, PHP, HTML, Qt, QML, PyQt5, CUDA, OpenGL, OpenGLES, OpenCV3 & OpenCV4, dLib, DL/ML Tools like Keras, Theano, TensorFlow, Pytorch, cuDNN, USART, CAN, LIN, I2C, SPI, I2S, RS232, RS485, Socket Programming, TCP/IP, HTTP, IBM DOORS, Enterprise Architect, Git, Docker, Gerrit
- **Technical Skills:** Performance Optimization, Natural Language Processing, Voice Recognition using Voice-to-Text, 3D Visualization Development, Interactive Graphics, Software Optimization, 3D Modeling and Visualization, Deep Learning Integration, Natural Language Generation, Database Management
- **Other Skills:** Analytical Skills, Problem Solving, Policy & Procedure, Leadership Skills, Team Building/Management, Coaching/Mentoring, Presentation Skills, Interpersonal Skills, Observation Skills, Goal Setting, Linear Algebra, Probability & Statistics



KEY STRENGTH

- Technical lead
- Software Development
- Team Building / Management
- Coaching / Mentoring

- Analytical Skills
- Problem Solving
- Policy & Procedure
- Leadership Skills

- Presentation Skills
- Interpersonal Skills
- Observation Skills
- Goal Setting
- Strong in Linear Algebra, Probability & Statistics



I hereby furnish the above is true and best of my knowledge

Place: Chennai

(VINOTH KUMAR. S)