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Job Description (2024 Placements)

Samsung Electronics Co., Ltd. is engaged in researching emerging technology to create new businesses and also in developing core technology to enhance the competitiveness of Samsung's products.
The list below is what we are focusing on recently. When you join Samsung Electronics after your graduation, you may be involved in one of the projects you are interested in among the job field below.

1 Visual Display

> **The Visual Display Division** is global leader in Display business area such as TV, Audio and Smart Signage. Since 2006, Samsung Electronics Visual Display Business division's flat-screen TVs have had the highest market shares in the global flat screen TV market.
> People from all over the world have shown continuous love and support for our innovative products such as QLED TV, the Curved TV, UHD TV, and Smart TV, because of the technology, design, and Samsung brand name. Our business will continue to lead the trend, meet customer expectations and provide differentiated experience for every customer.

General AI
 	
(AI Vision / Intelligent Solution Lab)
	• **Securing a vision engine using AI : Differentiation of image quality and usability**
	• **Providing an easy and convenient consumer use environment using the next generation user interface (Voice + AI + IoT).**
	
	□ **Video Quality Innovation**
	- Development and advancement of vision technology for image quality differentiation
	  .Image Quality Assessment/Classification (IQA)
	  .Detection of objects of user interest
	
	□ **Camera Video Understanding**
	- Functional differentiation and improving usability through user/space information recognition
	  .Touch/Gesture interaction technology
	  .Eye Tracking Technology
	  .Spatial Awareness Technology
	
	□ **Content Understanding / Creation Technologies Development**
	- Improving accessibility and contributing to advertisements/recommendations through content/text recognition
	  .AI-based video assessment technology
	  .Video Question & Answering technology
	  .Generative model development and lightweight technology
	  .Various character recognition technologies in the video
	  .Screen comprehension-based summary and content generation technology
	
	□ **AI-based Vision Solution**
	- A Study on the Image Segmentation based on ML model
	  . Identifying special objects or texture based on defined categories with ML model
	  . Source - still image, continuous video stream, and live video feed
	  . Applying visual effect with segmented object
	
	□ **Development of AI service and Differentiated Off Screen based on on-device AI**
	- Development of user proximity confirmation technology and securing usability
	- Increased experience of using off-screen based on user characteristics

Gen. AI
 	
(AI·Big Data Lab)
	• **Developing lightweight models through architecture changes of generative AI**
	• **Improving the rule-based rigid interface by using generative AI**
	• **Providing new user experiences that existing TVs could not give with generative AI**
	
	□ **Development of image generation fine-tuning and adaptive model**
	- Generation of images for an aspect ratio of 16:9 or higher
	- Latent space upscaling for the generation of 4K-level images
	- Development of a fine-tune model with a specific purpose
	
	□ **Development of conversation-based user experience enhancement solutions**
	- Development of user experience enhancement solutions using LLM
	  . Development of interactive menu-based experiences such as E-Manual
	  . Providing speech-based personalized recommendation function
	- Development of real-time translation functions for subtitles in broadcasting content
	- Efficient summary development for large-capacity tokens using techniques
	  such as MapReduce
	
	□ **User experience improvement based on WebAgent**
	- Development of WebAgent to improve web browsing experience on TV

Visual Solution
 	
(Picture Quality Algorithm)
	• **Providing an immersive viewing experience, high-quality video expression, and developing sustainable image quality technology**
	
	□ **Maximizing an immersive viewing experience**
	- 2.5D stereoscopic expression technology
	  .User location tracking and virtual perspective image generation
	  .Estimation of depth and contrast/saturation control according to perspective
	- Light Field Display/Projector quality technology
	  .Generation of 2D to 3D multi-view images for LFD
	  .Correction of projector's projection surface deviation and lens distortion
	
	□ **Improving image quality based on cognitive/display characteristics**
	- Improvement of low quality centered on objects of interest
	  .Improvement of image quality centered on faces in low-quality images
	  .Improvement of scroll text breakage/judder/stutter in news
	  .Improvement of ball tremor/disappearance in sports
	
	□ **Excavation and development of eco/user-friendly image quality technology.**
	- Power consumption improvement technology
	  .Power consumption improvement by extracting a region of interest and
	   reducing luminance in an uninterested region
	  .Discovering BLU driving technology to improve power consumption
	  .Improvement of ball tremor/disappearance in sports
	- Low-vision viewing assistance image quality
	  .Development of auxiliary image quality through outline/contrast/color emphasis
	
	.Definition of effects and emphasis levels for each level of visual impairment

Audio
 	
(Sound Lab)
	• **Development of audio differentiation technology for TV/sound devices**
	
	□ **Development of TV/sound device-linked technology**
	- Multi-device synchronized playback function based on low-latency wireless
	  audio transmission technology
	- Latency control and improvement in audio sync performance between
	  audio output devices
	
	□ **AI Sound Function and Differentiated Signal Processing in TV/Sound Device**
	- Development of AI sound algorithm and differentiated sound function
	- Development of audio DSP framework and sound algorithm
	
	□ **Development of High-Quality Wireless Hi-Fi System Technology**
	- Development of high-performance audio SW/HW technology
	- Design a high-resolution sound system structure
	- Development of HW platform and DSP framework for new wireless audio systems
	
	□ **Commercialization of sound differentiation technology for TV/sound devices**
	- Development and product implementation of sound quality/3D effect
	enhancement technology

Security **(Security Lab)**	• **Strengthening the competitiveness of Tizen platform security and securing reliability** □ **Knox Platform** - Development of content security (DRM/CAS) technology .PlayReady, Widevine, TVkey™ Cloud, ATSC3.0 Security, HDCP - Development of secure key/data protection solution .Protection of confidential information using Knox Vault, Secure Storage, and FKP - Development of secure OS .Development of HW TEE based security technology - Development of VD security control platform (Engineering Mode) □ **Knox Solution** - Development of differentiated services based on security .Workspace, UEM, RBS/CloudPC, Custom Home, etc. - Development of Knox security solutions and frameworks .Platform security solutions, security management services .Development and provision of Knox APIs required for service development □ **Security Governance** - Software Development Security (DevSec) .SDL checks and establishment of security policies before and after launch .AI-based advancement and automation of security checks - Risk Management .Response to global security regulations and obtaining security certification .Management of security vulnerabilities, secret keys and certificates □ **Security Operations** - Service server security operation (SecOps) .Continuous server security control and incident response, cloud security inspection - Operation security system development .Development/operation of security control platform server and service system. - Personal Information Protection .Privacy related compliance inspection and response, external evaluation response

2. Mobile Experience

Mobile Experience Business of Samsung Electronics is leading the global market with innovative technology and design, launching breakthrough products such as the Galaxy S, Note and Z foldable.
Mobile Experience Business works hard to create and develop next-generation technologies in pursuit of continued success as a leader in the global mobile device industry.

Job Field	Job Description
System Device R&D (System Display)	※ **Task** ☐ Design and development of state-of-the-art device drivers for display H/W. ☐ Understand and debug display issues for various mobile processor architectures. ☐ Implement intelligent resource management strategies to maximize hardware utilization, minimize power consumption, and extend device battery life. ☐ Research and Development of AI-driven debugging tools and techniques to analyze and diagnose complex display-related issues. ☐ Research and Development of visual AI models to identify and classify display issues in realtime. ☐ Develop innovative methods to incoporate AI-techniques into display driver development cycle to improve speed and efficiency of developers. ※ **Recommended Skills and Experiences** ☐ Ability to use programming languages such as C/C++/Python. ☐ Experience in development of Linux and Embedded System. ☐ Basic understanding of ML/AI/Neural Network technologies. ☐ Experience in developing AI learning algorithms and AI frameworks such as TensorFlow, PyTorch, or CUDA. ☐ Basic understanding of display hardware architecture, interface protocols, and communication standards.

Visual AI Group	With the vision of **" World Best Visual Experience"**, the Visual AI Group is striving to lead AI technology by developing the best products and providing users with irreplaceable visual experiences. □ **AI-based Data Engineering for Visual AI Solution Development** - Data pipeline construction . Develop various filters such as PII (personal Identifiable Information) and watermark filters for efficient data collection . Create automatic image annotation engines to generate valuable information including segmentation, depth estimation, optical flow, and more. - Data analysis for visual AI solutions . Assess AI solutions by deploying a large multimodal model (LMM) to gain deeper insights into the strengths and weaknesses of the solutions. . Analyze different types of noise in images based on shooting environments (long /short exposure, indoor/outdoor, motion blur) camera characteristics (dark current noise, shot noise), and data types (quantization, domain translate from RAW to RGB).
Advanced Lab. Multimedia.	Research and development of the AI-based future multimedia solution. □ **AI-based Multimedia Solution Development** - [Goal] Image Generative, Image Enhancement, Image Retrieval - Development of AI-based image generation, enhancement, retrieval solution . Image in-painting, out-painting, generation, editing . 2D-to-3D image generation, image remastering . Vision-Language model, Image-text embedding

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3. Networks Business

[Our Vision]

At Samsung Networks, we are committed to driving innovations in mobile communications, setting our eyes on next generation technologies such as **5G and beyond**.
We are aware that our solutions impact global consumers, industries, and societies.
We also understand the responsibilities that we owe to the millions of lives,
small and large companies, and major industries worldwide.
As such, we are striving to develop and provide the very best networks and be the pioneer to introduce the most groundbreaking technologies and new services.

[Our Business]

Samsung Networks have worked tirelessly to unleash the full power of **2G, 3G, 4G, and 5G, and achieved numerous world's 1st milestones during this process**.
We are now focusing our efforts on 5G research and development.
Samsung was one of the first organizations to conduct mmWave 5G studies and laid the groundwork for mmWave to be used for mobile telecommunications.
Samsung is uniquely positioned to provide an **end-to-end 5G network portfolio**, including chipsets, devices, radio and core equipment, as well as professional services based on AI.
We have commercially proven this end-to-end
5G solution across both the **mmWave and mid-band spectrum**.
Samsung has partnered with global key operators in pushing the limits of legacy technologies,
moving forward to next generation.
The company's **advanced 4G and 5G network solutions** are used by customers globally to support mobile networks, and are recognized as the most reliable and secure network while maximizing performance.

[How We Operate]

Unrelenting research and development has been at the heart of our innovations ever since the very first products were designed and produced from Samsung Networks.
We honor such determination and efforts and believe this has been the motivator that keeps pushing us Towards continued progress.
Samsung Networks has established 10 R&D centers worldwide, each with a specific area of expertise.
Engineers are collaborating with several organizations within the Samsung Electronics portfolio of companies that leads global research of new technologies,
including Samsung Research and Samsung Advanced Institute of Technology,
to look into the future and prepare for tomorrow's technological advancements.
Samsung Networks organizations located all around the globe enable us to maintain a healthy and visionary business operation.

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Job Field	Job Description
vRAN S/W R&D	**Posting Title** - Virtualized RAN software developer **Summary of Position** - Design and optimization of the structure, functions, and algorithms required for PHY netw layers for virtual 4G and 5G mobile communication base stations. **What you will do** - Physical channel implementation and optimization for 4G/5G - Scheduler for parallel processing - Automated testing framework - System Software based on Container Platform - Simulation and performance analysis, debugging tools for PHY Layer SW **What you will get by the end of your internship** - Highly trained SW development and optimization skill - Real-Time processing and scheduling knowledge - Deep understanding of 4G/5G physical layer - Container application software knowledge - Virtualization software knowledge

4. Samsung Research

Samsung Research is the R&D hub of Samsung Electronics DX division. We create new innovation by adopting cutting-edge technlogies to products of DX division utilizing artificial intelligence, problem-solving ability and software-related expertise. Our research areas include artificial intelligence, data intelligence, device innovation, communication, display & media, SoC architecture and software platforms.

Team	Job Description
Tizen Platform	※ **Task** □ Research and development of Samsung common software platform that covers all products. □ Securing core technology for expansion to new devices □ Development of Tizen OS for external IoT devices and external cooperation □ Development of common technology for Tizen frameworks & applications. ※ **Recommended Skills and Experiences** □ Experience in using programming languages(C/C++, C#, etc.) and problem solving □ Able to program using basic knowledge of computer science such as operating system, computer architecture, and computer network. □ Experience in system level development, kernel, framework, etc.
MDE Lab	※ **Task** □ Develop Multi-Device Experience (MDE) services like IoT, device-to-device collaboration, virtual communication, and immersive experience □ Develop software frameworks for providing features of Multi-Device Experience (MDE) services □ Research advanced topics for improving Samsung Services like SmartThings, On-device AI, Edge AI □ Develop network middleware software for supporting latest standards (Bluetooth, Wi-Fi, Matter) ※ **Recommended Skills and Experiences** □ Specialized in Computer Science, Electrical Engineering, and related areas. (Data Network, Operating System, Distributed System, etc.) □ Linux System Programming □ Device/Cloud application development

Security & Privacy	※ **Task** Research and development of AI Security - security for AI / AI for security Research and development of system security including confidential computing Research and development of technology to protect and manage personal data Research and development of security platform to protect user device and data in MDE Research and development of user safety services ※ **Recommended Skills and Experiences** Experience in developing Android / Linux / web application Experience in design and development of service / application framework Experience in code static/dynamic analysis Experience in developing AI-based security tools and analyzing data Experience in developing system software such as Kernel(Linux, Secure OS) / Hypervisor(KVM)
Communication S/W Research	※ **Task** □ Research and development of cloud based flexible & reliable RAN □ Develop protocol stack for next generation communication system □ Research AI/ML models for AI-based network optimization □ Develop intelligent connectivity framework for multi-device experience innovation ※ **Recommended Skills and Experiences** □ Experience in using programming languages(C/C++/Rust/Python/Java, etc.) and problem solving □ Basic understanding of network system and protocol design. □ Basic understanding of mobile communications(LTE/5G), and connectivity (Wi-Fi, Bluetooth, etc) □ Basic understanding of AI/ML techniques, AI models, and have experience in utilizing AI frameworks. □ Experience in utilizing cloud-native techs (Kubernetes, Container, etc.)

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5. Digital Appliances

The Digital Appliances Division is innovating the marketplace through product leadership, design superiority and marketing Excellence. In the new wave of IoT, Digital Appliances division is to lead Smart Home business with the connectivity among various digital appliances including refrigerator, air-conditioner, washing machine, robot cleaner, oven, microwave oven, etc.

Job Field	Job Description
Computer Vision for Smart Home Appliances	□ **Computer Vision for Smart Home Appliances** - Research, design and develop solutions for home appliances Computer vision algorithms for feature-extraction and image recognition . Deep Learning models for image recognition and classification . Multi modal with various sensors - Develop on-device and cloud model . Optimize on-device solution for home appliances . Serving cloud-based model in public cloud - Development based on MLOps - Productization based on practical user scenario - Ownership of project with end-to-end solution

Data Engineering for Smart Home Appliances	□ **Data Engineering for Smart Home Appliances**
	- Samsung has the advantage of being well-positioned at the intersection of
	  Data intelligence and strong home appliance presence in the market
	- Extracting meaningful information and insights out of unstructured and structured usage
	  and sensor data of home appliances
	- Exploring device usage data for user-customized recommendation
	  and device operation Settings
	- Exploring various usage data for MDE (Multi-Device Experience)

AI Modeling for personalization	□ **AI Model for personalization with Sequence Data** - Research and development of prediction models for sequence data using AI/ML algorithms - Exploratory data analysis for sensor data modeling - Sound data analysis & modeling for noise sound classification for digital appliances

Job Field	Job Description
Cloud Service R&D for Smart Appliances	□ **Cloud Service R&D for Smart Appliances** - Collection/refining of large-scale IoT Big Data transmitted by home appliances - Cloud native (K8S, CI/CD, etc.) infrastructure development and DevOps - Develop API interface/data standardization for product/service interoperation - Develop various SmartThings services for home appliances - Develop container based micro-service architecture - Database schema design and query implementation
On-device AI for Inference and Training	□ **On-device AI Model Development** - Deep learning models for recognizing, detecting and predicting presence, texture, and temperature, respectively - Model optimization/compression with trade-off between performance and memory □ **On-device Training for Personalization** - Re-train pretrained models in devices' operations with the data collected in real-time - Apply the state-of-the-art technologies of continuous learning, incremental learning, transfer learning, federated learning, etc.

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6. Big Data Center

Big Data Center : 'In order to achieve data-based work innovation, the Big Data Center develops and operates an environment where employees can easily and intuitively utilize company-wide data. It is an organization that aims to contribute to management by analyzing/utilizing large and diverse types of data generated from all Samsung Electronics products and creating new business insights. In addition, it leads the Paradigm Shift of rapidly changing Big Data technologies such as generative AI and large-capacity data processing. It provides a variety of data services, and the center's flagship service is Samsung Account, which manages more than 1.7 billion global user information in various regions and processes more than 200,000TPS of service requests.

1. SW Developer

Position	SW Developer
Job	Data Engineering
Details	- [DevOps / MLOps / LLMOps Development] Development environment and operating environment automation development - [Application Server Development] BackEnd / FrontEnd Development, API Server Development, Security Development - [Solution Architect] Service (AI) Framework, MSA-based Orchestration, Big Data Framework, Real-time Data Processing Framework, Security Framework Development - [Data / AI Engineering] Big data-based preprocessing, workflow, DM / DW, AI modeling / training / evaluation / serving system development - Development of data modeling system for [Data Modeling] service (recommendation, personalization, abnormal detection, etc.)
Requirement	- A challenging spirit to analyze and solve difficult problems by Deep Dive - Adaptive ability through fast learning speed in rapidly changing IT and AI environments - Not satisfied with the existing method, but will to find a better method and constantly expand one's knowledge and ability - Have experience using public cloud such as AWS, GCP, Azure, etc. - Have SW development experience
Preferred Qualification	- IaC (Infra as Code)-based Infra management automation technology (e.g., Terraform) - Microservice architecture-based architecture design and service development technology (e.g., Kubernetes, Helmchart) - CI / CD-based build / test / distribution automation technology (e.g., Github Action, Argo)

2. SW Engineering & Security

Position	SW Engineering & Security
Job	Data Engineering
Details	SW Engineering : - Find quality improvement items through software analysis -Systematization of software development process and continuous software quality control and improvement - Software architecture change management Security: - Design and development of cloud-based server security that can respond to external security threats - Service and data access control design to prevent personal information leakage - Security design for internal structure for stable service development - Development of technology to prevent abnormal information theft from outside - Design to prevent risk factors by analyzing the flow of personal information
Requirement	SW Engineering : - Software development process establishment experience - Software quality management process establishment and execution experience - Experience of software code quality and development culture improvement activities - Experience in managing software architecture changes - Software verification Security: - Server security and personal information security review and design experience - Micro Service Architecture-based server development experience - Cloud-based security function / non-function requirement analysis experience
Preferred Qualification	'SW Engineering : - Various SE work experience - Software R&D job experience - Test-driven software development experience - Agile development process application experience - Understanding the SW development process considering security/personal information - Understanding the process of processing Big Data Security: - Experience in backend development related to large data collection, platform data processing, and data loading - Java, Spring framework-based Backend development - Application design/development experience for large-scale data and real-time processing - OAuth, OpenID Connect, JWT, Access control (ACL, RBAC, ABAC) - Development experience in public cloud environment such as AWS, GCP, etc.