2023 TOSHIBA Research Internship Themes

Research & Development Center (RDC)

Master or Doctor 1* 1*

No.	Research Domain	Research Subject	Face to Face	On-line	Research Topics	Knowledge and Experience	Number of people	
							Master	Doctor
RD-1	AI·Machine learning	Pattern analysis & classification	-	✓	Internship students will conduct research and development for pattern analysis and classification, with the aim of improving productivity of factories or manufacturing places. Specifically, investigation, implementation, and evaluation for latest technologies of signals, images and data records clustering and classification based on statistical analysis or machine learning (especially, deep learning) will be conducted.	Applicants should have a ·Experience about programming of Python and using deep learning framework such as TensorFlow, PyTorch, and so on. ·Basic knowledge of statistical analysis or machine learning (especially, deep learning) .	1*	1*
RD-2	AI·Machine learning	Media analysis & processing	-	✓	Internship students will conduct research and development for media data analysis and processing, with the aim of automating plant operation and maintenance. Specifically, investigation, implementation, and evaluation for latest technologies of signal, image, and text (natural language) analysis and processing based on deep learning will be conducted.	Applicants should have a ·Experience about programming of Python and using deep learning framework such as TensorFlow, PyTorch, and so on. ·Basic knowledge and experience about any one of a signal, image, and text analysis and processing using deep learning techniques.	1*	1*
RD-3	AI·Machine learning	Deep learning platforms	-	✓	Internship students will conduct research and development for deep learning platforms, with the aim of labor-saving and automating of deep learning model design and so on. Specifically, investigation, implementation, and evaluation for latest technologies of compaction, architecture search, generalizing, semi-supervised learning, weakly supervised learning, domain adaptation, contrastive learning etc. of deep neural networks will be conducted.	Applicants should have a ·Experience about programming of Python and using deep learning framework such as TensorFlow, PyTorch, and so on. ·Basic knowledge of deep learning.	1*	1*
RD-4	AI·Machine learning	R&D of Image, Speech, Text and Cross-modal Understanding Technology	✓	✓	·Image, speech, text understanding ·Cross-modal understanding ·Knowledge construction using the above technology ·Research and implementation about the above technology	·Experience of programming and using an open source framework (TensorFlow, Pytorch etc.) ·Basic knowledge about any of: image, speech and text processing	2*	2*
RD-5	AI·Machine learning	R&D of three-dimensional sensing, autonomous behavior, simulation for robots	✓	✓	·Three-dimensional sensing, SLAM*, prediction, simulation for robots to move autonomously ·Research and implementation about the above technology *SLAM: Simultaneous Localization and Mapping	·Experience of programming ·Basic knowledge about any of: deep learning, robot control, and computer vision	1*	1*
RD-8	IoT	Cloud-native IoT Edge	✓	✓	Survey on communication protocols and relevant solutions for IoT devices, and development of software modules for them.	Knowledge about computer networks, and experiences of computer network programming in C, JavaScript, and Python	1	0
RD-13	Sensing systems	Advanced MEMS Gas and Environmental Sensors	✓	-	·You can experience an R&D regarding advanced hydrogen/CO2 gas and environmental sensors. ·Through understanding, measurement, observation, and analysis of the prototype sensors, you can practice the methodology and logical thinking required for research.	·High intellectual curiosity and motivation. ·Basic knowledge of MEMS, electronics, material mechanics is recommended. ·In addition, it is desirable to have knowledge and experience of programming such as Python.	1*	1*

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RD-15	Magnetics/Superconductivity MI/AI	Development of magnetic materials/superconducting materials using MI	✓	-	Extract and quantfy material structural factors that contribute to material properties by applying MI to observation images of magnetic materials and superconducting materials. A new material evaluation method using images is examined.	Those who have basic knowledge of inorganic materials and have programming experience in Python. Interest in and knowledge of materials informatics and image analysis are even better.	1*	1*
RD-20	Cyber security	Cyber Resilience	-	✓	Survey on the latest cyber resilience technologies, look at issues of the technologies against actual cyberattack cases, and verify usability by using actually cyber-resilience tools.	·Basic computer skill (NW, OS) ·Interest in cyber security	1*	1*
RD-22	Cyber security	Offensive / Defensive Security	-	✓	Option 1: Investigate into publicly-known cyber attacks, try them, and summarize them in an attack catalog. Option 2: Collect traces of attacks and investigate how we can use them to detect cyber-attacks.	Strong interest in cyber-attacks. Linux skills are preferred.	2	0
RD-24	Power Electronics	Research for realization of renewable energy as the main power source from the viewpoint of economy.	✓	✓	Economical and technical investigation for realization of renewable energy as the main power source from the viewpoint of economy.	Interst for research including funding. Eelectrical engineering, Economics	1*	1*
RD-28	Wireless, Sensing	Measurement and Detection technology using millimeter waves	✓	✓	Measurement and detection technologies using millimeter waves and AI for infrastructure equipment.	Experience of digital signal processing and AI techlogies. Interest for anomaly detection technology. Experience of reading technical papers.	1*	1*
RD-35	Machine Learning	High-dimensional data analysis (sparse modeling)	✓	✓	Implement and evaluate regression and classification models using high-dimensional data such as genetic and manufacturing data.	Basic knowledge of machine learning and statistics. R and Python programming experience.	1*	1*
RD-37	Sensing system	R&D of a non-destructive inspection technology and system using AE sensors	✓	-	Development of systems to detect faults in machinery or structures based on AE sensing. Specifically, experiments, signal processing, and evaluation of prototype systems will be conducted.	Applicants should have a basic knowledge of physics, electrical/electronics/information, or mechanics. Must be interested in and willing to work outside of their area of expertise.	1*	1*

Digital Innovation Technology Center (DITC)

Master or Doctor
1*   1*

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							Master	Doctor
DI-5	Embedded Linux	Study of Embedded Linux system with WebAssembly technology	-	✓	Throughout this research, you will work on the research of a WebAssembly technology on Linux. In Toshiba Digital Inovation Technology Center, we develop and distribute our Debian-based Linux distribution for embedded devices, which is supposed to be used for Toshiba products. You will survey, research and evaluate latest WebAssembly related technology.	Programming (Excellent skills for C, Python) English (Reading/Writing)	1	1
DI-7	Software Engineering	Research and development tools for management of Open Source Software	-	✓	Our aim is to research and develop tools that are essential for open source utilization. Ultimately, we plan to contribute and publish code to the open source community beyond our company. We will discuss and coordinate specific tools and methods of contribution such as new feature development, bug fixes, documentation cleanup etc. By participating in this project, you can learn how to make contributions to the open source community. Additionally, the contributions you make to the OSS community during the internship will be a valuable achievement for your future.	·We are looking for individuals who are interested and passionate about developing and utilizing open source software, and are willing to work on it. ·Programming experience is desirable, although there are no restrictions on programming languages. ·It would be beneficial to be able to discuss topics in English within the OSS community outside of the company when necessary.	1	1