[ETRI] Study Proposal of International Admission for 2020 Spring Semester

No.	Major	Sub-Major	Research Group (Team)	Study and Research Proposal
1	ICT	Computer Software	AI Lab	· Visual Intelligence based Nutrition(Food & Nutrients) detection and analysis – AI based Food & Nutrients detection – Multi foods segmentation based automatic nutrition and calorie recognition – Multi Nutrients segmentation based automatic nutrition and calorie recognition · DNN based human action recognition – Development of AI based human action recognition – Image based human 3D skeleton pose estimation – Graph convolution network based precise action recognition – 3D skeleton Dynamics and Wavelet transformation realtime action recognition · Deep Neural network based Pedestrian-Simultaneous Localization And Mapping – Sensor(IMU, Accelerometer, magnetometer, etc) based pedestrian localization spatial environment awareness – Image based pedestrian localization spatial environment awareness – Multi modal based pedestrian localization spatial environment awareness
2	ICT	Communication & Media Technology	Broadcast Media Research Institute	· Future mobile communication technologies – Wireless communication technologies for 5G mobile networks – 5G network infrastructure technologies – Millimeter-wave mobile communication networks · IoT network technologies – IoT connectivity technologies for low-power wireless communications – IoT convergence technologies in industrial, public, and smart life areas – Intelligent IoT network technologies

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3	ICT	Communication & Media Technology	Broadcast Media Research Institute	· Broadcasting and media technologies – Broadcast based technologies for high efficiency broadcast media – Ultra-realistic UHD broadcasting & service technologies – Disaster alert broadcasting service technologies – Video technologies for realistic media service
4	ICT	Advanced Device Technology	ICT Creative Research Lab./ Materials and Components Research Division	· Component/Device Technology Development – Development of two-dimensional semiconductor technology and new functional devices using it as future semiconductors beyond conventional semiconductor technology – Development of low power neuromorphic synaptic materials and devices that mimic human brain – Various device process and module technology research to improve solar cell device performance – Ultra high density electron source based on nano materials and new concept of digital X-ray source, smart medical image and industrial nondestructive inspection parts and system research – Chip-level optical data I / O method to study ultra-fast, low-power mass communication technology between silicon chips – Synthesis of low dimensional nanomaterials and high quality graphene, high performance heterojunction devices, optoelectronic devices, and high performance sensors – Production of electronic devices such as energy conversion and storage materials / devices and meta devices for ICT using nano materials, meta-structure technology and 2D / 3D printing technology – Research on the development of design, materials and process technologies for fusing digital and RF devices and sensors into 2.5D / 3D modules based on through silicon via (TSV) technology
5	ICT	Advanced Device Technology	ICT Creative Research Lab./ Reality Devices Research Division	· Develop key technologies in next-generation display, convergence sensor, sensory image panel, and skin device – Research on materials and element technologies applicable to flexible devices that are attracting attention as next generation displays – Research on reflective / transmissive display technologies such as hologram technology, backplane technology for driving display panels, and electrochromic technology – High sensitivity sensor material based on nano material, ultra small MEMS sensor device based on MEMS process, signal processing ROIC that processes signals obtained from sensor device with high sensitivity and broadband characteristics, power supply including intelligent algorithm that gives intelligence, high efficiency secondary battery Control and convergence sensor devices that integrate each of these key elements

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6	ICT	Advanced Device Technology	ICT Creative Research Lab./ Photonic/Wireless Devices Research Devision	· Development of optical component technology and millimeter wave optical radio integrated module for ultra-high speed system of tens of terabits or more based on optical integrated circuit, high-speed photon technology – Development of 400Gb / s bandwidth variable optical transmission / reception module and its components based on coherent optical communication technology using polarization split phase modulation method for large data transmission in optical communication network – Based on GaN-based HEMT device technology, high output MMIC and PA module for mobile communication base station / terminal radar, high efficiency energy saving power semiconductor source and core technology are developed – 3D laser imaging and quantum computer based technology research – Research on subscriber optical parts and next generation light source technology
7	ICT	Information Security Engineering	–	· Development of Cyber Self Mutation Technologies for Proactive Cyber Defence – Development of security assessment automation technology – Development of network dynamic mutation technology · Development of detection technology for Fileless and Document type malware. – Development of deep learning based detection technology for fileless malware using powershell. – Development of document type malware detection technology using structure of document and text keywords of malicious script in document. · Extraction of key from noisy data – Development of reliably extraction key technology from a variety of noisy data with machine learning – Proof of the stability of key extraction techniques and preparing countermeasures against attacks · Research on public key verification structure for information-centric network – Development of Topology based on scalability, resilience, cost, migration, node and content mobility – Design appropriate standard metrics for quantifying network performance

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8	ICT	Information Security Engineering	-	· Development of Universal Authentication Platform Technology with Context-Aware Multi-Factor Authentication and Digital Signature - Development of user authentication technology based on biometric information(face, voice, behavior) - Development of user context-aware technology · Development of Blockchain Identity Management System with Implicit Augmented Authentication and Privacy Protection - Development of implicit user authentication technology - Development of decentralized identity management service technology