List of research topics for NII International Internship Program 2020 **- On-Site**

No.	Research area	Title of the research	Website	Name of supervisor	Title of the supervisor	Requirements for applicants: Master's / Ph.D. Student	Total number of acceptance per supervisor	Duration : 2-6months (less than 180days)	Comments
1. Principles of Informatics Research Division									
S1	Foundations of Big Data Analysis	Sensitivity Analysis of Algorithms	https://arxiv.org/abs/1904.03248 https://arxiv.org/abs/2006.04094 https://arxiv.org/abs/2009.04556	Yuichi Yoshida	Associate Professor	PhD students	3	2-6 months	
S2	Foundations of Big Data Analysis	Sublinear-Time Algorithms on Real Functions and Matrices	https://arxiv.org/abs/2007.07449 https://arxiv.org/abs/1909.03391	Yuichi Yoshida	Associate Professor	PhD students		2-6 months	
S3	Foundations of Big Data Analysis	Spectral Graph Theory for Digraphs and Hypergraphs	https://arxiv.org/abs/2006.08302 https://arxiv.org/abs/1809.04396 https://arxiv.org/abs/1807.04974	Yuichi Yoshida	Associate Professor	PhD students		2-6 months	
S4	Foundations of Big Data Analysis	Submodular Function Optimization	https://arxiv.org/abs/2004.14650 https://arxiv.org/abs/2002.05477	Yuichi Yoshida	Associate Professor	PhD students		2-6 months	
S5	Artificial Intelligence / Web Informatics	Semantic Web / Linked Data / Linked Open Data	http://lod.ac http://www-kasm.nii.ac.jp/	Hideaki Takeda	Professor	Master's or PhD students	3	3-6months	
S6	Artificial Intelligence / Web Informatics	Social Web / Social Media Analysis / Social Network Analysis	http://www-kasm.nii.ac.jp/	Hideaki Takeda	Professor	Master's or PhD students		3-6months	
S7	Artificial Intelligence	Articiial Social Intelligence: building intelligence systems with social knowledge and social interaction		Hideaki Takeda	Professor	Master's or PhD students		3-6months	
S8	Artificial Intelligence	Ethics on Articial Intelligence		Hideaki Takeda	Professor	Master's or PhD students		3-6months	
S9	Software verification	Separation logic	http://research.nii.ac.jp/~tatsuta/index-e.html	Makoto Tatsuta	Professor	Master's or PhD students	2	2-6 months	
S10	Machine Learning	Geometric analysis of machine learning	https://mahito.nii.ac.jp/	Mahito Sugiyama	Associate Professor	PhD students	2	6 months	

2. Information Systems Architecture Science Research Division									
S11	Wireless and Mobile Networks, Sensing, Signal Processing, Machine Learning	AI and Machine Learning-based wireless networks for beyond 5G and 6G	http://www.nii.ac.jp/en/faculty/architecture/kaneko_megumi/	Megumi Kaneko	Associate Professor	Master's or PhD students	3	4-6 months	Required programming skills: Matlab. Basic knowledge wireless/digital communications and signal processing is required.
S12	Wireless and Mobile Networks, Sensing, Signal Processing, Machine Learning	Energy efficiency optimization and energy harvesting for IoT wireless communcations and sensing	http://www.nii.ac.jp/en/faculty/architecture/kaneko_megumi/	Megumi Kaneko	Associate Professor	Master's or PhD students		4-6 months	Required programming skills: Matlab. Basic knowledge wireless/digital communications and signal processing is required.
S13	Wireless and Mobile Networks, Sensing, Signal Processing, Machine Learning	Integrated terrestrial and spatial wireless communications for beyond 5G and 6G	http://www.nii.ac.jp/en/faculty/architecture/kaneko_megumi/	Megumi Kaneko	Associate Professor	Master's or PhD students		4-6 months	Required programming skills: Matlab. Basic knowledge wireless/digital communications and signal processing is required.
S14	Machine Learning, Software Engineering, Testing and Debugging	Automated Testing and Debugging of Machine Learning-based Systems	http://research.nii.ac.jp/~f-ishikawa/en/lab.html	Fuyuki Ishikawa	Associate Professor	Master's or PhD students	5	2-6 months	
S15	Cyber-Physical Systems, Software Engineering, Testing and Debugging	Automated Testing and Debugging of Autonomous Driving Systems	http://research.nii.ac.jp/~f-ishikawa/en/lab.html	Fuyuki Ishikawa	Associate Professor	Master's or PhD students		2-6 months	
S16	Cyber-Physical Systems, Software Engineering, Safety Engineering, Formal Methods	Safety Analysis and Verification for Cyber-Physical Systems	http://research.nii.ac.jp/~f-ishikawa/en/lab.html	Fuyuki Ishikawa	Associate Professor	Master's or PhD students		2-6 months	

3. Digital Content and Media Sciences Research Division									
S17	Traditional Geometric Computer Vision	3D Reconstruction for Large-Scale Image Collections; 3D Scan Using Mobile Devices; Underwater 3D Reconstruction	https://researchmap.jp/yinqiangzheng?lang=en	Yinqiang Zheng	Associate Professor	Master's or PhD students	4	2-6 months	Students aiming at top conferences (ICCV, CVPR, ECCV) and journals (PAMI, IJCV) are encouraged to join us.
S18	Data-Driven Geometric Computer Vision	Deep Learning for 3D Capture, Point Cloud Denosing, Surface Completion, CAD Model Extraction and Realistic Rendering	https://researchmap.jp/yinqiangzheng?lang=en	Yinqiang Zheng	Associate Professor	Master's or PhD students		2-6 months	Students aiming at top conferences (ICCV, CVPR, ECCV) and journals (PAMI, IJCV) are encouraged to join us.
S19	Traditional Photometric Computer Vision	Multispectral and Hyperspectral Imaging System; Spectral Image Denosing and Superresolution; Intrinsic Images; Polarizing Imaging;	https://researchmap.jp/yinqiangzheng?lang=en	Yinqiang Zheng	Associate Professor	Master's or PhD students		2-6 months	Students aiming at top conferences (ICCV, CVPR, ECCV) and journals (PAMI, IJCV) are encouraged to join us.
S20	Data-Driven Photometric Computer Vision	Deep Learning for Image Enhancement, Colorization, Style Transfer; Data-Driven Optimal Camera Design for Object Detection and Recognition	https://researchmap.jp/yinqiangzheng?lang=en	Yinqiang Zheng	Associate Professor	Master's or PhD students		2-6 months	Students aiming at top conferences (ICCV, CVPR, ECCV) and journals (PAMI, IJCV) are encouraged to join us.
S21	content-based image and video analysis	video and image search (esp. TRECVID AVS task. see: http://www-nlpir.nist.gov/projects/trecvid/)	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Master's or PhD students	3	more than 90 days	
S22	content-based image and video analysis	identification of specific object in video and image (esp. TRECVID instance search. see: http://www-nlpir.nist.gov/projects/trecvid/)	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Master's or PhD students		more than 90 days	
S23	content-based image and video analysis	Video Event Analysis (esp. TRECVID ActEv task. see: http://www-nlpir.nist.gov/projects/trecvid/)	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Master's or PhD students		more than 90 days	
S24	content-based image and video analysis	Disaster Scene Analysis (esp. TRECVID Disaster Scene Description and Indexing (DSDI): see http://www-nlpir.nist.gov/projects/trecvid/)	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Master's or PhD students		more than 90 days	
S25	content-based image and video analysis	Landmark image retrieval, e.g., Google Landmark Image Retrieval https://www.kaggle.com/c/landmark-retrieval-2020.	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Master's or PhD students		more than 90 days	
S26	Text Media	Language grounding and dialogue systems	http://www-al.nii.ac.jp	Akiko Aizawa	Professor	Master's or PhD students	3	3-6 months (6 month is preferable)	Master's or PhD students
S27	Text Media	Natural language understanding, generation, and scientific paper analysis	http://www-al.nii.ac.jp	Akiko Aizawa	Professor	Master's or PhD students		3-6 months (6 month is preferable)	Master's or PhD students
S28	computer vision	One of the following topics: (1) 3D vision, (2) Human activitiy recognition, (3) Gaze sensing and navigation, (4) Object segmentation from video using deep learning, and (5) Image/video generation using deep learning	http://www.dgcv.nii.ac.jp	Akihiro Sugimoto	Professor	Master's or PhD students	5	Up to 6 months (at least 3 months; a longer period is better)	Rigorous background on mathematics is required. Strong programming skills on image processing and computer vision are also required. In the case of Master course students, highly motivated students who can stay for 6 months are preferable. Students who are willing to pursuit ph D at NII are preferable as well. Potential applicants should send your CV and research interests/proposals directly to Prof. Sugimoto before your application.
S29	digital geometry	(1) Discretization model of geometric shape, (2) Discrete shape fitting to noisy integer points.	http://www.dgcv.nii.ac.jp	Akihiro Sugimoto	Professor	Master's or PhD students		Up to 6 months (at least 3 months)	Rigorous background on mathematics as well as computer vision is required. In particular, sufficient knowledge of linear algebra, graph theory and number theory are important requirements. Programming skills on image processing or computer vision are also required. Potential applicants should send your CV and research interests/proposals directly to Prof. Sugimoto before your application.
S30	Digital Humanities	Machine learning for image processing (esp. character recognition), geographic information, linked data and metadata management for cultural heritage	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Master's or PhD students	4	3-6 months	A student with programming skills and interests in real problems is preferred.

S31	Earth Environmental Informatics	Big data analytics (esp. image processing, remote sensing and machine learning) for societal problems such as environment and sustainability	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Master's or PhD students		3-6 months	A student with programming skills and interests in real problems is preferred.
S32	Crisis Informatics	Big data analytics (esp. image processing, natural language processing, and machine learning) for natural disasters, pandemics and crisis	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Master's or PhD students		3-6 months	A student with programming skills and interests in real problems is preferred.
S33	Open Science	Research on a new trend of science, such as open data, data citation, citizen science, and open innovation	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Master's or PhD students		3-6 months	A student with programming skills and interests in real problems is preferred.
S34	Multimedia Data Mining and Analysis	Multimodal deep learning for cross-modal retrieval between image and text, venue inference, multimedia content recommendation	http://research.nii.ac.jp/~yiyu/	Yi Yu	Assistant Professor	Master's or PhD students	4	3-6 months	
S35	Artificial Intelligence and Music	Deep generative model for lyrics-to-melody generation, melody-to-lyrics generation, singing voice synthesis	http://research.nii.ac.jp/~yiyu/	Yi Yu	Assistant Professor	Master's or PhD students		3-6 months	
S36	Computer science, compilation	Cooking Recipe Execution Plan Generation	https://perma.cc/YN55-P2J4	Frederic Andres	Associate Professor	Master's or PhD students	4	180 days	collaboration with the Process-centric functional grammar for generating and proving cooking recipes (Fun2GPCR)
S37	Artificial intelligence	Dish Tasting Learning Service	https://perma.cc/D8MX-4SLG	Frederic Andres	Associate Professor	Master's or PhD students		180 days	collaboration with the Big Data LOD benchmark meets Intelligent Food and Cooking Recipe project
S38	Fuzzy Theory	Fuzzy Approach-based MouthFeel Discovery	https://perma.cc/737J-7HKC	Frederic Andres	Associate Professor	Master's or PhD students		180 days	collaboration with the Big Data LOD benchmark meets Intelligent Food and Cooking Recipe project
S39	AI. Data science	Deep Learning-based Water Crystals Classification	https://perma.cc/7EAF-NJNL	Frederic Andres	Associate Professor	Master's or PhD students		180 days	Collaboration with the Computational Challenges in AI beyond Deep Learning 3.0 project
S40	Algorithm, Optimization	Research and development of scalable CDR (Conflict Detection and Resolution) algorithms for Unmanned Aircraft Systems ("drone") Traffic Management (UTM)	http://research.nii.ac.jp/~prendinger/papers/FY2020(1)_Topics.html	Helmut Prendinger	Professor	Both okay	3	4-6 months	Please check the website for details!
S41	Deep Learning, Robotics	Advanced Robotics Challenge (World Drone Competition): Environment recognition and person detection from drone perspective	http://research.nii.ac.jp/~prendinger/papers/FY2020(1)_Topics.html	Helmut Prendinger	Professor	Both okay		4-6 months	Please check the website for details!
4. Information and Society Research Division									
S42	Educational Data Mining, Knowledge Tracing, Learning Analytics	Personalized learning and cognitive diagnostic modelling		Yuan Sun	Associate Professor	Master's or PhD students	1	2-6 months	
5. Management and Outside Collaboration on R&D									
S43	Theory (Algorithmics, Statistics, Machine Learning)	Theory of Intrinsic Dimensionality	https://www.dropbox.com/s/punl3fqlkek0xh2/proj-theory-of-ID.pdf?dl=0	Michael Houle	Professor	Either	4	4-6 months	Priority given to PhD students, and for internships of 6 months. Shorter internships (2-3 months) are possible for students who are already collaborators.
S44	Data Mining / Machine Learning	Feature Selection and Intrinsic Dimensionality	https://www.dropbox.com/s/cpgsxqosk5jd6tf/proj-feature-selection.pdf?dl=0	Michael Houle	Professor	Either		4-6 months	Priority given to PhD students, and for internships of 6 months. Shorter internships (2-3 months) are possible for students who are already collaborators.
S45	Data Mining / Machine Learning	Anomaly Detection and Intrinsic Dimensionality	https://www.dropbox.com/s/wokjllg5qfyykua/proj-anomaly-detection.pdf?dl=0	Michael Houle	Professor	Either		4-6 months	Priority given to PhD students, and for internships of 6 months. Shorter internships (2-3 months) are possible for students who are already collaborators.
S46	Data Mining / Machine Learning	Classification and Intrinsic Dimensionality	https://www.dropbox.com/s/ltyb63zm0f46wru/proj-classification.pdf?dl=0	Michael Houle	Professor	Either		4-6 months	Priority given to PhD students, and for internships of 6 months. Shorter internships (2-3 months) are possible for students who are already collaborators.

Added									
As of Oct. 30th									
S47	Interactive Information Retrieval	Understanding and Modeling User Behaviour during Complex Search Task	The current project page has not been set up, but the previous related project page is available at; http://cres.jpn.org/?FrontPage	Noriko Kando	Professor	Either Master and PhD students are fine, but priority will be given to PhD student	6	6 months	The grand target of the project is to propose a mechanism to support the users conducting complex/exploratory search tasks. As a step toward the target, several internship research tasks are prepared as following, but not limited to: 1) enhance the method to assess the "success" of complex/exploratory search outcome based on Concept map and others, 2) investigate user search bahaviour in terms of dwell time, link depth, search trail, , engagement, perceived task difficulty, cognitive task complexity, and/or outcome, 3) investigate the relationship between user's attributes such as domain expertise, task familiarity, time constraint, etc. and the search behaviour and outcomes, 4) building and/or enhancing the tools usable for the above mentioned 1) -3). Any other topic related to this research direction shall be considered.
S48	Interactive Information Retrieval and Human Computer Interaction	Research and Developing a lifelog camera- or a sensor- based method to enhance the interaction between in-building museum visitor and artifacts displayed at Museum. Use iPadPro 2018.	Enhance a functionality of detailed interaction between visitor and exhibits using lifelog-cameras or any other light-weight sensoring devices.	Noriko Kando	Professor	Either Master and PhD students		6 months	Enhance the interaction functionality of the current prototype system of an interactive exploratory user guide using ipadPro 2018. For the sensors, the current prototype system using iBeacons, and this project will investigate and try tother mechanisms to sense and identify user's behaviour in the museum.
S49	Human computer Interaction, Design	Design method of the postcard which containing the images of the artifacts that the visitor observed in the museum visit, based on	To enhance the prototype Interactive user guide system for Museum, this project conducts user experiment to obtain the feedback	Noriko Kando	Professor	Either Master and PhD students		6 months	Related to the above-mentioned #2 project.
S50	Argument Mining / Argument Summarization / Argument Structure Analysis	(1) Argument Mining / Argument Summarization / Argument Structure Analysis, or (2) Sentiment Analysis	https://poliinfo.github.io/	Noriko Kando	Professor	Either Master and PhD students		6 months	Regarding a challenge on political information analysis in the NTCIR's QA Lab shared task series and JSPS Funded Project on Stance Analysis, this project aims 1) survey of the exisiting literature on argument analysis (mining, summarization, structure analysis), 2) propose system(s) for automatic argument analysis / mining / summarization using either a) NTCIR-16 Polinfo Corpus (Japanese), or b) any other corpus in English. For (2) Sentiment analysis
S51	Citation analysis	Citation analysis of the "Information Retrieval" domain		Noriko Kando	Professor	Either Master and PhD students		6 months	To analyse the trend and structure of research area of Information Retrieval (IR) and Interactive Information Retrieval (IIR) using various citation analysis methods including co-citation mapping. Compare the analysis published in 1991*, analyse how the domain had been developped over the three decades [NB: * Noriko Kando et al (1991) "Structure of Information Retrieval Research: Tracking the Specialties and Develpment of Research Using Co-citation Maps and Citation Diagrams"
As of Nov. 6th									
S52	text mining	text mining based on embedding models	https://www.tlab.nii.ac.jp	Atsuhiro Takasu	Professor	Master's or PhD students	3	3 - 6 months	
S53	spatio-temporal mining	data analysis and mining methods for sensor/trajectory data	https://www.tlab.nii.ac.jp	Atsuhiro Takasu	Professor	Master's or PhD students		3 - 6 months	
As of Jan. 12th									
S54	Computer Graphics	Fluid Simulation	https://ryichando.graphics	Ryoichi Ando	Assistant Professor	Master's or PhD students	1	180 days	