AOYAMA GAKUIN UNIVERSITY
COLLEGE OF SCIENCE AND ENGINEERING
<u>Possible internship projects in 2020</u>

Laboratories other than the following faculties' are also available on request basis.
http://www.aoyama.ac.jp/en/undergraduate/science/faculty.html

Department of Integrated Information Technology

Prof. SUMI, Kazuhiko
https://www.researchgate.net/profile/Kazuhiko_Sumi

1. 3D human model (human shape and pose estimation)
Given a depth image and/or a color image taken from Microsoft Kinect like depth camera, estimate the human body shape (surface model of the human) and pose (skeleton model of the human). For example, see https://www.jstage.jst.go.jp/article/jcmsi/10/5/10_402/_article
(Pre-requirement: knowledge of C/C++/python programming, linear algebra, linux os.)

2. 3D object model (structure from motion)
Given a video of an object, a room, or a building taken by a mobile camera, then construct the 3D surface model of the object, the room structure, or a building structure. For example, see http://ieeexplore.ieee.org/document/7986844/
(Pre-requirement: knowledge of C/C++/python programming, linear algebra, linux os.)

3. Audio-video annotation
Given a short video clip, then generate sentences that describe the video contents from both of the audio features and video features. For example, see
http://openaccess.thecvf.com/content_ICCV_2017/papers/Hori_Attention-Based_Multimodal_Fusion_ICCV_2017_paper.pdf
(Pre-requirement: knowledge of C/C++/python programming, linear algebra, linux os.)

4. Single-shot or few-shot object model learning for robot manipulation
Given a single or few images of the target object and pre-trained object detection neural network, then update the neural network so as to detect the target object in an arbitrary pose. For example, see https://arxiv.org/pdf/1812.01866.pdf
(Pre-requirement: knowledge of C/C++/python programming, linear algebra, linux os.)

5. Face image generation for training dataset
Given an existing real human faces, then generate a large scale human face dataset that has similar difficulty for personal identification, gender classification, and age estimation.
(Pre-requirement: knowledge of C/C++/python programming, linear algebra, linux os.)

Prof. Martin J. DÜRST

http://www.sw.it.aoyama.ac.jp/Dürst

mailto:duerst@it.aoyama.ac.jp

Contributing to Ruby or Ruby on Rails
Ruby is an object-oriented programming language of Japanese origin used world-wide. Rails is a ground-breaking Web framework. Our Lab has made various contributions to Ruby, in particular in the area of internationalization (i.e. adapting software to to work for a wide range of languages and scripts). You will be able to learn and possibly contribute to the programming language Ruby, to libraries using Ruby (for example libraries for numeric computation or machine learning) and/or the Web framework Ruby on Rails. The work may be carried out in Ruby or in C.

Prof. TOBE, Yoshito

http://rcl.it.aoyama.ac.jp/?page_id=189

1. Gesture-based wireless communication over Bluetooth
2. Unmanned Aerial Vehicle (UAV) operation using Linux
3. Mobile-Phone-based Participatory Sensing

Assoc. Prof. LOPEZ, Guillaume

http://www.wil.it.aoyama.ac.jp/

https://www.researchgate.net/profile/Guillaume_Lopez

1. Development of SmartWatch application to estimate and log user activity (sleep, concentration, eating behavior, emotion, stress, etc.)
2. Development of a SmartWatch application to support sport skill improvement (sprint, baseball, tennis, ping-pong, badminton, etc.)
3. Development of an original smart accessory using Arduino tiny board, sensors (pressure, light, IR, temperature, etc.), and actuators (LED, vibration, heat, etc.)
4. Development of AR application for Microsoft HoloLens head-mounted display, that can communicate with wearable devices or hand-made sensors.

Assoc. Prof. YUE, Yonghao

https://www.cg.it.aoyama.ac.jp/

mailto: yonghao@it.aoyama.ac.jp

Examples of projects are:

1. C++ coding for developing offline renderers (accounting for inter-reflections and multiple scattering)
2. C++ coding for developing continuum mechanics simulators based on the material point method (for simulating granular materials, Herschel-Bulkley fluids, etc.)
3. C++ coding for developing shape design tools (e.g., shape design for fabricating lenses)

Department of Industrial and System Engineering

Prof. ISHIZU, Syohei
http://www.agnes.aoyama.ac.jp/en/ise/faculty/ishizu.html

1. Education tools for data analysis based on QC problem solving
2. Analysis system for customer affective evaluation

Prof. OUCHI, Noritomo
http://www.agnes.aoyama.ac.jp/en/ise/faculty/ouchi.html

1. Data analysis with R
(Economic data analysis, business data analysis, patent data analysis)
2. Development of learning support tools for data analysis

Prof. ONODA, Takashi
http://www.ise.aoyama.ac.jp/~ml_out/index-e.html

Research Interests
1. Ensemble Learning
2. Support Vector Machines & Kernel Methods
3. Transductive Inference & Constraint Clustering
4. Outlier Detection
5. Artificial Intelligence
6. Real World Application

Prof. MATSUMOTO, Toshiyuki
http://www.agnes.aoyama.ac.jp/en/ise/faculty/matsumoto.html

1. Development of Improvement Method for Production Activities
2. Development of Practical Education System for Industrial Engineering

3. Development of Education and Management for Environmental Problems

Remark: An applicant should have high programing ability.

Prof. KURIHARA, Yosuke

http://www.agnes.aoyama.ac.jp/en/ise/faculty/kurihara.html

1. Development of signal measurement system
   (Bio-signals, Activities of daily living, Motions for sports)
2. Signal processing analysis with Matlab
   (Time series data analysis, Frequency analysis, State estimation)

Prof. KUMAGAI, Satoshi

http://www.agnes.aoyama.ac.jp/en/ise/faculty/kumagai.html

1. Business Process Management (Business process and data modeling)
2. Development HVAC (Heating, Ventilation, and Airconditioning) Management System
   (Data analysis of HVAC data.)
3. Financial analysis of corporation

Prof. SUNG, Shao-Chin

http://www.agnes.aoyama.ac.jp/en/ise/faculty/sung.html

1. Cooperative Games Simulation: Coalition Formation, Group Activity Selection
2. Scheduling Algorithms: Single-Machine Scheduling, Just-in-Time Scheduling, Shop Scheduling
3. Network Design: Network Formation Games, Reliability Based Network Design, Multi-Objective Network Optimization

Prof. MIZUYAMA, Hajime

http://www.agnes.aoyama.ac.jp/en/ise/faculty/mizuyama.html

1. Agent-based discrete-event simulation: Modeling and programming
(Production and service provision processes, logistics and supply chains, etc.)
2. Web-based human computation systems: Prototype design and implementation
(Prediction market games, ESP-like GWAP systems, etc.)

Assoc. Prof. KOBAYASHI, Kazuhiro

https://raweb1.jm.aoyama.ac.jp/aguhp/KgApp?kyoinId=ymdeyogmggy in Japanese language

1. Continuous Optimization (Semidefinite Optimization, Second-order Cone Optimization)
2. Mathematical Optimization in Supply Chain Management
3. Algorithm Design

Department of Mechanical Engineering

Prof. KUMANO, Hiroyuki

http://www.agnes.aoyama.ac.jp/en/me/lab/kumano.html
http://www.me.aoyama.ac.jp/~kumano/ in Japanese language

Thermal Engineering
<Research Fields>
Thermodynamics, Thermal Engineering, Thermal Energy Storage System, Heat Transfer in Solid Liquid Phase Change, Measurement of Thermophysical Properties

Prof. CHO, Hideo

http://www.agnes.aoyama.ac.jp/en/me/lab/cho.html
http://www.me.aoyama.ac.jp/~www-msl/ in Japanese language

Non-destructive Testing and Evaluation
<Research Fields>
Non-destructive Evaluation, Ultrasonic Measurement, Laser Ultrasonic, Acoustic Emission, Corrosion Engineering

Prof. FUMOTO, Koji

http://www.agnes.aoyama.ac.jp/en/me/lab/fumoto.html
http://www.me.aoyama.ac.jp/~fumoto/ in Japanese language

Heat and Mass Transfer
<Research Fields>
Heat Pipe, Heat Removal, Heat Transfer Enhancement, Micro Heat Exchanger, Thermal Storage, Bio-Heat Transfer, Thermal and Fluid Control.

Prof. YOKOTA, Kazuhiko

http://www.agnes.aoyama.ac.jp/en/me/lab/yokota.html

http://www.me.aoyama.ac.jp/~yokota/ in Japanese language

Experiments and Simulations on the Fundamental Flows

<Research Fields>

Aeronautics and Astronautics, Aeronautical and Astronautical Vehicles, Engines and Propulsion, Experimental Fluids Engineering, Computational Fluids Engineering, Theoretical Fluids Engineering, High Speed Aerodynamics, Turbomachinery, Fluids Machinery, Fluids Devices

Prof. YONEYEMA, Satoru

http://www.me.aoyama.ac.jp/~yoneyama/index_e.html

http://www.me.aoyama.ac.jp/~yoneyama/ in Japanese language

Experimental Mechanics

<Research Fields>

Strain Measurement with Optical Methods, Optical Methods and Image Processing Applied to Solid Mechanics, Mechanics of Time-dependent Materials, Viscoelasticity, Digital Image Correlation, Inverse Problem, Fracture Mechanics

Department of Electrical Engineering and Electronics

Prof. KOH, Shinji

http://www.agnes.aoyama.ac.jp/en/eee/faculty/koh.html

http://www.ee.aoyama.ac.jp/koh-lab/index.html   in Japanese

Materials science and technology of graphene-based devices

1. CVD growth of graphene films on Cu substrates
2. Evaluation and control of electron transport characteristics of graphene sheets
3. Fabrication and evaluation of graphene-based chemical sensors
4. Fabrication and evaluation of graphene-based bio-fuel cells
5. Fabrication and evaluation of graphene-based microwave devices

Prof. YONEYAMA Jun

http://www.ee.aoyama.ac.jp/Labs/yoneyama-www/index-e.htm

Control system analysis and design

1. Attitude control of helicopters based on optimal control theory which minimizes a certain performance function

2. Underactuated control system such as position control of 2-wheel and/or 4-wheel vehicles

3. Nonlinear system control via fuzzy systems theory with applications to a vehicle with trailers

* Students will learn control theory and Matlab programming.

Assoc. Prof. MATSUMOTO, Hirokazu

Power electronics

1. Wireless power transfer systems for automatic guided vehicles

2. Converter circuits for DC-AC, AC-DC, DC-DC conversion

Department of Physics and Mathematics

Prof. MITSUI, Toshiyuki

http://www.agnes.aoyama.ac.jp/en/phys/faculty/mitsui.html

http://www.phys.aoyama.ac.jp/~w3-mitsui/index.html sorry, in Japanese

<Research Fields>

Materials science, Experimental physics and biology

1. Fabrication of nano-bio sensor

2. Single DNA detection

You will work on Si based microfabrication, semiconductor processing and low noise measurement by home build electronics. You may do finite element based numerical simulation.

Department of Chemistry and Biological Science

Prof. HASEGAWA, Miki

http://www.agnes.aoyama.ac.jp/en/bio/faculty/hasegawa.html

http://www.chem.aoyama.ac.jp/Chem/ChemHP/inorg2/index.html

<Research Field>

Photochemistry of Coordination Compounds

Luminescent lanthanide complexes with organic ligands will be examined by the based on molecular design. Also, it is possible to make a skill to observe luminescence of lanthanide complexes here.

Prof. Miyano, Masashi

http://www.agnes.aoyama.ac.jp/en/bio/faculty/miyano.html
http://raweb1.jm.aoyama.ac.jp/aguhp/KgApp?kojinId=ahbfde in Japanese
https://scholar.google.co.jp/citations?user=voJif10AAAAJ&hl=ja&oi=ao

<Research Field>
Structure determination of proteins with medicinal interests by X-ray crystallography and elucidation of their molecular function based on the atomic structure. Internship program is from the theoretical background of the macromolecular single crystallography to a practices of protein crystallization and diffraction data collection including practical crystallographic calculations for beginner protein crystallography.