AY2025 Plans of Creative Factory Seminar
2025年度創造工房セミナーについて

Code	Theme	Instructors (main instructor)
CFS01	Human Activity Analysis and Recognition using Machine Learning Techniques	SHIN, J.
CFS02	Map and track yourself from the ground and the air! Self-positioning and 3D surveying with rover and drone 陸空から地図を作って自分を追跡してみよう！　GNSSを使ったローバー自己位置同定とドローンによる3D測量	DEMURA, H., OGAWA, Y., YAMADA, R., HONDA, C.
CFS03	Teleoperation of Robot Arm with Haptic Feedback	JING, L.
CFS04	Performance Improvement of an Application Using an FPGA Board	SAITO, H., KOHIRA, Y., TOMIOKA, Y.
CFS05	Developing Parallel Big Data Analytical Framework for Knowledge Discovery in Multiple Timeseries Data	RAGE, U. K.

セミナーの成果を発表する「ポスターセッション（9月19日（金）開催予定）」への参加が必須です。

成績はポスターセッション終了後に決定されます（確定は10月）。

Students are required to participate in Poster Session scheduled on September 19 (Fri).

Grades will be determined after the Poster Session in October.

CFS01	Human Activity Analysis and Recognition using Machine Learning Techniques
Instructors	SHIN, J.
Course Schedule	June 10 – September 13 * Product creation: June 10 – September 13
Abstract	In recent years, human activity analysis and recognition based on video analysis or sensor data analysis has attracted considerable attention in research and industrial community. This course aims the human activity analysis and recognition using machine learning techniques. The applications of human activity analysis and recognition are spreading in various fields, such as detecting suspicious behavior in public areas, healthcare, elderly people monitoring, fitness tracking, working activity monitoring, human computer interaction, intelligent video surveillance, human-robot interaction, human disorder identification and so on. The purpose of this course is to study feature extraction, selection and machine learning algorithms and use those algorithms to develop human activity analysis and recognition system. In the case of applications, we will mainly focus on human neurological disorder identification and gesture recognition. The basic procedure of a system is as following: 1. Human activity data collection (video based or sensor based) 2. Feature extraction and selection 4. Build the classification or matching or clustering or regression model 5. Take the unknown person data 6. Test and evaluate the model Through this course, we can learn the fundamental knowledge of data analysis, pattern matching, and pattern recognition in the area of human activity analysis and recognition.

CFS02	陸空から地図を作って自分を追跡してみよう！　GNSS を使ったローバー自己位置同定とドローンによる 3D 測量 Map and track yourself from the ground and the air! Self-positioning and 3D surveying with rover and drone
Instructors	（Main）　DEMURA, H. （Sub）OGAWA, Y., YAMADA, R., HONDA, C.,
Course Schedule	June 9 – July 29
Abstract	Operate a rover and a drone on the Hakoniwa (Moon-Mars Garden) in RTF, self-positioning with mapping from ground and air. Implement and experience a chip using multi-GNSS, which is becoming increasingly common in IoT devices. The deliverables are the procedures for 3D surveying and GNSS self-positioning, as well as the data and 3D visualization. 月火星箱庭 RTF 模擬月面走行路でローバーとドローンを運用し、陸空から地図を作りつつ自己位置同定を行う。IoT 機器で普及しつつあるマルチ GNSS を使ったチップを実装し、体験する。成果物は、3D 測量ならびに GNSS 自己位置同定の手順、そのデータ、その 3D 可視化、である。 Schedule: Every Mon/Tue 9-10th p, one-day exercise in RTF, and preparation of posters via online #1 6/9(Mon), 10(Tue)　Self-positioning, GNSS, RTK #2 16(Mon), 17(Tue)　Surveying in 3D #3 23(Mon), 24(Tue)　SLAM #4 30(Mon), 7/1(Tue)　GNSS chip installation on Drone and Rover #5 7/7(Mon), 8(Tue)　ditto #6 14(Mon), 15(Tue)　Indoor Practice #7 21(Tue), 28(Mon)　ditto ## 7/29(Tue) Extra Day　RTF Experiments (rover driving/drone flying, data acquisition)　by a chartered bus ## Aug.-Sept.　Online mtg. to prepare for the poster (Date and Time to be determined with students) ## Sept. 19　CFS Presentation ※なお、会津大学から RTF への借り上げバスは、SCCP の下記見学と共用する。 楢葉遠隔技術開発センター https://fukushima.jaea.go.jp/visit/decommissioning.html 東日本大震災・原子力災害伝承館　https://www.fipo.or.jp/lore/ ロボットテストフィールド福島　https://www.fipo.or.jp/robot/

CFS03	Teleoperation of Robot Arm with Haptic Feedback
Instructors	(Main) Lei JING (Sub)
Course Schedule	July 1 – September 15
Abstract	When people grasping an object with hand, they can tell the object with the tactile feedback, even closing their eyes. In this project, we will challenge the possibility to teleoperate a robot arm with the haptic sensors on both robot hands and human hands. And to verify the whether the close loop feedback between the robot and human can essentially improve the teleoperation efficiency. In this project, the students can expect to learn the following knowledge and skills: - fundamental working mechanism of the tactile sensors - robot arm control - motion capture system usage - robot and hand operation simulation with Unity Seminar Schedule: stage 1 (Jul. 1~15) : Project understanding, definition of the system, task assignment, make the development plan. stage 2 (Jul. 16~Aug.31) : system development and evaluation stage 3 (Sep.1~Sep.15) : summary on the project and prepare the presentation

CFS04	Performance Improvement of an Application Using an FPGA Board
Instructors	(Main)　SAITO Hiroshi (Sub)　KOHIRA Yukihide, TOMIOKA Yoichi
Course Schedule	June 16 – September 15 * Product creation：June 16 － September 12
Abstract	Objective: The main objective of this seminar is to accelerate an application using a field programmable gate array (FPGA) board. Through this seminar, students learn circuit design, performance improvement, or power optimization. Moreover, students learn how to use a tool such as Electronic Design Automation (EDA) tool for their development. Through the seminar, students study 1. how to model an application using a language 2. how to use a tool 3. how a synthesized circuit works on an FPGA board 4. evaluation of the developed circuit Method: 1. Selection of an application such as image processing 2. Modeling of the application using a language 3. Synthesis of an integrated circuit using Intel Quartus Prime or Xilinx Vitis 4. Simulation of the synthesized circuit using a simulator 5. Execution of the synthesized circuit

CFS05	Developing Parallel Big Data Analytical Framework for Knowledge Discovery in Multiple Timeseries Data
Instructors	（Main）Rage Uday Kiran (Sub)
Course Schedule	June 15 – September 15 * Product creation： July 1 － August 15
Abstract	Air pollution is major cause for many cardiorespiratory problems in Japan. Every year at least 60,000 Japanese are dying due to air pollution. To confront this problem, Ministry of Environment, Japan has set up a nation-wide sensor network, called SORAMAME, to record air pollution levels throughout Japan on an hourly basis. The raw data generated by this sensor network naturally exist as Spatiotemporal big data. Useful information that can empower the users (e.g., environmentalists and policy-makers) lies in this big data. The objective of this course is to develop a tool kit that can facilitate the experts to find useful information hidden in the big air pollution data. In this Create Factory Seminar, students will first develop a Big Data Air Pollution Analytical Framework using Hadoop, HBase, and Spark system. Next, students will develop ETL (Extraction, Transformation, and Load) technologies to store the SORAMAME data into the developed big data information. Next, students will develop novel distributed pattern mining algorithms to discover patterns in the big air pollution data. Next, students will evaluate their distributed algorithms against the state-of-the-art sequential/distributed algorithms.