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| Course Name [科目名] | Mathematics for Data Mining & Security |
| Instructor Name [教員] | Seiji Hotta and Shun Watanabe |
| Course Credits [単位数] | 3 |
| Course Overview [概要] | This course aims to cultivate a better understanding of roles of mathematics in information science through introducing principles of data mining and security. In the data mining section, we will examine popular data mining techniques (anomaly detection, clustering, classification, regression, and data visualization) with some practice problems for understanding of the necessity of mathematical optimization and linear programming problem. In the security section, we will learn basics on the number theory and algebra such as Euclidean algorithm, polynomial, and extension field, accompanied with some applications such as the RSA cryptography and the Reed-Solomon code. |
| Course Key Words [キーワード] | Mathematical information technology, data mining, security |
| Academic Goal [目標] | This course is designed to give an overview of various basic mathematical theories for data mining and security. The course will give students an overall understanding of these fields and would make them realize that mathematical methodologies play important roles in information technologies. The course will be based on lectures, discussions, and doing small projects. |
| Course Schedule [授業内容] | Data mining section:  Anomaly detection  Regression  Classification  Clustering  Data Visualization  Security section:  Euclidean algorithm  RSA cryptography  Polynomial  Extension field  Reed-Solomon code |
| Textbooks, References,  and Supplementary Materials  [テキスト、参考書、その他] | Data mining section:  Texts and simple codes (Octave) will be provided via a website.  Security section: Texts will be suggested in the class. |
| Grading Philosophy  (Percentage / Criteria / Methodology)  [成績評価の方法] | Exercises in each lecture. |
| Other  (i.e. Expectations on Classroom  Conduct and Decorum etc.)  [その他] |  |