

List of Dissertation Abstract (Department of Information Environment)

Name	Supervisor	Title	Abstract
ABE Toshiki	OZEKI Kenta	Colorings and dominating sets of graphs on surfaces	A coloring of a graph is the mapping from the vertex set to positive integer so that no two adjacent vertices receive the same colors and the chromatic number is the minimum cardinality needed to color the vertices of the graph. In this thesis, we evaluate chromatic numbers and analogical ones for planar graphs and near planar graphs and we solve List Coloring Conjecture partially, which is still an open problem. Moreover, we evaluate the domination number of planar graphs by using a coloring method.

UEMURA Toshiaki	TOMII Takashi	An Energy Consumption Database of Electric Vehicle Utilizing Vehicle Driving Logs	In this research, we constructed an Electric Vehicle (EV) energy consumption database using vehicle driving logs. By collecting the sensor data of the vehicles currently drive by the users and estimating the energy consumption of EVs, our system predicts the "energy consumption in the future when users change their car from Internal Combustion Vehicles to EVs. In this paper, we showed practical examples of the useful use of the data about EV's energy consumption obtained from the database to demonstrate problems specific to EVs can be solved by using vehicle driving logs.
--------------------	---------------	---	--

ENAMI Kengo	NEGAMI Seiya	Re-embedding structures of graphs on surfaces and related topics for graph colorings	<p>We study topological graph theory and hence deal with embeddings of graphs on surfaces. Since a graph may not have only one embedding on an embeddable surface, the following two questions attracted many topological graph theorists: (1) How many (distinct) embeddings on a surface does a graph have? (2) What kind of structures generate these embeddings of the graph? We often call such a structure the re-embedding structure and call the topic about these questions re-embedding theory. We hope that this thesis can contribute to development of re-embedding theory.</p>
KANEI Fumihiro	MATSUMOTO Tsutomu	A Study on Analysis of Threats that Prevent Use and Distribution of Secure Mobile Applications	<p>I propose a framework that prevents threats of fraudulent monetization caused by tampering of Android apps. The proposed framework increases the cost of attacks by making automated tampering of Android apps more difficult, while reducing the benefits of attacks by performing ad fraud detection that is difficult to avoid. This makes attacker's fraudulent monetization of app tampering inefficient and forces them to discontinue their attacks.</p>

KOIDE Takashi	MATSUMOTO Tsutomu	A Study on Analyzing Cyber Attacks through Active and Passive Observation	<p>This thesis focuses on cyber attacks against many and unspecified users or devices, which affect a wider range of users. Current existing countermeasures are effective against individual attacks, but reactive and limited to these attack techniques. These countermeasures will not respond to changes in attack techniques and the evolution of devices in the future. In this thesis, we propose methods for observing cyber attacks targeting many and unspecified users and devices on the Internet by combining passive and active observation. Correlation analysis of the observation from two perspectives allows us for a faster and more comprehensive collection of cyber attacks in the wild.</p>
---------------	----------------------	---	--

KOBAYASHI Masayuki	NAGAO Tomoharu	A Study on Improving the Interpretability of Image Classification Models	Although machine learning techniques have received considerable attention and demonstrated outstanding performance, their uninterpretable nature is still considered to be a major problem. This black-box nature leaves only two questions: why and how did they reach their decision? Therefore, it is important to review work on machine learning interpretability. In this study, we take a closer look at model interpretability and propose methods that can achieve reasonable performance while maintaining high interpretability. To this end, we propose methods for designing more interpretable training methods, gaining an insight into how model works, and learning more interpretable models.
-----------------------	-------------------	--	---

<p>HIGUCHI Nobuhiro</p>	<p>HARASHITA Shushi</p>	<p>On the boundary components of central streams and determining their Newton polygons</p>	<p>In algebraic geometry and number theory, p-divisible groups are important research objects. For the universal family of p-divisible groups, its base scheme canonically has structures of a foliation and stratifications. In this research, we treat the most important leaf of the foliation: central streams. The central stream is determined by a line graph which is called a Newton polygon, and it is defined as the locus the fibers over which are minimal p-divisible groups with the Newton polygon. In this paper, we classify the boundary components of central streams and determine their Newton polygons, which was an unresolved problem.</p>
-----------------------------	-----------------------------	--	--

MAEZAWA Shunichi	OZEKI Kenta	Connected subgraphs with certain properties in dense graphs	<p>A Hamilton path is a path containing the all vertices of a graph and a spanning tree is a tree containing the all vertices of a graph. Degree conditions and forbidden subgraph conditions for a sufficient condition of the existence of a Hamilton path have been studied. Graphs satisfying these conditions tend to have many edges compared with the number of vertices. Such graphs are called dense graphs. We show degree conditions and forbidden subgraph conditions for the existence of spanning subgraphs that are extended concepts of a Hamilton path, for example, a spanning tree with bounded maximum degree and a spanning tree with bounded total number of branch vertices and leaves.</p>
---------------------	-------------	---	--