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Master's Thesis
Academic Year 2014

Customized Recommendation for Business
Logistics - Objective Oriented Recommendation
Mechanism

Graduate School of Media Design,
Keio University

Xiejing Yu

A Master's Thesis
submitted to Graduate School of Media Design, Keio University
in partial fulfillment of the requirements for the degree of
MASTER of Media Design

Xiejing Yu

Thesis Committee:

Associate Professor Kazunori Sugiura	(Supervisor)
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Abstract of Master's Thesis of Academic Year 2014

Customized Recommendation for Business Logistics -
Objective Oriented Recommendation Mechanism

Category: Science / Engineering

Summary

This research propose a objective oriented recommendation mechanism for business logistics management in physical world, the business logistics focus on the efficiency in management, and its mission is to make the best arrangement and distribution of the items within the business logistics scope.

This research takes the KMD resource management as a case, analyze lending and returning information recorded in the system since 2010, the analysis also includes the evaluation and observation of the real management environment, and some features of Graduate School of Media Design. Proposal based on the case study result is a model of a objective oriented recommendation mechanism, which provides useful instruction for users, help them to find what they need in a short time, and make a proper plan based on the instruction, also encourage them to fulfill the use of the equipment, to reach the goal of efficient management.

Keywords:

Business Logistics, Customized Recommendation, Audio Visual, Objectives, Property Management

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Chapter 1

Introduction

The vast development in information and communication technology (ICT) has changed the outlook of many traditional business sectors. Logistics models in business were initially developed with a core aim of better efficiency in getting the right item to the right person at the right time in the right place, now have evolved gradually but significantly to embrace the advancement in technology. To have the capacity to maintain and manage large storage quantity and complex delivery inquires, the digitization of management procedures and the adoption of innovations utilizing the Internet and big data technology are crucial to business logistics in the 21st century.

How could ICT models and applications facilitate people getting things that better suits their aims, in a shorter processing time, and thereby accelerate the circulation in logistics? Based on the model of content-based commendation recommendation algorithm based on analyzing the content users selected viewed or purchased, this project proposed and evaluated the model of objective oriented recommendation that to take the objectives why people use the item as the content to stretch the border of business logistics in the age of Internet.

The recommendation system built on the Dynamic Item-Based Recommendation Algorithm is one of the solutions to tackle with large quantity of inquires and actions efficiently in electronic commerce. By exploring the similarity in aggregated data of online behavior through collecting, categorizing and analyzing, this recommendation system enables business to specifically target their audience or customers of different ages, income level, field of occupation and preferences.

Successful stories of this system are commonly heard from online-trading and content-sharing websites such as Amazon [2] and YouTube [19].

Comparing to individual customers on Amazon and YouTube, customers in business logistics are large organizational entities with clearer preferences and needs, more routined and slowly-evolved behaviors.

The recommendation system works on the principium that by analyzing the behaviors of a large population of users, or a large amount of individual behaviors of a specific user, to find the similarities in these behaviors, so to communicate the information to targeted audience.

As the ultimate goal of business logistics service is to make best arrangement of the items within business scope, for businesses with clearly defined objectives, their customers' purchase behavior are highly objective-oriented, therefore, are traceable and applicable to scientific analysis. Therefore, the adoption of recommendation system in business logistics could be the solution to manage large circulation of items and equipment with advanced technology.

In this research, we are aimed to establish an objective -oriented recommendation mechanism recommendation for business logistics management.

Based on the content-based recommendation, the objective-oriented recommendation mechanism is settled on the assumption that people's ultimate aim of obtaining an item (or a group of items) is to fully utilize its designated function. In this case, all purchase or rental inquiries are rational and reasonable, and therefore, can be aggregated for analysis. Taken the objectives of people obtaining a specific item as the content variables, this mechanism provides the analysis of connections between the items that meet people's requirement, the relevance between these items and purchasers' social characters (such as age, income level and occupations), as well as the compatibility between different contents in a series of related works.

To study the applicability of the system, this project takes the KMD resource management [10] (the facility provided by Graduate School of Media Design at Keio University, with the main business of lending digital equipment, such as video camera, tripod, and PCs, to KMD students, in order to help satisfying with the hardware needs they may met while in doing research) as a case, analyzing the 4 years borrowing information recorded in the system, also combine with the real

environment for management, and feature of Graduate School of Media Design, to discovery effective objective, to make a proper recommendation mechanism. Through which to provide useful instruction for users, to help them find what they need in short time, and make a proper plan based on the instruction, also encourage them to fulfill the use of the equipment, to reach the goal of efficient management.

The case study result shows that in the concrete environment in KMD Resource management, users do use the equipment for some certain objectives, which is describe as the audiovisual activities.

Extend the objective oriented recommendation mechanism to a general field of business logistics industry with multiple actors and large scale business, and help the division with different objectives make a proper arrangement of the items is expected as the future work.

The structure of this research is stated as follows:

Chapter 2 will introduce the general environment of the business logistics and related works and researches in customize recommendation, also the successful application of recommendation system.

Chapter 3 describes briefly about the concept, which includes the proposal outline, the methodology, the research model and the anticipated results.

Chapter 4 present a case study in a concrete environment, which is the core experiment of the research.

Chapter 5 come up with a proposal based on the issues found in the result of the case study, detail system descriptions including system design and interface will be introduced in this chapter.

Chapter 6 is the evaluation of the case study and the proposal discussed in Chapter 5, which focus on evaluation how much the result of the case study match the concept of the objective oriented recommendation, and discuss the merits and limitation of the proposal. Opportunities and difficulties in promoting the system into general business logistics is also a issue in the scope of this chapter.

Chapter 7 come to the conclusion of the research and the future work.

Chapter 2

Related Works

The goal of this research is to come up with a customized recommendation for business logistics, to reach the goal of improving logistics management in the physical world.

In this chapter, we will give an overview introduction about the business logistics including the definition and development of it, and come over several issues that we can take into consideration to improve in research. We also introduce several recommendation solutions that have been widely used in the real business currently, to discuss and come up with a possible solution that effectively suits the logistics management environment.

2.1. Business Logistics

2.1.1 What is Business Logistics

The term of business logistics has evolved since the 1960s [12], defined as "the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements" [5].

The mission for business logistics is "to get the right goods or services to the right place, at the right time, and in the desired condition, while making the greatest contribution to the firm" [5].

The typical logistics activities can be roughly classified into core activities and supporting activities, in two big channel: the physical supply channel and the physical distribution channel [5]. The core activities take place in every supply and distribution channel, they contribute the most to the total cost of logistics. Key logistics activities includes customer service, transportation, inventory management. Support activities vary from company to company, a comprehensive list of support activities includes: ware housing, materials handling, purchasing, protective packaging, cooperation with production/operations and information maintenance(Figure2.1) [1,11].

Logistics is important because it creates value-value for customers and suppliers of the firm, and value for the firm's stakeholders. Value in logistics is expressed in terms of time and place. Products and services have little or no value unless they are in the possession of customers when(time) and where(place) they wish to consume them [5].

2.1.2 Development of Business Logistics

The business logistics focus on the resupply of goods needing limited amounts of producer repair or maintenance follow-up to industrial users and consumers, development in business logistics nowadays can be conclude as follows [5]:

- Lowering down the costs and improving the efficiency is becoming more and more significant.
- Globalization extend global industries, which expand the needs of careful management of logistics costs.
- Logistics variables are becoming more and more important in the minds of customers while they evaluating the service of offering a product.
- Customers are increasingly tending to expect a quick, and customized response to their demands.

All these changes indicate that modern business logistics think highly of the efficiency: quick, customized and low cost.

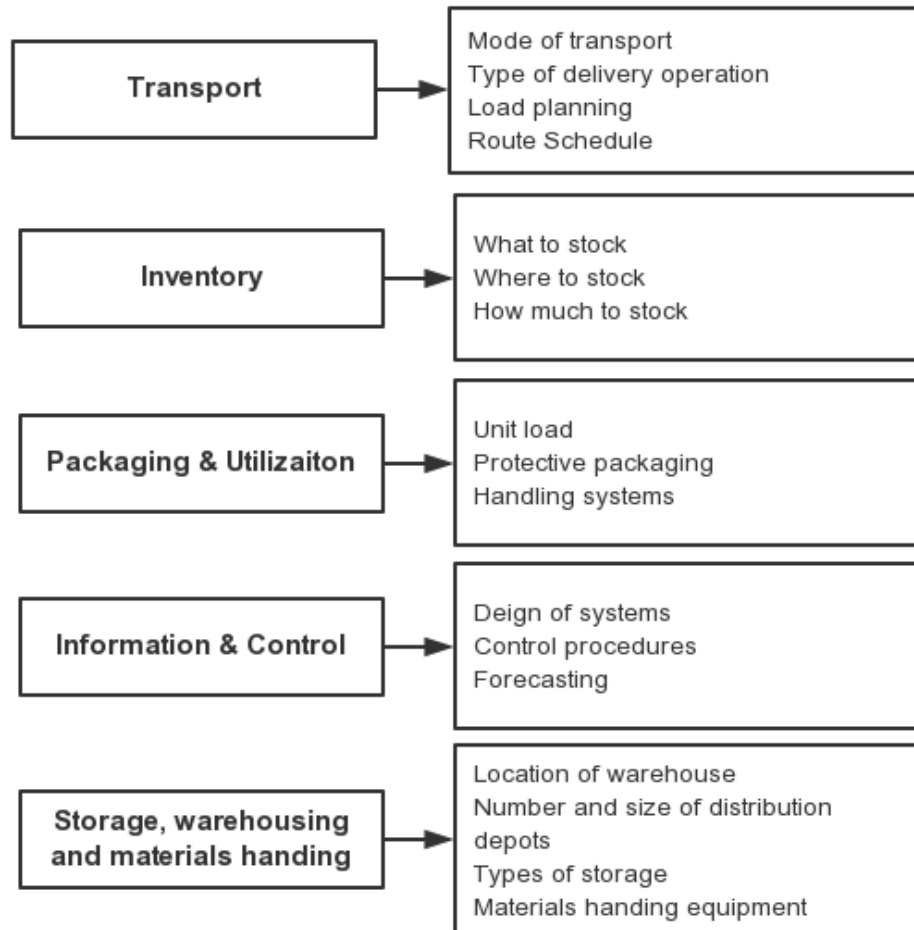


Figure 2.1: Business Logistics Activities

2.1.3 Issues in Research

Effective logistics usually involves with five issues: movement of product, movement of information, time/service, cost and integration, which are also the opportunities and fields for research in business logistics [8].

- Movement of products

It is easy to understand the importance of this issue, as for logistics, move of products is often the way most people think. Products moves should in keeping with the emphasis in cost reduction, inventory management, customer service. Whats more, products flow within the supply pipeline and the movement plan should be flexible [15].

- Movement of information

In business logistics, we must also have the information to learn the "right item", "right place", "right time", "right person".

The logistics industry is fertile ground for the application of technologies, applications such as smart phone mobile technology in the provision of proof pf delivery and delivery confirmation will create increased visibility of delivery status, improved cash flow, better management of supplies and reduced admin. Systematized forecasting techniques will also become essential to predict client demands to help hauler plan resource more proactively and intelligently [15,16].

- Cost

Cost is the key measure by which logistics effectiveness if often measured. There is no doubt about how important costs are. Cost reduction should taking service into consideration as well [15,16].

- Time/service

Time/service is a factor of competition, customer requirements, companies in the industry, logistics is a link among all these factors [15].

- Integration

Logistics is a process bringing all the factors-customer, industries, people involve in managing process together, its necessary to bring all those factors and make them work in a harmonious pace [15].

The five issues discussed above point out to several different perspectives for research in the field of business logistics, these perspectives provide us some direction we can think future for coming up with a proper solution to improve the efficiency of business logistics.

2.2. Customized Recommendation

As with the development of the Internet, studies in data is becoming more and more popular, as data provides the objective measure of all kinds of management. "You cant manage what you don't measure" [3]. This sentence explains why data is so important in business and management nowadays. Through data, we can measure the result of the business and get to know more about the businesses, which can be directly translated into improvement in decision making and performance. We can measure and therefore manage more precisely than ever before. We can make better predictions and smarter decisions. We can target more-effective interventions, and can do so in areas that so far have been dominated by gut ad intuition rather than data rigor [3, 17].

Recommendation mechanism is the result of the network technology and the accumulation of the data in the net world.

The direct goal for recommendation is to provide with certain group of people with useful information [13]. Recommendation in the physical world is fairly simple and monotonous, as it it impossible to meet needs to each individual, aggregate numbers is governed as the only possible choice. For example, the bookstore will only exhibit the popular books, which means, the intended readers are not clearly targeted.

Recommendation in digital world usually combined with recommendation algorithm, it is now widely used in the on-line business, on-line content site(Figure 2.2) [14], on-line advertising and social network(Figure 2.3) [6].

Recommendation system is a certain kind of web applications that involve predicting user responses to options. Such systems typically provide the users

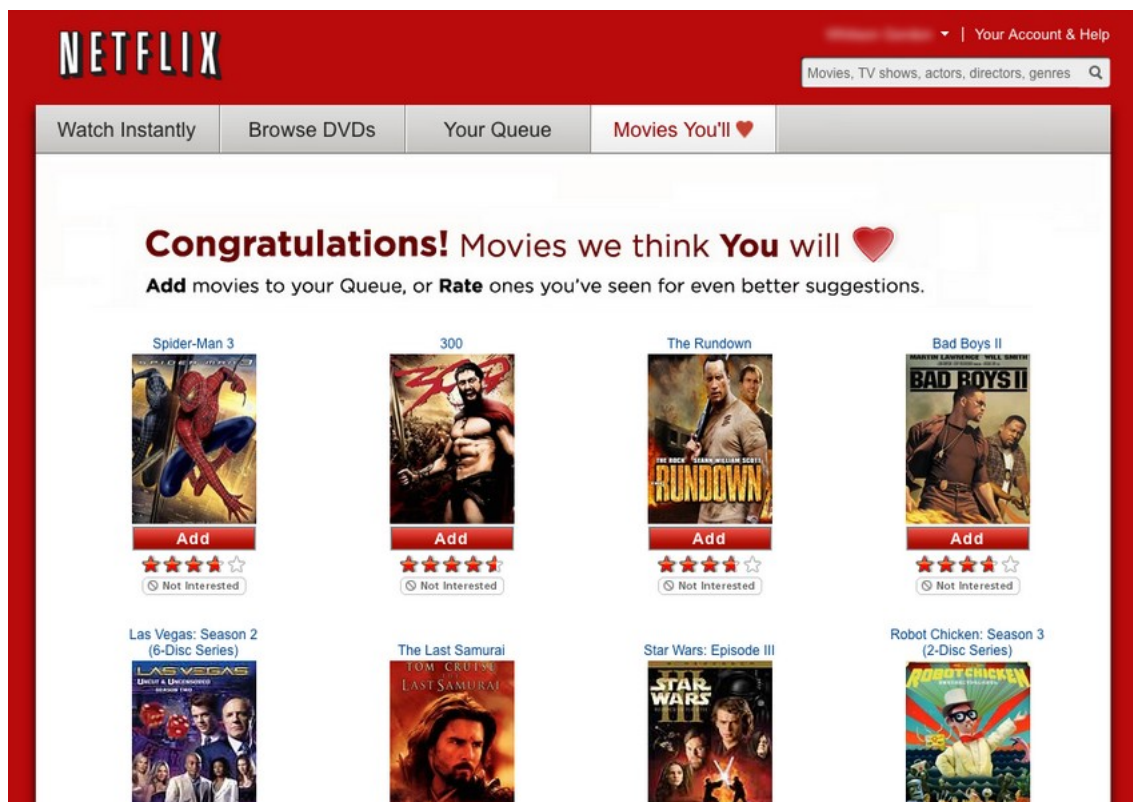


Figure 2.2: Recommendation in on-line Video Site

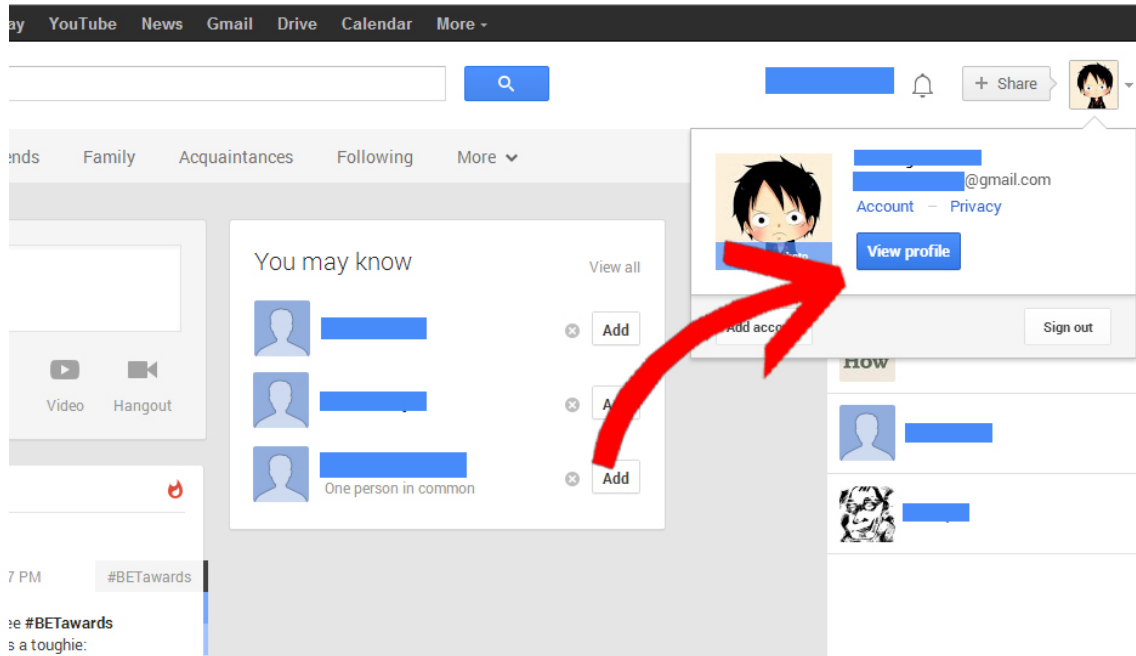


Figure 2.3: Recommendation in Social Network

with a list of recommend items they might prefer, thus expose the users to a huge collections of items. These systems help users to decide on appropriate items, and ease the task of finding preferred items in the collection.

There are two good examples of recommendation system.

Offering news articles to on-line newspaper readers, based on prediction of reader interest [6].

Offering customers of an on-line retailer suggestions about what they might like to buy, based on their past history and/or product searches.

Recommendation systems use a number of different technologies. We can classify these systems into two broad groups.

Content-based systems [18]examine proprieties of the items recommended. For instance, if a YouTube user has watched many war movies, then recommend a movie classified in the database as having the "War" genre.

Collaborative filtering systems [18]recommend items based on similarity measures between users and/or items. The items recommended to a user are those preferred by similar users.

User Preference is the core of recommendation system.

2.2.1 Amazon Item-to-Item Collaborative Filtering Recommendation System

Amazon is one of the typical on-line retailer that use recommendation algorithm to personalize the on-line store for each customer.

Amazon.com use recommendations as a targeted marketing tool in many Email campaigns and on most of its Web site pages, including the high-traffic Amazon.com homepage(Figure2.4).



Figure 2.4: Example of Recommendation Information on Amazon.com Homepage

Except for the recommendation information showed on the home page based on the items customer has viewed, Amazon.com also provide the service of "Recommended for you", customer can find the page of "Recommended for you" after logging in.

Figure2.5 shows an example picture of Amazons "Recommended for you".

As figure2.6 shows, Amazon's shopping cart recommendations, offer customers

[Your Amazon.com](#) > **Recommended for you**
(If you're not Yu Xiejing, [click here.](#))

Just For Today

[Browse Recommended](#)

Recommendations

[Apps for Android](#)
[Baby & Maternity](#)
[Car Products](#)
[DIY & Tools](#)
[DVD](#)
[Electronics, Camera & AV](#)
[Fashion](#)
[Food & Beverage](#)
[Foreign Books](#)
[Home & Kitchen](#)
[Japanese Books](#)
[Jewelry](#)
[Kindle Store](#)
[Large Appliances](#)
[MP3 Downloads](#)
[Music](#)
[Musical Instruments](#)

These recommendations are based on [items you own](#) and more.

view: **All** | [New Releases](#) | [Coming Soon](#)

- 

CakePHP2 実践入門 (WEB+DB PRESS plus)
by 安藤 祐介 (September 29, 2012)
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Figure 2.5: Example of Recommendation Information in "Recommended for you"

product suggestions based on the items in their shopping cart. The feature is similar to the impulse items in a supermarket checkout line, which are targeted to each customer.

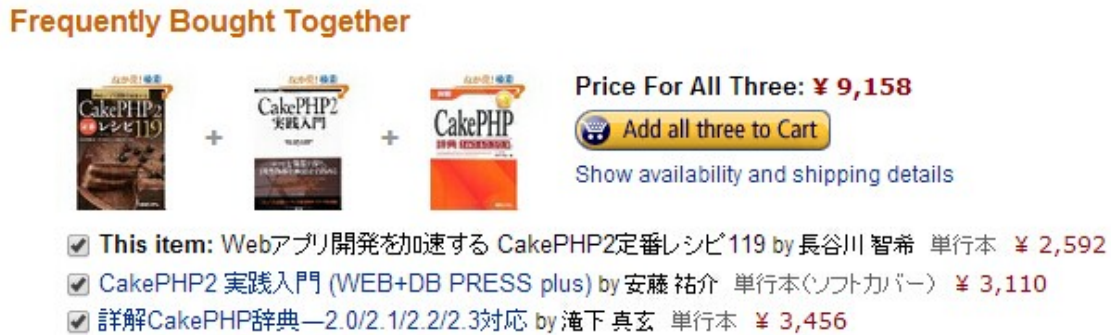


Figure 2.6: Example of Recommendation Information of "cart recommendation"

Amazon use Item-to-Item Collaborative Filtering algorithm [7], which focuses on the items rather than the users. It does not try to match the user to similar customers. Instead, it matches each of the user's purchased and rated items to similar items, and then it merges the similar items among them into one recommendation list unique to the user.

Amazon has more than 29 million customers and several million catalog. The amount of data and users is large enough for observing the similarity between items, and therefore make considerably precise recommendation [7].

2.2.2 YouTube Content Based Recommendation System

YouTube has developed to the world's most popular and widely used web video site. People from the whole world come to YouTube to discover, watch and share originally-created videos. YouTube provide s a forum for people to engage with video content across the global and acts as a distribution platform for content creator. Everyday, over a billion video plays are doe across millions of video by millions of users, and every minute, users upload more than 24hours of video to YouTube [9].

The recommendation information on the homepage is a feature of Youtube (Figure 2.7). YouTube represent a typical content-based recommendation.The

Recommended



蜡笔小新中文版【国语中字】第886集 小葵的秘密收藏
by POSYUCKIN 10,367 views
1 month ago



XTM HDTV 480p 新三国 three kingdoms 2010 中国 第52集
by AnHui Television 746 views
1 year ago



湖南卫视快乐大本营-黄晓明现场猛吃盒饭 张歆艺张译再登...
by 中国湖南卫视官方频道 China HuNanTV Official Channel
58,259 views 1 year ago



新三国演義 2010 DVD 92
by 三國新 17,017 views 1 year ago



新三国演義 2010 DVD 33
by 三國新 18,848 views 1 year ago



新三国1 粤语
by L CZ 31,232 views
9 months ago

Figure 2.7: Example of Recommendation Information on YouTube Homepage

recommendation information is generated based on the user's behavior, the system make recommendation by analyzing what the user has viewed automatically.

2.3. Discussion

As we have mentioned above, the mission of business logistics is to having the right item in the right quantity at the right time at the right place for the right price in the right condition to the right customer, or briefly, to maximize the efficiency of all the activities involved in the whole business logistics process. Time is one of the key factor that provide measurement of efficiency. A recommendation mechanism that can foretell all the information can be helpful in business logistics management.

The current existing recommendation are mostly personal oriented, they usually making recommendation based on personal preference. One reason lead to the result is that the occasion most recommendation system used are leading by individual opinion, neither the on-line business site nor on-line book site or video site.

Besides, in actual situations, business logistics management differs a lot according to the difference of the property managed and the environment the management operated.

The motivation I came up with the idea comes from my experience working as a manager at resource management department-the KMD Resource Management. Though it is a small department and only a small field in the big business logistics work, I found that the management differs a lot according to the changes in time and people we regarded as our active users are usually have several features in common. The purpose they borrow the equipment are also fixed.

On the other hand, I found several problems that may result to the low efficiency in current work. New student usually do not know what they have to borrow, and how long they will use the equipment, which lead to a result that they can not return the equipment on time, or sometimes they returned the equipment fairy earlier than the time arranged. These behavior add difficulties for making arrangement of other equipment. While the regular users usually forget to reserve the needful equipment in advance, while in some occasions during busy season,

they can hardly get what they want because most popular equipment already out of inventory.

Another finding is that in this situation, students act based on several same or similar objectives: shooting documentary video, preparing demo for a coming event, making concept video for a class, etc. Around these objectives, they usually borrowed a set of equipment they want.

Therefor, I believe if we can provide with them the useful information describing for what purpose/objective what set of equipment they should borrow, and each equipment may be needed for how many days, around what time they will need the equipment, for guidance, to instruct them make a proper borrowing plan, we can improve the current management a lot.

In general business logistic field, the circumstance is same. For example, while in the hospital logistics, the medical devices usually serve for a particular objective or purpose, maybe a cosmetic surgery. Around the objective of the surgery, a set of equipment including tweezers, scalpel and several other devices will also needed.

Therefore, we believe a objective oriented recommendation will be a proper solution for better management on lots of occasions in business logistics.

Chapter 3

Concept

In this chapter, we will come up with a solution based on the result of discussion in Chapter 2 and describe the detail objectives and contents of the proposal, as well as introducing the methodology and anticipated results of the research environment.

3.1. Objective Oriented Recommendation Mechanism

3.1.1 Overview

Discussion in Chapter 2 pointed out that the mission of the business logistics is efficiency, which detailed defined as having the right item in the right quantity at the right place for the right price in the right condition to the right customer. Among those "right"s, "right place" and "right time" are two of the key factor that influence the efficiency of business logistics.

Consider the group characteristic, the diversity and specify purpose directed features in the properties of business logistics, we propose a objective oriented recommendation mechanism in this research, to reach the goal stated above.

As discussed before, business logistics management differs quite a lot according to the difference in properties, it will be really hard to take all kinds of properties into consideration. In this research, we use the audiovisual properties as the

example, to discuss how to establish a recommendation mechanism for properties in this field based on the objectives why people use them.

Based on the content-based recommendation, the objective-oriented recommendation mechanism is settled on the assumption that people's ultimate aim of obtaining an item (or a group of items) is to fully utilize its designated function. In this case, all purchase or rental inquiries are rational and reasonable, and therefore, can be aggregated for analysis. Taken the objectives of people obtaining a specific item as the content variables, this mechanism provides the analysis of connections between the items that meet people's requirement, the relevance between these items and purchasers' social characters (such as age, income level and occupations), as well as the compatibility between different contents in a series of related works.

3.1.2 Proposal Outline

Efficiency in business logistics can be described as the best arrangement of the resources items, distribute them to person who want them or move them to the place they should be in at a proper time.

In order to get the item to the right person, observation of the objectives of the certain item, and for what purpose a person may using this item is necessary. Based which, to discuss the features of this group of people, and the relationship between the person and the equipment.

This research comes up with a recommendation mechanism for management in business logistics, based on analyzing the objectives of the item and the purpose why people using them.

The outline of the proposal showed as figure 3.1.

The first stage focus on collect the information of the usage of the items and for what purpose people may use them, gathering information in for one purpose what set of items are usually needed is also necessary.

Based on the essential information, we analyze the relationship between the item and person, the related items around one common purpose, also the related objectives which means one item may be used for several objectives, and we have to learn the connection between those objectives.

After analyzing, we can build a recommendation mechanism based on the

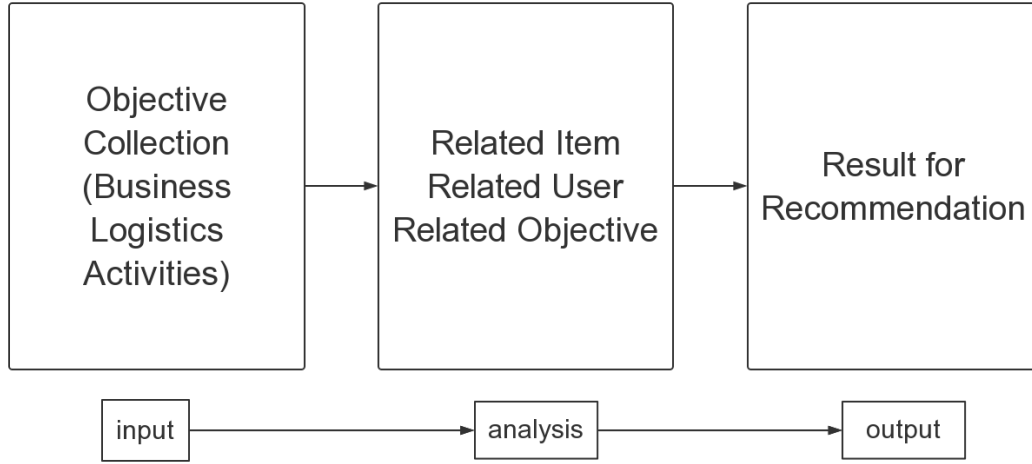


Figure 3.1: Proposal Outline

result.

3.1.3 Reality Analysis

As we have discussed, research on the recognition of objectives of the item is a direction we can taking into consideration for making a recommendation mechanism, to improve the efficiency in business logistics management. However, one of the biggest challenge in making a recommendation mechanism in the field of business logistics is that the specific management differs on the basis of the concrete environment, specific product, and particular industry, though they have lots in common, it's impossible to analysis all the industry in all environment. Therefor, in this research, we will take introduce a case study in the field of audiovisual items management.

Audiovisual(AV, or A/V) generally involves two aspects: the audiovisual activities and presentations, the audiovisual products.

Slide-tape presentations, films, television programs, business presentation, live or concert and some other events are all in the scope of audiovisual activities [4].

Actually we usually use set of equipment rather than only one certain item while we try to accomplish a goal. For example, in an audiovisual presentation,

people use lots of equipment such as the projector, mic and variety of connectors, all these different equipment begin to have a strong relationship between each other because of the specific objective of serving for the presentation.

If we ask how these different equipment connect for a objective, two aspects should be taking into consideration:

- The features of the objective.
- The role of each equipment.

Here we still take the audiovisual presentation as the example.

In a typical presentation, the presenter provides the audio by speaking, and supplements it with a series of images projected onto a screen, either from a slide projector, or from a computer connected to a projector using presentation software.

In order to attract the audiences attention, the presenter nowadays tend to like show some interesting video contents.

Around this purpose, related equipment and their objectives or usage are showed as follows:

Mic amplifying sound;

Projector show contents on the screen;

Connectors connecting devices;

Camera and its supplementary may also be related through the presenter, who may using these equipment to made the contents showing in the presentation.

Those equipment relate to each other because they serve for a common objective, and the usage of these equipment are in accord with the objective.

3.2. Methodology: Case Study

In order to get a precise result, we put this research into a concrete environment. We will take the KMD resource management [10] as a case to implement the research.

The KMD resource management is a facility provided by Graduate School of Media Design at Keio University, with the main business of lending digital

equipment, such as video camera, tripod, and PCs, to KMD students, in order to help satisfying with the hardware needs they may met while in doing research.

The reasons why we choosing the KMD resource management as the case for study is of several reasons as follows:

- As we have explained above, that the area of business logistics is fairly abstract and complicated, it covers a wide range of issues in variety fields. A case study is helpful in narrowing the topic and focus on a specific aspect with universal significance.
- A case will provide a actual environment with real scenes in business logistic management, in that case, we can get authentic and objective data for research.

The KMD resource management is a real used facility, it has been put into use since April 2010, and the three years information in the database offer a great source to discover knowledge in it.

- Though the KMD resource management is a drop in the bucket comparing to the whole business logistic, and only covers a small part of logistics activities, it involves lots of important issues related, such as inventory management, distribution, information management and so on. Whats more, it reflects the key mission of "have the right item to the right people at the right time" in business logistics.

3.3. Research Model and Anticipated Results

3.3.1 Research Model

Research outline is showed as figure 3.1, in order to establish the recommendation mechanism, the research is divided into three stages: Information collection, data analysis, recommend.

This study takes the KMD resource management as a case to implement the research, The KMD resource management is division providing a AV property service, detail research model based on the real environment are showed as figure 3.2.

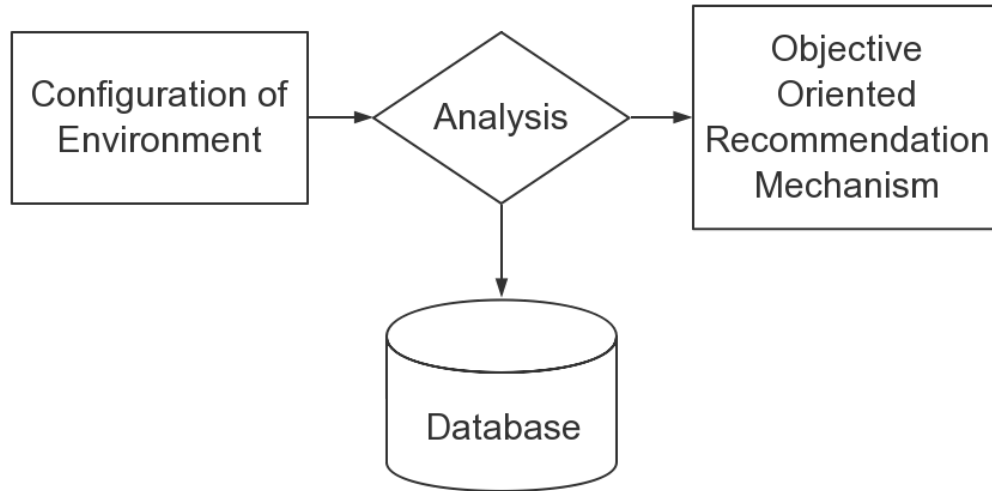


Figure 3.2: Research Model

First, describe the current management, including:

- Factors involved in the management.
- Description of the equipment.
- Description of current system.
- Description of the flow of current management.

Second, data analysis, we focus on three parts:

- Purposes why people use and the relationship with equipment.
- User's features and how they related to the objectives and equipment.
- Description of current system.
- Features of equipment related to different users and objectives.

Third, come up with the proposal for recommendation mechanism.

3.3.2 Anticipated Results

Two kinds of objectives may result to the connection of equipment:

1. Audiovisual activities including slide-tape presentations, films, television programs, business presentation, live/concert and some other events.

In this research, the KMD events will be a important factor that can taking into consideration for the objective for the recommendation mechanism.

2. Users's feature. Users may not relate to the connection of equipment directly, but some user features, such as occupation, hobbies may also have influence on the result.

Chapter 4

Case Study

In this chapter, we will take the KMD resource management as an example, focus on data analysis of the 3 years borrowing information recorded in the system, also combined with the real situation, feature of Graduate School of Media Design, to discovery useful information.

Detail description of the current management environment as well as the process of data analysis and the result will be explained in this chapter.

4.1. Overview

This research is aimed at proposing a objective oriented recommendation mechanism for business logistics management in physical world, and we present a case study in a real, concrete environment- the facility of KMD resource management to evaluate the current management and try to come up with solution for improvement.

The reason we put the research into a concrete environment is as follows: business logistics is a big field, a real, concrete environment will help narrowing the field and provide with true data. Besides, the KMD resource management provide a database that contains there years management information, and it involves lots of interesting rules and facts that considered meaningful for the general business logistics management.

The research flow for the case study can be deviled into three steps:

- Step 1: Objective Facts Description
- Step 2: Database Description
- Step 3: Data Analysis and Results

4.2. Objective Facts Description

4.2.1 Factors Involved in the Management

The KMD Resource Management (Figure 4.1) is consist of four parts:

- Equipment for lending, including still cameras, video cameras, tripods, projectors, lights, displays, reflectors, memorys, PCs and variety kinds of cables and connectors.
- Managers response for managing the equipment as well as leding behaviors. TA and administer are two different types of managers devided by authority. TA is mainly involved in operating the lending and returning behaviors, while the administers play the major role in managing the equipment, making purchase plan, implementing inventory and checking missing or broken items.
- System named as MRBS for recording and managing lending behavior, the current management system has been put into use since 2010.
- KMD students as the borrowers.

4.2.2 Equipment Description

Equipment in KMD resource management is roughly divided into AV equipment(Figure 4.2), PC equipment(Figure 4.3) and other equipment. However, PC equipment and some other equipment such as the memories are usually facilities involved in an audiovisual activities. It is necessary to give a description of these equipment as well.

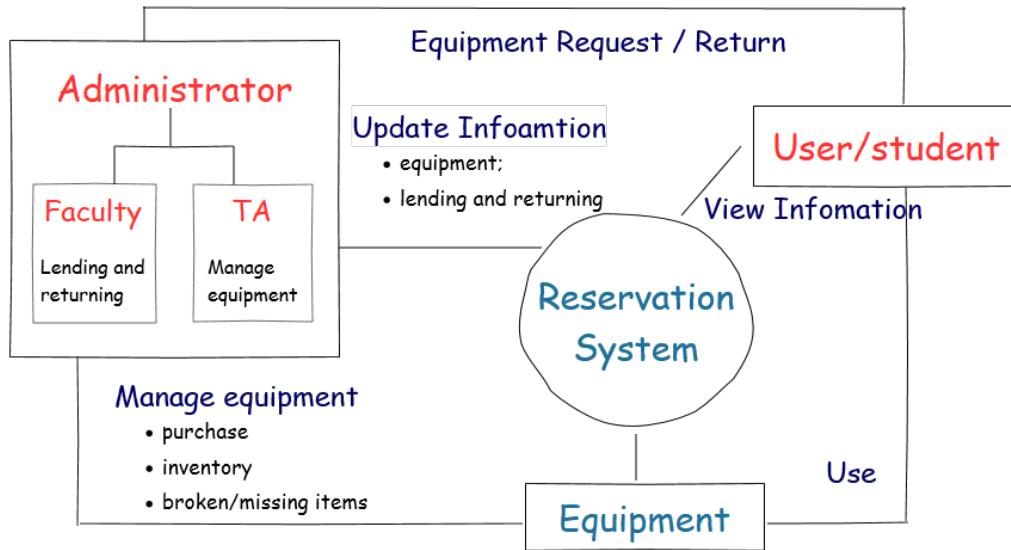


Figure 4.1: KMD Resource Management Environment

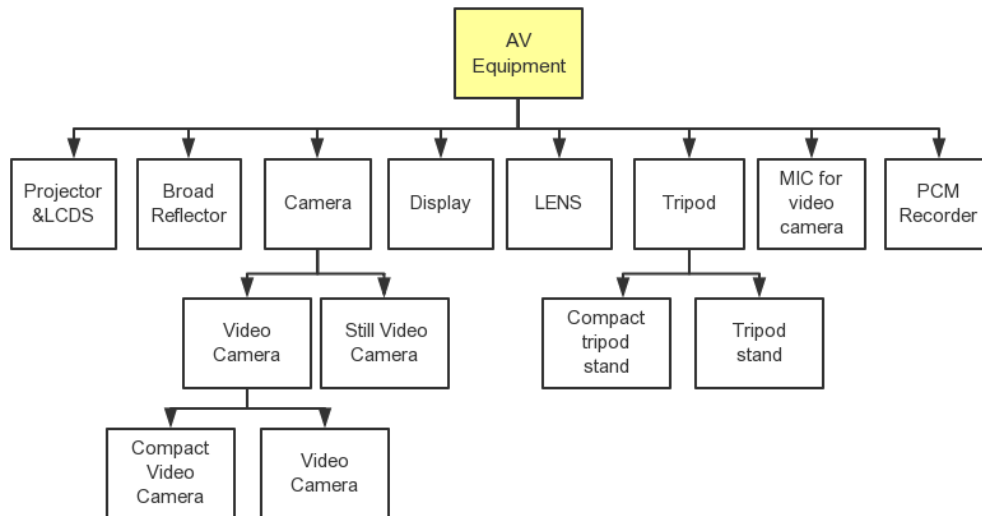


Figure 4.2: Type of AV Equipment

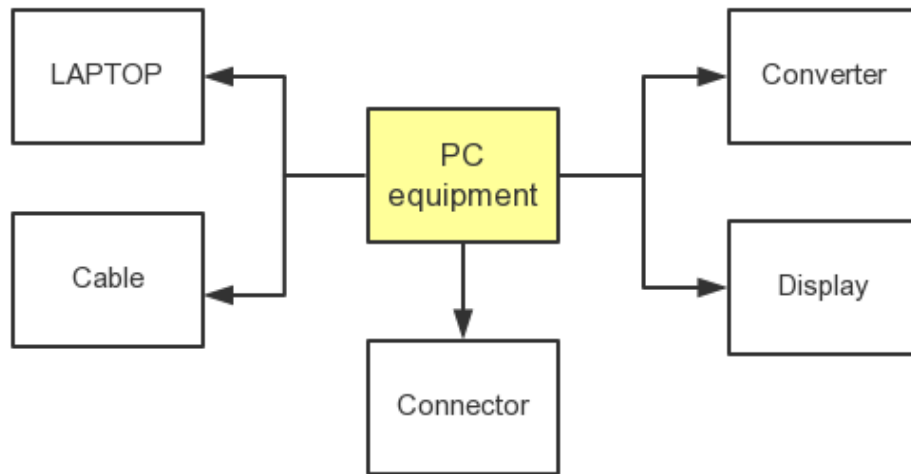


Figure 4.3: Type of PC Equipment Related to AV Activities

4.2.3 Current System Description

Named as MRBS, the current system for management has been put into use for four years. Interface of the current system is showed in Figure 4.5. It is originally designed for the purpose of reserving classrooms, therefore, either the database structure design or the interface design reflects uniqueness compared with normal property management system in business logistics. For example, the type of the equipment is called area, while the name of the equipment is described as room, and the main reservation page presents as a calendar.

Figure 4.6 shows the input interface. Content for input includes:

- description, which usually includes the name and student ID of the user
- detail description which usually includes the phone number, e-mail address and other useful information such as for what purpose the student use the equipment, or what other equipment the student also borrowed as a supplement.

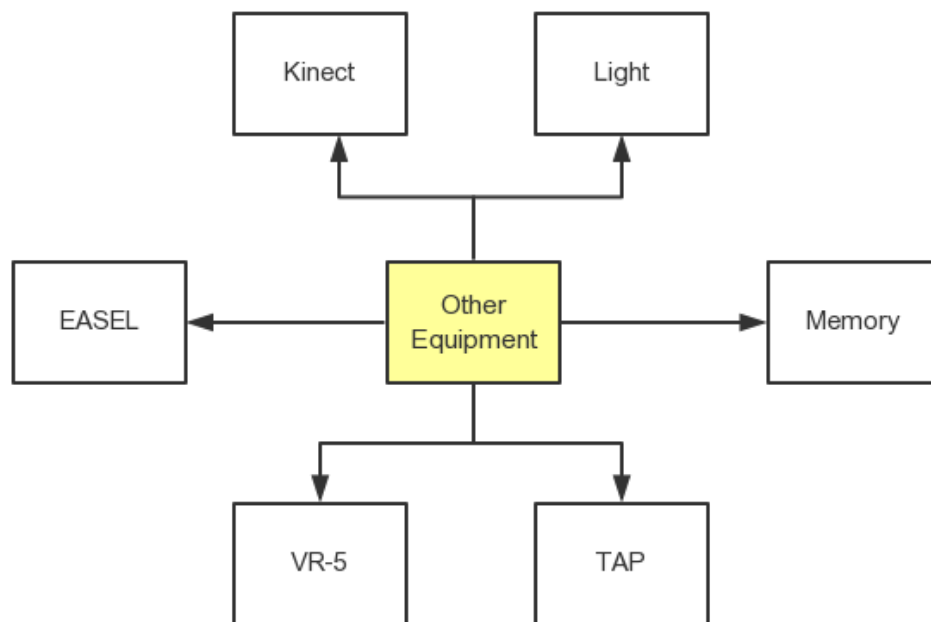


Figure 4.4: Type of Other Equipment Related to AV Activities

- date for reservation
- time for reservation
- equipment for reservation
- type of event using the equipment
- the way for repeat of the equipment
- end day
- end day describe in week

4.2.4 Current Management Description

The flow of a normal lending behavior is as follows:

- Student come to the office and make application for the items they need.
- TA check the inventory and preparing available equipment for the student.
- Student leave personal information and contacts including name, student ID, phone number, email address, period for borrowing, for what purpose they need the equipment.
- TA input the information into the system at the right place for each equipment.
- Student return the equipment while time expired and the borrowing behavior finished.
- TA check over the equipment and update the record in the system with adding an "Sumi" as a symbol for finish in the title of the record.

TAs daily work

Working hours: 13:00-17:00 from Monday to Friday (holidays exclude)

Work content:

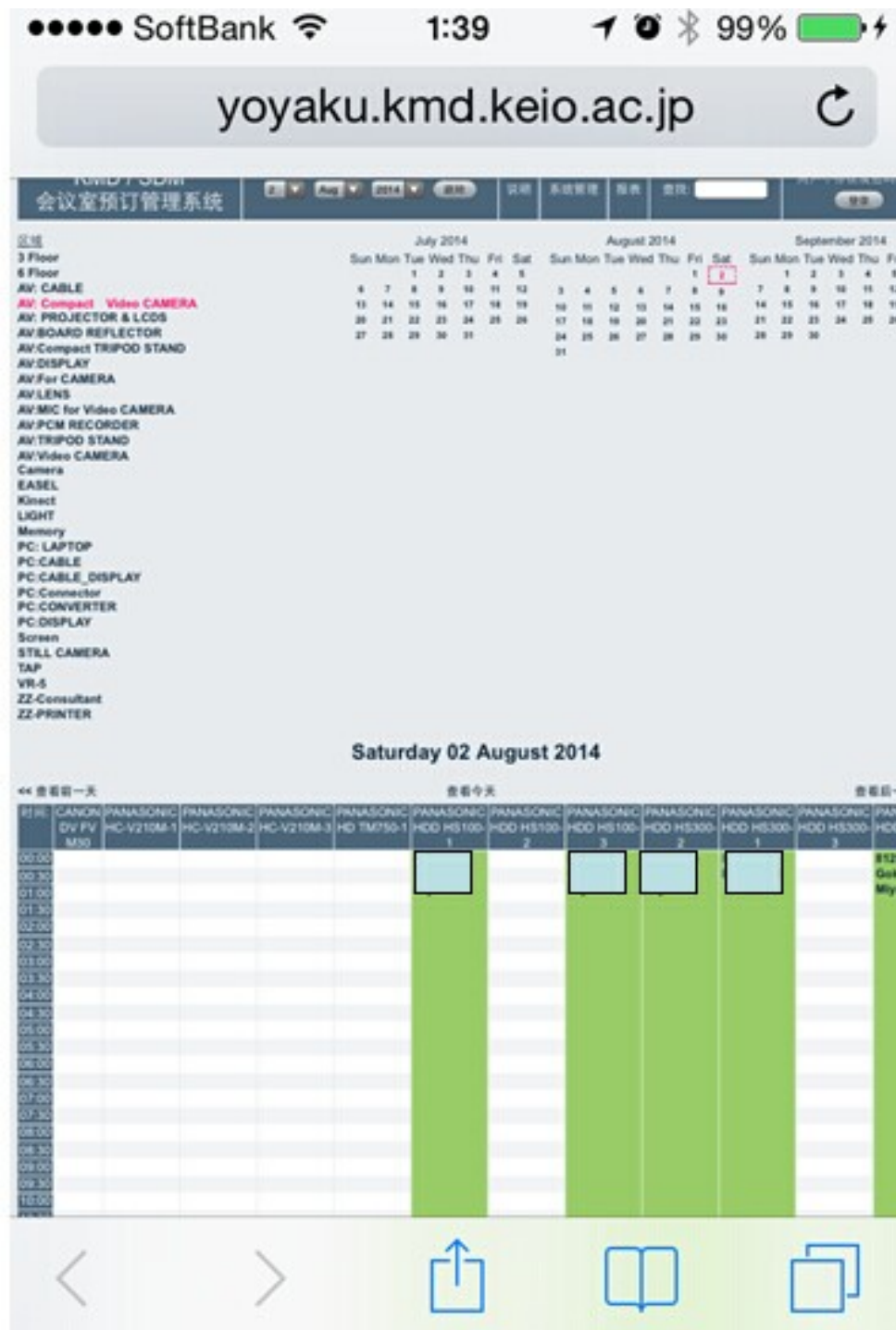


Figure 4.5: Interface of the System

会議室予約システム

yoyaku.kmd.keio.ac.jp/mrbs/edit_entry.php?id=16862&edit_type=series&day=10&m

应用 keio programming job information 签证 我的首页 新浪微博... 参考 学习 视频 cathyf

KMD / SDM
会議室予約システム

10 7月 2014 移動

～ルプ

定例予約を編集

概要: [text box]

詳細な説明
(人数,
内部会議/外部会議
等)

[text box]
[text box]@gmail.com

日付: 9 7月 2014

時間: 00:00

所要時間: 1 日 ☐ 終日

Area: PC: LAPTOP

部屋: PC-3(DELL)
PC-4(VAIO Z)
PC-5(VAIO Red)
PC-6(SONY VGN-FW92DS)
ThinkPad

種別: Real Projects

繰り返しの様式: ☐ なし ☒ 毎日 ☐ 毎週 ☐ 毎月 ☐ 毎年 ☐ 毎月同じ日 ☐ n週毎

繰り返しの終了日: 16 7月 2014

繰り返しの曜日: ☐ 日曜日 ☐ 月曜日 ☐ 火曜日 ☐ 水曜日 ☐ 木曜日 ☐ 金曜日 ☐ 土曜日
(毎週/n週毎 選択時)

複数の部屋を選択するときは、
Controlキーを押しながらクリックしてください。

Figure 4.6: Input Interface

Managing equipment belonging to KMD Resource, operating lending and returning behavior, find available equipment according to the users demand, update the lending and returning recording in the system. Send everyday report to KMD student office.

4.3. Database Description

The current system is developed by PHP programming language and MySQL database. Before we start doing data analyzing, we have to browse the past data, and find out the target data, decide what data should be analyzed. This step is the premise step of remove obvious redundant data and make data more concise.

After scanning the data roughly, I found data related to borrowing time and returning time, the information left by borrowers are two major fields we have to concern.

The next step is to doing some preparation of the MySQL data.

First, we have to make it clear of the relationship of the database structure.

The information of the data base is as follows:

Database name: mrbs;

The information recorded in KMD-Resource Reservation system are stored in the database "mrbs", the tables and their functions included in the database are showed as follows:

Table 4.1: Tables In The Database And Their Functions

Table Name	Function
mrbs_area	Describe the type of the equipment
mrbs_entry	Retain all the lending and returning information
mrbs_room	Retain detail equipment information
mrbs_repeat	Retain the way for repeat, day, week, month
mrbs_users	Retain different types of users with different authority
mrbs_variables	System reserved

After observation, there are three essential tables relate to this research: table mrbs_area, table mrbs_entry, table mrbs_room.

Table 4.2: Table:mrbs_area and Function of Each Field

Field	Type	Function
id	int(11)	Retain unique id
area_name	varchar(30)	Retain name of the equipment types
area_admin_email	text	Retain administrator information
resolution	int(11)	
default_duration	int(11)	Retain the default duration
morningstarts	int(11)	Retain the start time in the morning
morningstarts_minutes	int(11)	Retain minutes of the start time in the morning
eveningends	int(11)	Retain the end time in the evening
eveningend_minutes	int(11)	Retain minutes of the end time in the evening
private_enabled	tinyint(1)	System reserved
private_default	tinyint(1)	System reserved
private_mandatory	tinyint(1)	System reserved
private_override	varchar(32)	System reserved

Table 4.3: Table:mrbs_entry and Function of Each Field

Field	Type	Function
id	int(11)	Retain unique id
start_time	int(11)	Start time of lending
end_time	int(11)	End time of lending
entry_time	int(11)	Retain the type of activity
repeat_id	int(11)	Retain repeat id
room_id	int(11)	Retain the id of a certain equipment
timestamp	timestamp	Retain the of the event happened
create_by	varchar(80)	Retain the time of the record created
name	varchar(80)	retain borrower name
type	char(1)	Retain event type
description	text	Retain borrower contacts and other information
private_entry	tinyint(1)	System reserved

Table 4.4: Table:mrbs_room and Function of Each Field

Field	Type	Function
id	int(11)	Retain unique id
area_id	int(11)	Retain equipment type id
room_name	varchar(25)	Retain detail equipment name
sort_key	varchar(25)	Retain the sort key of the equipment
description	varchar(60)	Retain the description of a equipment
capacity	int(11)	Describe the capacity of room
room_admin_email	text	Retain manager information

The main table is mrbs_entry, this table record every borrowing behavior, also the information of the borrower, time, contact phone number and email, also the most important equipment name and for what purpose.

Beside the main table, three related tables also play important role in the system. Table mrbs_room describe the name of the equipment, it connected with mrbs_entry by room_id, mrbs_area presents the type of equipment. This table is not directly connected to mrbs_entry, but related to mrbs_area by room_id.

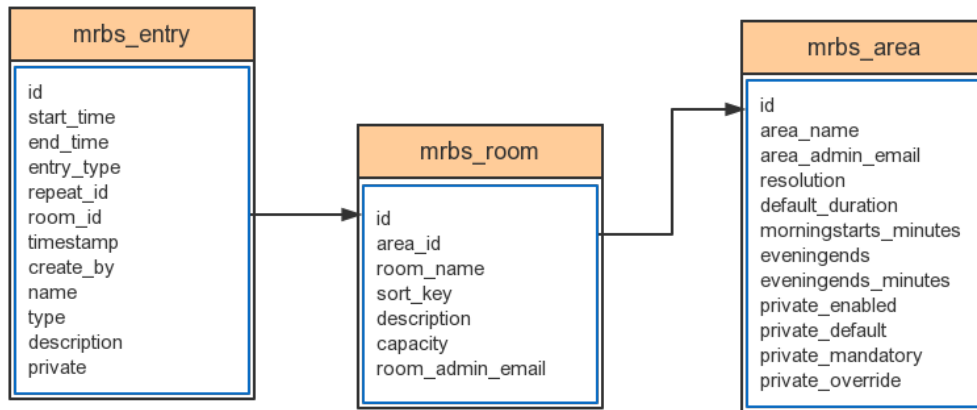


Figure 4.7: Relationship Between Tables in Database "mrbs"

```

SELECT mrbs_entry.*FROM mrbs_entry mrbs_entry,
      (SELECT mrbs_repeat.id FROM mrbs_entry
        LEFT OUTER JOIN mrbs_room
          ON mrbs_entry.room_id = mrbs_room.room_name
        LEFT OUTER JOIN mrbs_area
          ON mrbs_room.area_id = mrbs_area.area_name
      ) SubQuery
ORDER BY mrbs_entry.room_id DESC

```

Figure 4.8: Join Tables in Database”mrbs”

4.4. Data Analysis and Results

4.4.1 Sample Data Description

The data for analysis in this research starts from 12th April 2010 to 24th April 2014.

As Figure 4.9 shows, the total amount of the sample data reaches 7592 and 73% of them are marked with description.

4.4.2 Preliminary Analysis

Figure 4.10 shows the three years trend of the equipment be borrowed from 2010 to 2014. It indicate that the lending and borrowing behavior reaches peak four times a year. considering the fact that KMD schedules repeated every half year, the rule can be concluded that peak season show up around the start of the new semester and the mid-term.

Figure 4.11 and 4.12 shows that for what purpose people use the equipment, we find actually only 27% of them are marked with the purpose, and among them, for project occupies 56% percent.

Figure 4.13 shows the number of different kind of equipment have been used during the past three years. There’s a very huge difference in the popularity between different types of equipment.

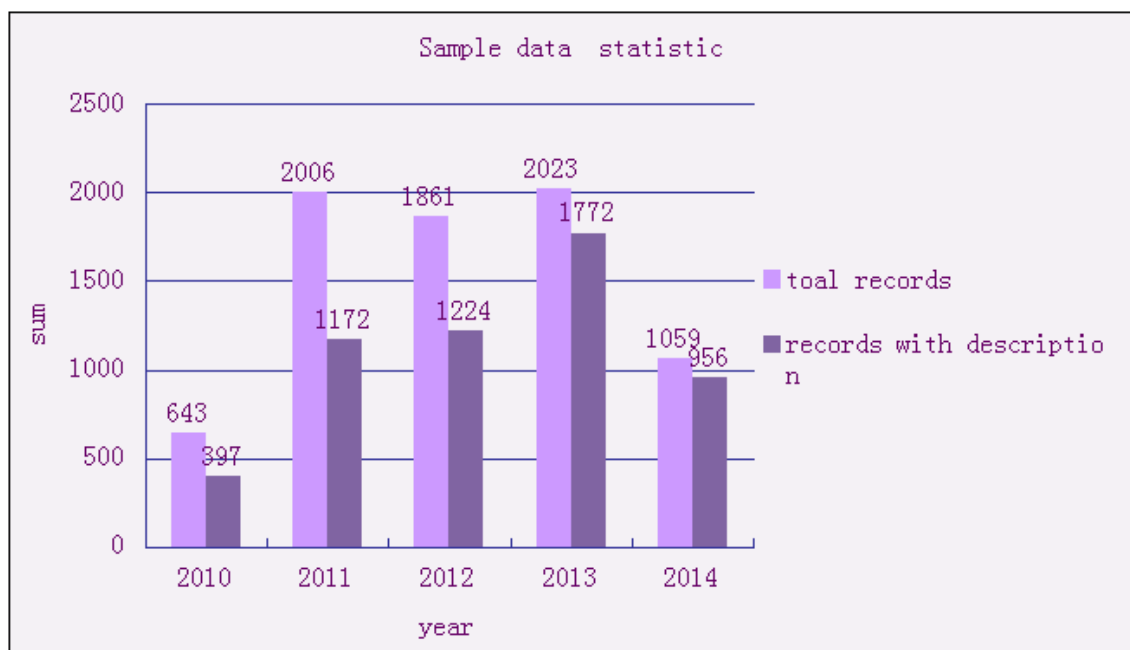


Figure 4.9: Amount of Sample Data

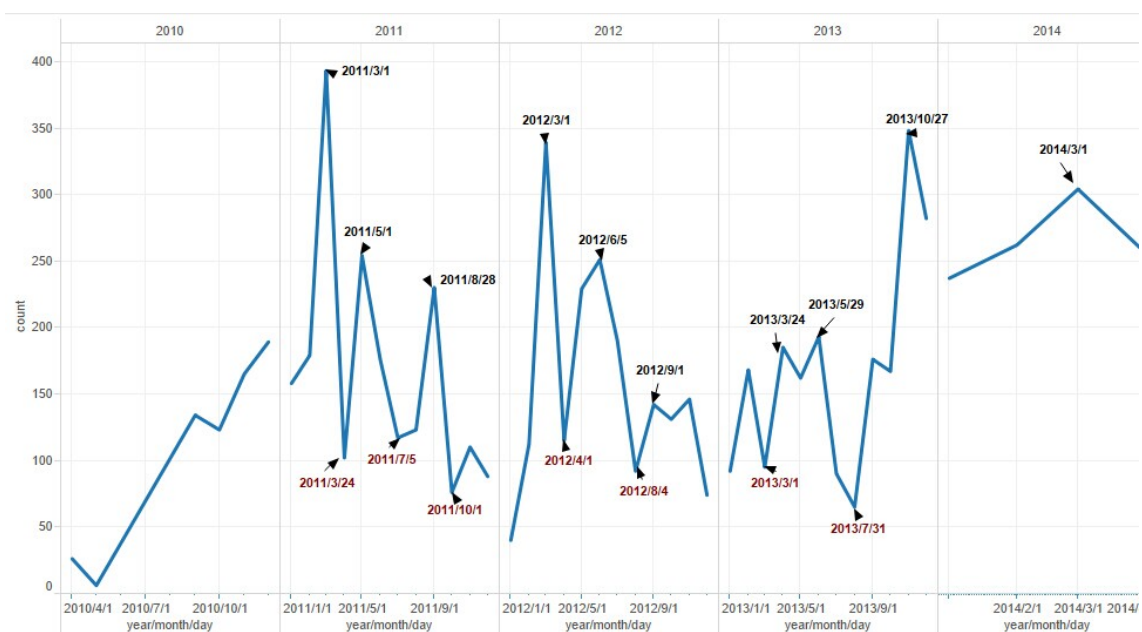


Figure 4.10: Trend From 2010 To 2014

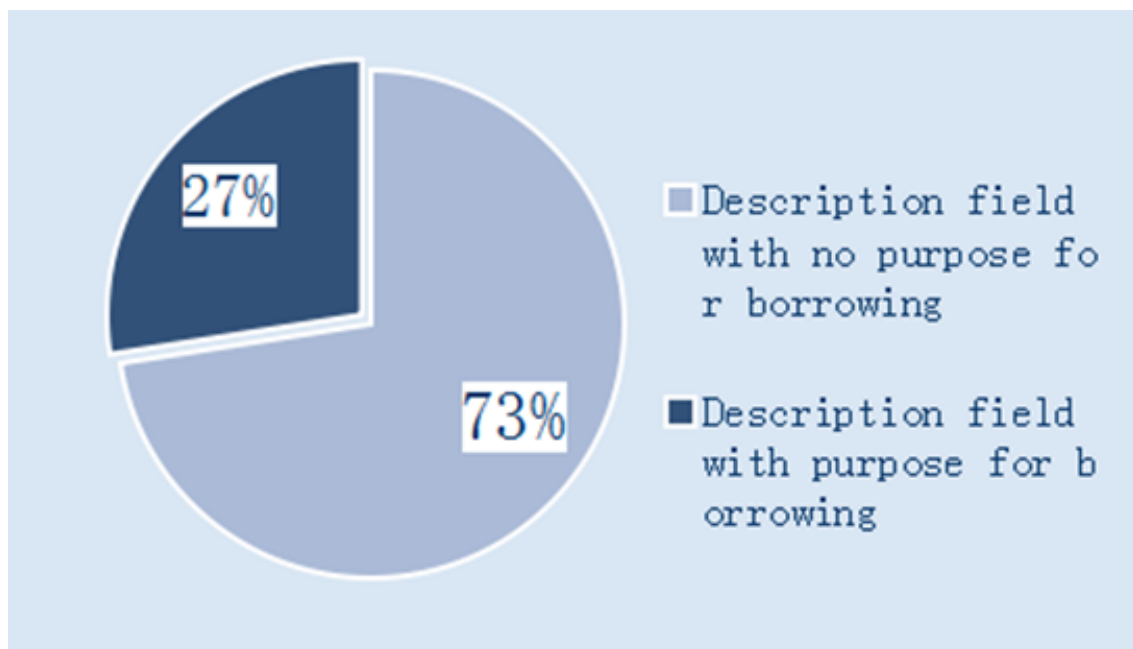


Figure 4.11: Purpose

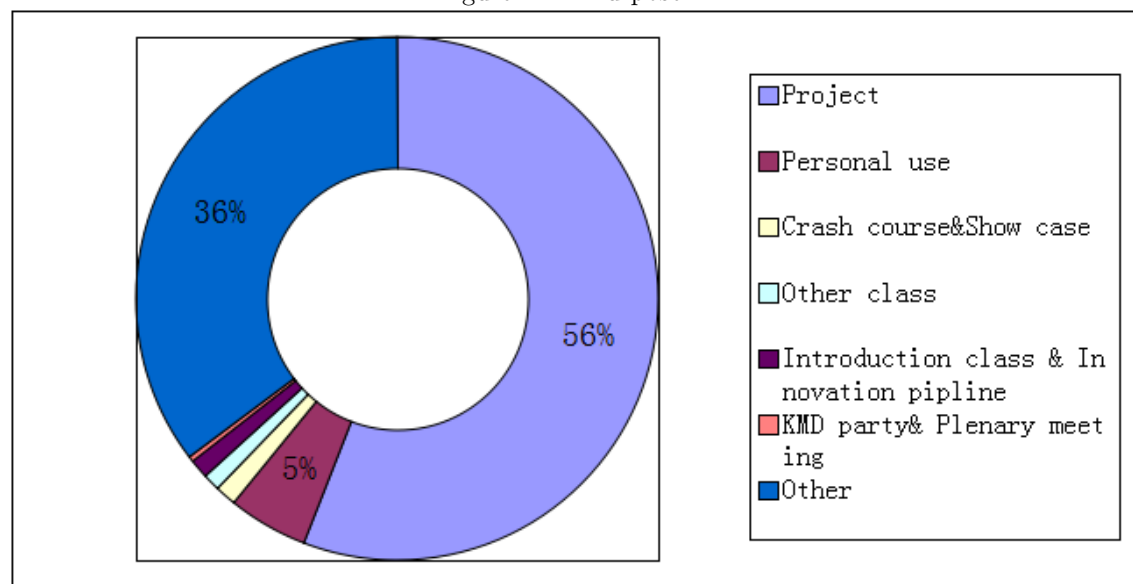


Figure 4.12: Detail Purpose

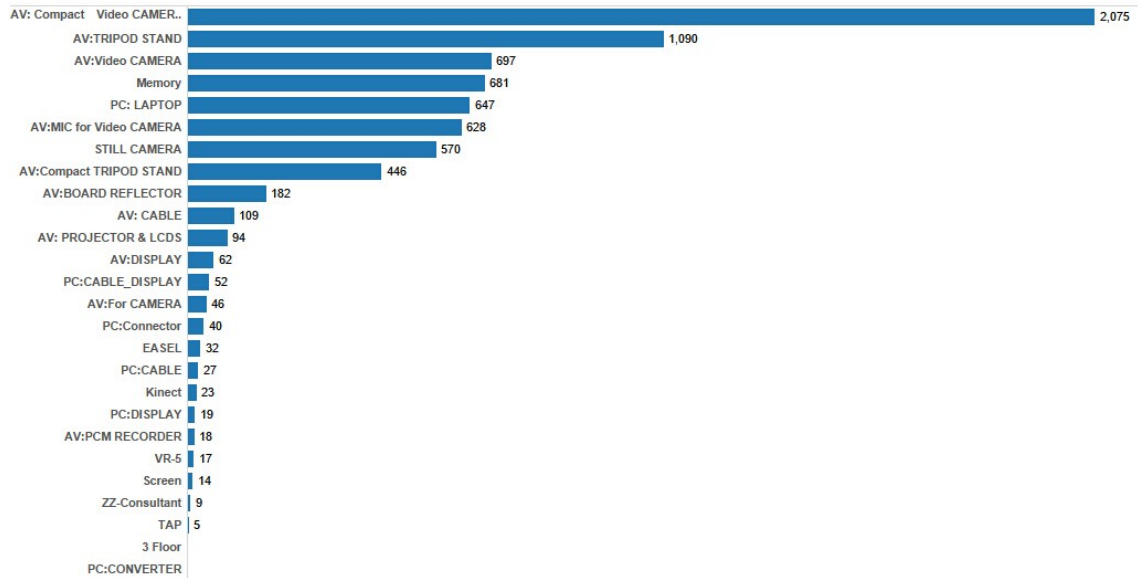


Figure 4.13: Equipment Used

Figure 4.14 shows the result of the user distribution in projects we find that students from the global computing, PMP, policy, space, OIKOS are the active users.

4.4.3 Objective Analysis

Figure 4.10 shows the three years trend of the equipment be borrowed from 2010 to 2014. It indicate that the lending and borrowing behavior reaches peak four times a year. around March to April, May-Jun, September, November. March to April and September are the beginning of the semester, while May-Jun, November are the mid-term. considering the fact that KMD schedules repeated every half year, the rule can be concluded that peak season show up around the start of the new semester and the mid-term. The valley comes the month next to the peak month.

Contrast with the KMD Schedule(Figure 4.5), similarities in time indicates that the active use of the equipment has relationship with the KMD events.

If we combined the result with KMD schedule, we will find March to April and September have event Crash Course and Show Case. Figure 4.15 is a example combination of equipment for crash course.

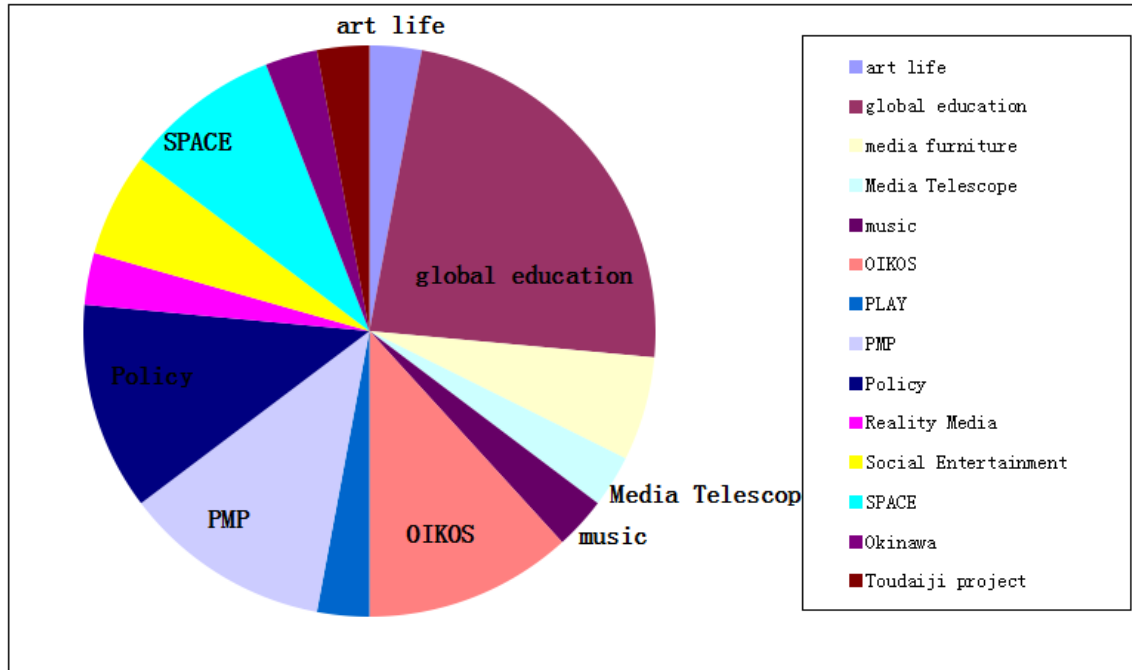


Figure 4.14: Project

Table 4.5: KMD Schedule(Regular Events)

Event Name	Spring Semester	Fall Semester
Crash Course	1st weekend of April	3rd weekend of September
Show Case	Last week of April	1st week of November
Plenary Meeting	3rd Saturday of July	1st or 2nd Saturday of February
KMD Forum	February-March	

description	area_name	room_name	time_datetime	time_datetime	timestamp
(資) [redacted] 田, クラッシュコースにて使用 T: 03-64 [redacted] F: 03- 6 [redacted] 0 [redacted]@e-side.co.jp	AV:TRIPOD STAND	Manfrotto 501HDV-1	2014/4/4	2014/4/8	2014/4/8 14:35:24
		Manfrotto 503HDV-1	2014/4/4	2014/4/8	2014/4/8 14:35:33
	AV:Video CAMERA	PANASONIC HMC155-2	2014/4/4	2014/4/8	2014/4/8 14:30:15
		PANASONIC HMC155-4	2014/4/4	2014/4/8	2014/4/8 14:30:41
イ [redacted] クラッシュコースにて使用 T: 03-64 [redacted] F: 03- 6 [redacted] 0 [redacted]@e-side.co.jp	Memory	32GB SD-5	2014/4/4	2014/4/8	2014/4/4 14:05:19

Figure 4.15: Example Combination of Crash Course

Based on the result we got the recommendation list for crash course(Figure 4.16).

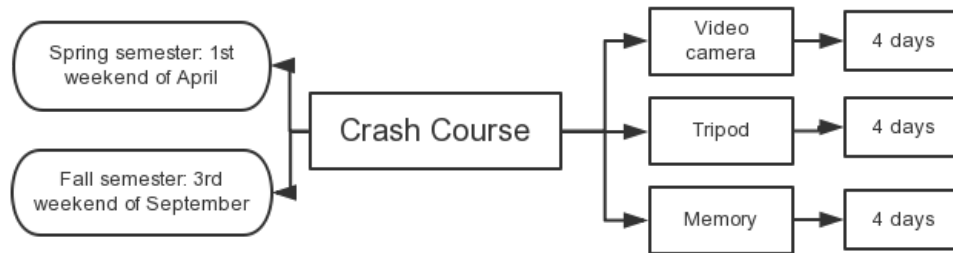


Figure 4.16: Recommendation Information for Crash Course

Repeat the same step, we can get the recommendation list of KMD regular event(Figure 4.17).

Figure 4.11 shows the result that Project occupies largest scale among all the purposes. Project, or Real Project is a unique feature of Graduate School of Media Design at Keio University, which represents as a unit for research group. A Real Project usually concentrate a group of people sharing similar opinion or interesting in academic.

Figure 4.14 listed parts of projects that connect with KMD resource closely. Figure 4.18 describe the amount each project use the facility, bigger circle means more use.

Here we have to mention, actually each Real Project consists several sub-projects, in some case, a sub-projects may have strong relationship with the equipment rather than the big project. In this case, the Music Project and Art Life are sub-projects.

Combination of equipment by each project and the average period are showed as Figure 4.19 and Figure 4.20.

Based on the result, we get the project based recommendation(Figure 4.21).

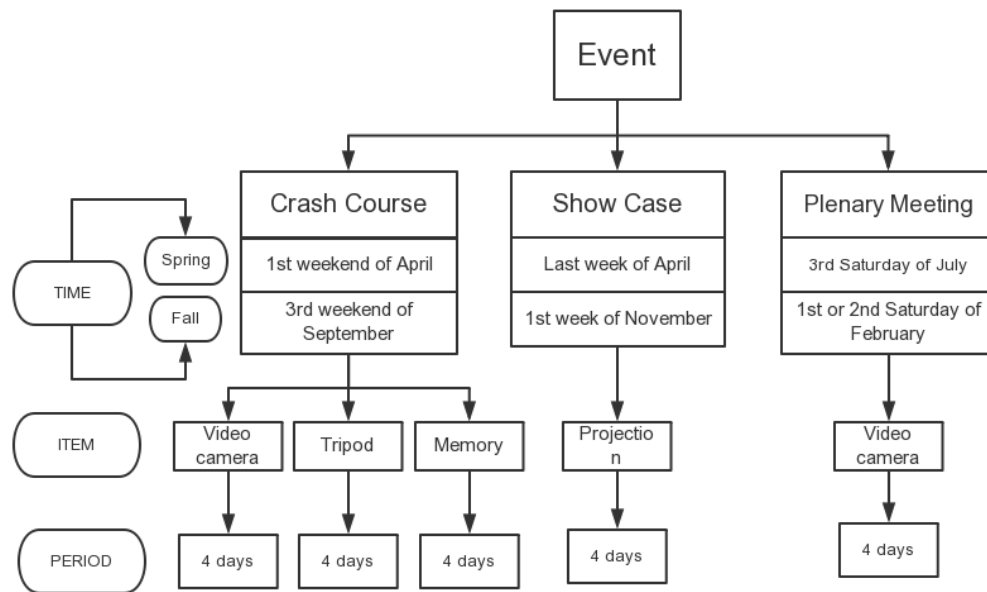


Figure 4.17: Recommendation Information for KMD Events

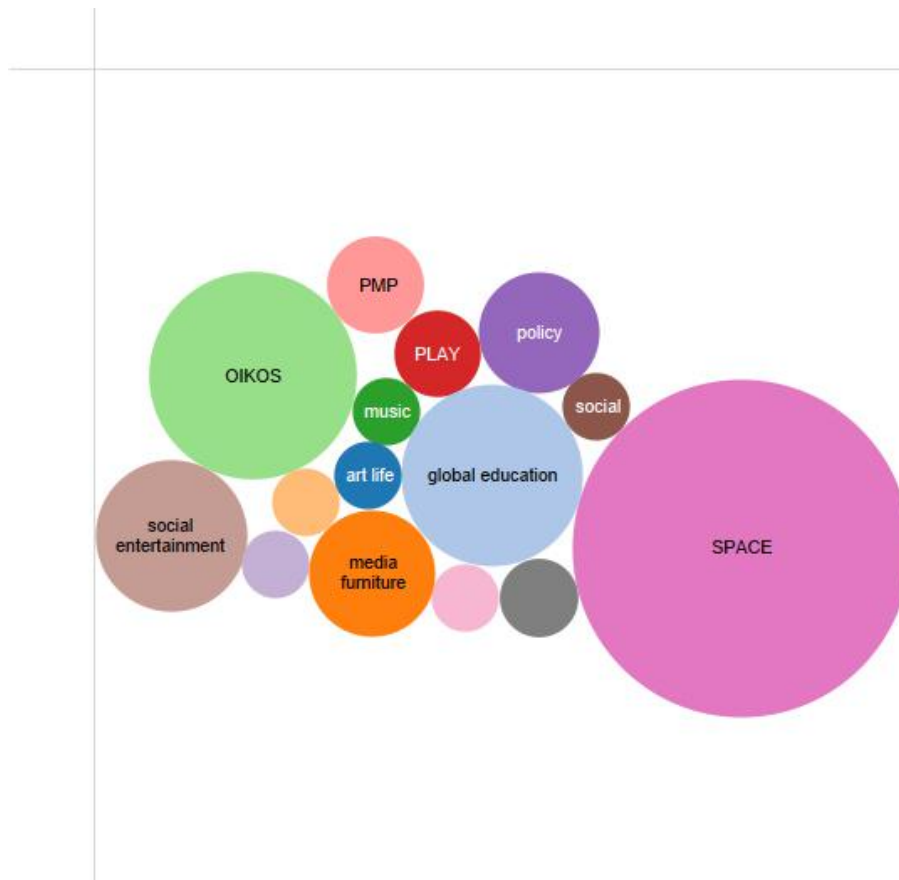


Figure 4.18: Project-equipment Frequency

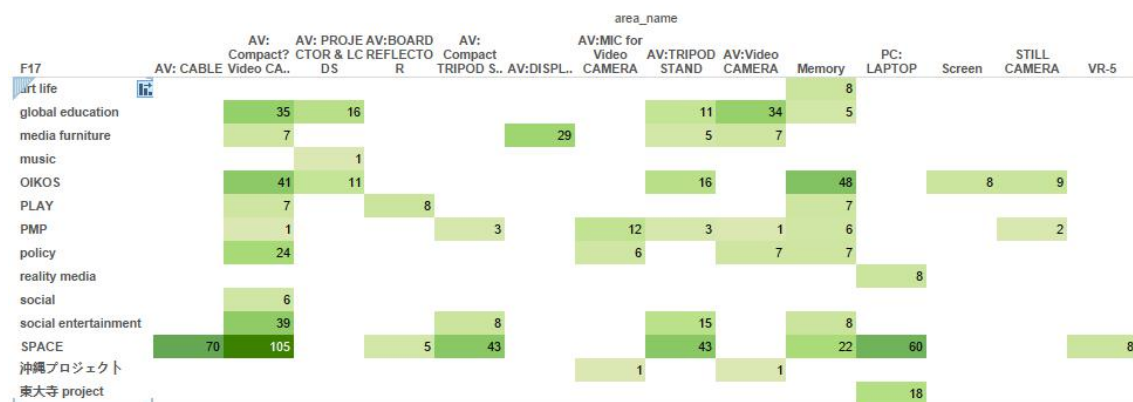


Figure 4.19: Combination of Equipment Based on Project

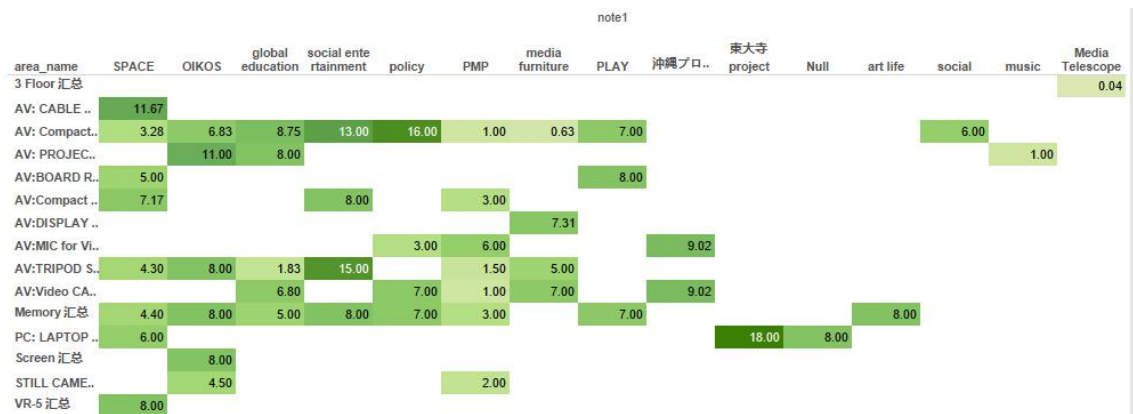


Figure 4.20: Period of the Equipment Used by Each Project

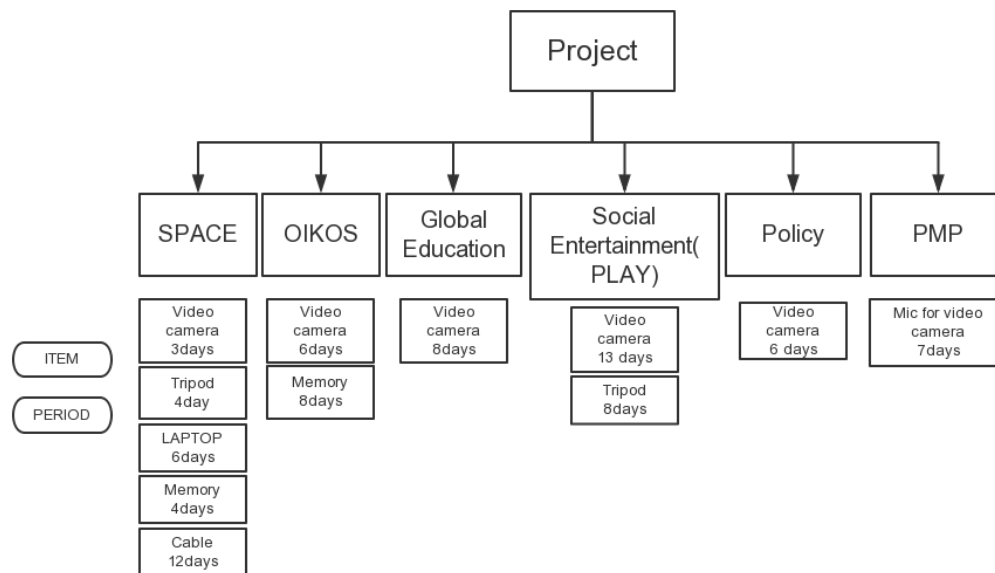


Figure 4.21: Recommendation Information for KMD Real Projects

4.5. Discussion

Throughout data analyzing, we find that the connection between equipment do have relationship with certain objectives, that the active use of equipment do have relationship with KMD events, Real Project properties do influence the behavior of using digital equipment. However, we also find several problems we have to taking into consideration for establishing a objective oriented recommendation.

Lack of data is one of the problem we find in the current database. We didn't got enough data representing objectives. Actually, through the analyzing process, the information left in the database is far less than we expected, as the result in Figure 4.11 indicates, only 27% of the recorded information have specify objective description. In that case, we can not just rely on the data in the database, but to find more other source, and come up with new solution to analyze the data. What's more, it is also an aspect in management that should taking into consideration for improvement.

At this point, I think the way of recording information is quite important, in the next management stage, we also have to consider more about how to leave more complete data in the database for better management.

Another we found difficult in doing research is due the changes in physical word. Especially the changes in KMD Curriculum and model for master's program¹.

Notes

- 1 KMD Student Guide 2014 Academic Year
http://www.kmd.keio.ac.jp/students/0422.2014KMD_Student_Guide.pdf

Introductory subjects (Requisite)	*The numbers in parentheses are unit of credit	
INNOVATION PIPELINE 1 (4)		
INNOVATION PIPELINE 2 (4)		
INNOVATION PIPELINE 3 (2)		
Theory/Strategy subjects (Elective)		
Design Track	Management Track	
ENTERTAINMENT THEORY AND CREATIVE STRATEGY (2)	MEDIA AND CONTENT BUSINESS (2)	
DESIGN THINKING AND BUSINESS STRATEGY (2)	GLOBAL SOCIETY (2)	
EMBODIED INTERACTIONS (2)	THEORY OF BUSINESS MEDIA (2)	
REALITY-BASED DESIGN (2)	BUSINESS STRATEGY IN THE ERA OF CHANGE (2)	
CREATIVE CONCEPTION FOR TRANSMEDIA (2)	NEW VENTURE ACCELERATION (2)	
DESIGN RESEARCH FOR INNOVATION THAT MATTERS (2)	SOCIAL CREATION (2)	
Technology Track	Policy Track	
COMPUTING SYSTEM ARCHITECTURE (2)	MEDIA POLICY (2)	
NETWORK OPERATION (2)	INTELLECTUAL PROPERTY TACTICS (2)	
DIGITAL MEDIA INNOVATION (2)	Global Track	
COMPUTATIONAL SERVICE ARCHITECTURE (2)	INTERNSHIP (2)	
INFORMATION SECURITY TECHNOLOGY (2)	ADVANCES AND SPREADS OF COOL JAPAN: JAPANESE POP CULTURE (2) *Nomura Securities Chair Course	
	GID THEORY/STRATEGY 1 (2)	
	GID THEORY/STRATEGY 2 (2)	
	CEMS THEORY/STRATEGY 1 (2)	
	CEMS THEORY/STRATEGY 2 (2)	
Project subjects		
Requisite	Elective	
INTRODUCTORY PROJECT (2)	REAL PROJECT (2)	
	BUSINESS PROJECT (4)	
	INTERNATIONAL PROJECT 1 (2)	
	INTERNATIONAL PROJECT 2 (2)	
Independent Research for Master in Media Design (Requisite)		
INDEPENDENT RESEARCH FOR MASTER IN MEDIA DESIGN (2)		
Optional subjects		
KMD ENGLISH 1 (1)	PRESENTATION SKILLS 1 (1)	
KMD ENGLISH 2 (1)	PRESENTATION SKILLS 2 (1)	
KMD ENGLISH 3 (1)	PRESENTATION SKILLS 3 (1)	
KMD ENGLISH 4 (1)	PRESENTATION SKILLS 4 (1)	

Figure 4.22: Subjects for Student Enrolled in Academic Year 2014

Introductory subjects (*1)	*The numbers in parentheses are unit of credit.
Requisite	Elective
INTRODUCTION TO MEDIA DESIGN (2)	BASIC ACADEMIC WRITING AND CRITICAL READING 1 (1)
INTRODUCTION TO MEDIA TECHNOLOGY (2)	BASIC ACADEMIC WRITING AND CRITICAL READING 2 (1)
INTRODUCTION TO MEDIA MANAGEMENT (2)	
INTRODUCTION TO MEDIA POLICY (2)	
Intermediate subjects (Elective) (*2)	
Design Track	Management Track
DESIGN THINKING (2)	MEDIA CONTENT INDUSTRY (2)
REAL MEDIA (2)	MEDIA PRODUCE (2)
INTERACTION DESIGN (2)	MEDIA BUSINESS MANAGEMENT (2)
ENTERTAINMENT EXPRESSION (2)	INTELLECTUAL PROPERTY MANAGEMENT (2)
Technology Track	Policy Track
INFRASTRUCTURE SYSTEMS (2)	MEDIA CONVERGENCE POLICY (2)
APPLICATION SYSTEMS (2)	DIGITAL CONTENT POLICY (2)
ADVANCED MEDIA TECHNOLOGY (2)	CREATIVE ECONOMY (2)
SYSTEMS OPERATION (2)	INFORMATION TECHNOLOGY POLICY (2)
Advanced subjects (Elective) (*3)	
Design Track	Management Track
ADVANCED INTERACTIVE MEDIA (1)	MEDIA BUSINESS STRATEGIES (1)
SENSUOUS CYBERNETICS (1)	ADVANCED MEDIA MARKETING (1)
ADVANCED CONTEXTUAL COMPUTING (1)	BUSINESS DIGITALIZATION STRATEGIES (1)
ADVANCED MOVING IMAGE MEDIA (1)	MEDIA FINANCE STRATEGIES (1)
DESIGN AESTHETICS (1)	MEDIA PLANNING STRATEGIES (1)
NARRATIVE DESIGN (1)	RIGHTS MANAGEMENT STRATEGIES (1)
ADVANCED REAL WORLD DESIGN (1)	CREATIVE INNOVATION MANAGEMENT (1)
INTERACTION DESIGN STRATEGIES (1)	BUSINESS START-UP (1)
POP CULTURE POLICY (1)	BUSINESS NEGOTIATIONS (1)
ADVANCED ENTERTAINMENT DESIGN (1)	BRANDING STRATEGIES (1)
Technology Track	Policy Track
ADVANCED MEDIA INFRASTRUCTURES (1)	MEDIA INDUSTRY POLICY (1)
HIGH PERFORMANCE COMPUTING (1)	GLOBAL MEDIA POLICY (1)
MEDIA TRANSMISSION TECHNOLOGY (1)	DIGITAL INTELLECTUAL PROPERTY POLICY (1)
ADVANCED INFORMATION DEVICES (1)	ADVANCED POP CULTURE DESIGN (1)
ADVANCED MOBILE TECHNOLOGY (1)	UBIQUITOUS LAW POLICY (1)
ADVANCED SPATIAL INFORMATION (1)	ADVANCED INTERNET GOVERNANCE (1)
NETWORK FOR REAL WORLD (1)	DIGITAL JOURNALISM (1)
INFORMATION SECURITY TECHNOLOGY (1)	STANDARDS POLICY (1)
NETWORKED KNOWLEDGE STRUCTURE (1)	CITY MEDIA POLICY (1)
OVERLAY NETWORKS (1)	DIGITAL ECONOMIC POLICY (1)
Independent Research for Master in Media Design (*4)	
INDEPENDENT RESEARCH FOR MASTER IN MEDIA DESIGN (2)	
Project subjects (*5)	
REAL PROJECT (2)	
Optional subjects	
KMD ENGLISH (1)	PRESENTATION THAT MATTER (1)

Figure 4.23: Subjects for Student Enrolled in Academic Year 2011-2013

Introductory subjects (*1)	*The numbers in parentheses are unit of credit	
Requisite		
INTRODUCTION TO MEDIA DESIGN (2)		
INTRODUCTION TO MEDIA TECHNOLOGY (2)		
INTRODUCTION TO MEDIA MANAGEMENT (2)		
INTRODUCTION TO MEDIA POLICY (2)		
Theory/Strategy subjects (Elective) (*2)		
Design Track	Management Track	
ENTERTAINMENT THEORY AND CREATIVE STRATEGY (2)	MEDIA AND CONTENT BUSINESS (2)	
DESIGN THINKING AND BUSINESS STRATEGY (2)	GLOBAL SOCIETY (2)	
EMBODIED INTERACTIONS (2)	THEORY OF BUSINESS MEDIA (2)	
REALITY-BASED DESIGN (2)	BUSINESS STRATEGY IN THE ERA OF CHANGE (2)	
CREATIVE CONCEPTION FOR TRANSMEDIA (2)	NEW VENTURE ACCELERATION (2)	
DESIGN RESEARCH FOR INNOVATION THAT MATTERS (2)	SOCIAL CREATION (2)	
Technology Track	Policy Track	
COMPUTING SYSTEM ARCHITECTURE (2)	MEDIA POLICY (2)	
NETWORK OPERATION (2)	INTELLECTUAL PROPERTY TACTICS (2)	
DIGITAL MEDIA INNOVATION (2)		
COMPUTATIONAL SERVICE ARCHITECTURE (2)		
INFORMATION SECURITY TECHNOLOGY (2)		
Innovators' Seminar subjects (Elective) (*3)		
INNOVATORS SEMINAR 1 (1)	INNOVATORS SEMINAR 3 (1)	
INNOVATORS SEMINAR 2 (1)	INNOVATORS SEMINAR 4 (1)	
Skills subjects (Requisite) (*4)		
MEDIA DESIGN SKILL 1 (1)	MEDIA DESIGN SKILL 3 (1)	
MEDIA DESIGN SKILL 2 (1)	MEDIA DESIGN SKILL 4 (1)	
Project subjects (Requisite) (*5)		
INTRODUCTORY PROJECT (2)	REAL PROJECT (2)	
Independent Research for Master in Media Design (Requisite) (*6)		
INDEPENDENT RESEARCH FOR MASTER IN MEDIA DESIGN (2)		
Optional subjects (*7)		
KMD ENGLISH 1 (1)	PRESENTATION SKILLS 1 (1)	
KMD ENGLISH 2 (1)	PRESENTATION SKILLS 2 (1)	
KMD ENGLISH 3 (1)	PRESENTATION SKILLS 3 (1)	
KMD ENGLISH 4 (1)	PRESENTATION SKILLS 4 (1)	

Figure 4.24: Subjects for Student Enrolled in Academic Year 2010 and Before

<For students enrolled in Academic Year 2014 (14 *Gakusoku*, Graduate School Regulations, Students) >

	First Semester		Second Semester	
First year	Crash Course	Innovation Pipeline 1 (4)	Innovation Pipeline 2 (4)	Innovation Pipeline 3 (2)
		Introductory Project (2)		Real Project (2)
			Theory/Strategy subjects (2)	Theory/Strategy subjects (4) Theory/Strategy subjects (2)
		KMD English 1 (1)	KMD English 2 (1)	KMD English 3 (1) KMD English 4 (1)
Second year	Real Project (2)		Real Project (2)	
	(Approval of qualification of Master's Thesis)		(Interim Presentation)	(Final Presentation)
	Theory/Strategy subjects (2)		Independent Research for master in Media Design (2)	
	Presentation Skills 1 (1)	Presentation Skills 2 (1)	Presentation Skills 3 (1)	Presentation Skills 4 (1)

* The numbers in parentheses are credits acquired in each semester.

◆ Approval of qualification of Master's Thesis

A student must satisfy the credit requirements in each of the following subjects and must be approved by the

Figure 4.25: Completion Model for Students Enrolled in Academic Year 2014

<For students enrolled in Academic Year 2011-2013 (11 *Gakusoku*, Graduate School Regulations, Students) >

		First Semester		Second Semester	
First year	Crash Course	Introductory (8)	Theory/Strategy subjects (4)		Theory/Strategy subjects (4)
			Innovators' Seminar subjects (1)	Innovators' Seminar subjects (1)	
			Skills subjects (1)	Skills subjects (1)	Skills subjects (1)
			Introductory Project (2)	Real Project (2)	
Second year	(Approval of qualification of Master's Thesis)		(Interim Presentation)	(Final Presentation)	
	Skills subject (1)		Independent Research for master in Media Design (2)		
	Real Project (2)		Real Project (2)		

* The numbers in parentheses are credits acquired in each semester.

◆ Approval of qualification of Master's Thesis

A student must satisfy the credit requirements in each of the following subjects and must be approved by the general faculty meeting.

- Introductory subjects (requisite): Total of 8 credits
- Theory/Strategy subjects: Total of 8 credits or more (from more than 3 tracks)
- Project subject (Introductory Project) : 2 credits

Figure 4.26: Completion Model for Student Enrolled in Academic Year 2011-2013

<For students enrolled in Academic Year 2010 and before (08 *Gakusoku*, Graduate School Regulations, Students) >

	First Semester		Second Semester	
	First Half	Second Half	First Half	Second Half
First year	Crash Course	Introductory (8)	Intermediate (2)	Intermediate (2)
		Advanced (2)	Advanced (2)	Advanced (2)
		Real Project (2)	Real Project (2)	
Second year	(Approval of qualification of Master's Thesis)		(Interim Presentation)	(Final Presentation)
	Real Project (2)		Independent Research for master in Media Design (2)	

* The numbers in parentheses are credits acquired in each semester.

◆ Approval of qualification of Master's Thesis

A student must satisfy the credit requirements in each of the following subjects and must be approved by the general faculty meeting.

- Introductory subjects (requisite): Total of 8 credits
- Intermediate subjects: Total of 8 credits or more (at least 2 credits or more from each track)

Figure 4.27: Completion Model for Student Enrolled in Academic Year 2010 and Before

Chapter 5

Proposal

In this Chapter, we propose a recommendation mechanism based on the result analyzed in Chapter 4. Detail system descriptions including system design and interface will be introduced in this chapter.

5.1. Issues from the Case Study

So far, analyzing of the case of KMD resource management has already finished in chapter 4. The result showed that the objectives and equipment in the KMD resource management do have relationship, as people usually use set of equipment while in order to realize a specific objective.

A recommendation mechanism will be useful in KMD Resource management, as this facility is a support for students which aimed to help them in needs of digital equipment, or precisely, to get the right item to the right student who need it, and distribute the items properly from time dimension. A recommendation system based on objectives, with specific equipment combination and time duration for use, is helpful in reducing the time for the users to make plan for using the equipment, also help managers of better management.

Several issues was found while doing the case study, we have to take them into consideration to improve the current management and to reach the goal of establishing the recommendation mechanism.

- The way for recording information influence a lot in this work as we have to

collect enough information to ensure the accuracy of recommendation. Current input interface is not helpful in recognizing the objectives why people use the equipment as all the useful information are mixed and hidden in a single field in the database.

- Categorization of the equipment is also important as it is necessary procedure to evaluate the objectives of the equipment, which is a nature channel for the connection between people's objective for using the equipment and the certain equipment.
- Changes in physical environment may result to the changes in objectives may result to the fact of lacking universality in objectives.

5.2. System Description

As discussed in Chapter3, the objective-oriented recommendation mechanism is settled on the assumption that people's ultimate aim of obtaining an item (or a group of items) is to fully utilize its designated function.

The proposal outline consists three steps:

1. Input: collecting information, objectives and features in the environment.
2. Analysis: analyze the related items, related user, related objectives.
3. Output :result for recommendation.

According to the result of case study, the objectives defined in this case are projects and events.

5.2.1 Input

Improving the way for collecting objectives and other management information is one of the most important works to get helpful information.

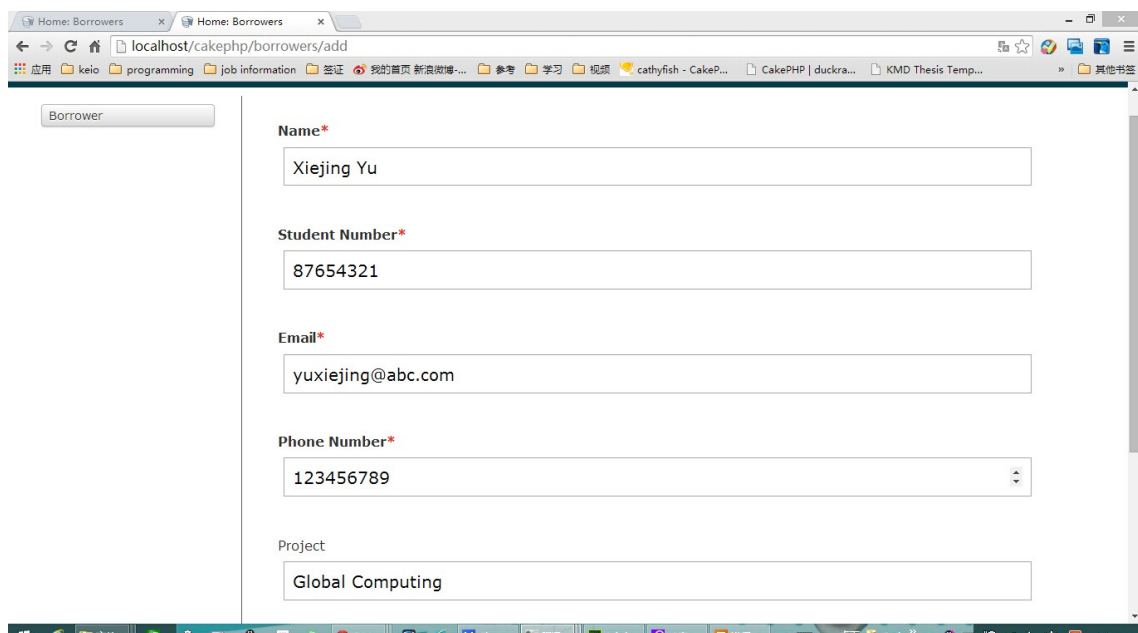
According to the current database, all the important information are stored in only one field, and those information are kept in both Japanese and English, the information is mixed and mingled, it will take lots of effort to get a certain

information we need. Therefore, in order to get precise information, we have to improve the interface for recording data, itemize the fields for each information.

Basically, user information, equipment information and behavior of lending information compose the major information need for the management in KMD resource.

User information

Considering the convenience for management and avoid to input user information every time, we create a information card (figure 5.1) for each new user. Detail fields includes user name, student ID and personal contact: email address and the phone number.



The screenshot shows a web browser window with the address bar displaying 'localhost/cakephp/borrowers/add'. The page content includes a sidebar with a 'Borrower' button and a main form area. The form has the following fields and values:

Field	Value
Name*	Xiejing Yu
Student Number*	87654321
Email*	yuxiejing@abc.com
Phone Number*	123456789
Project	Global Computing

Figure 5.1: Example Page of User Information

Equipment information

This proposal introduces a set cart function for gathering equipment information, that users can first put all the wanted equipment in the cart, then go to reservation at once, the image function are presented in figure 5.2.

The cart function is a solution for observation of how the set of equipment for a certain objective are combined, as people usually borrow a set of variety equipment at once in this case, and the relationship between the equipment is an important aspect we have to tackle in this research.

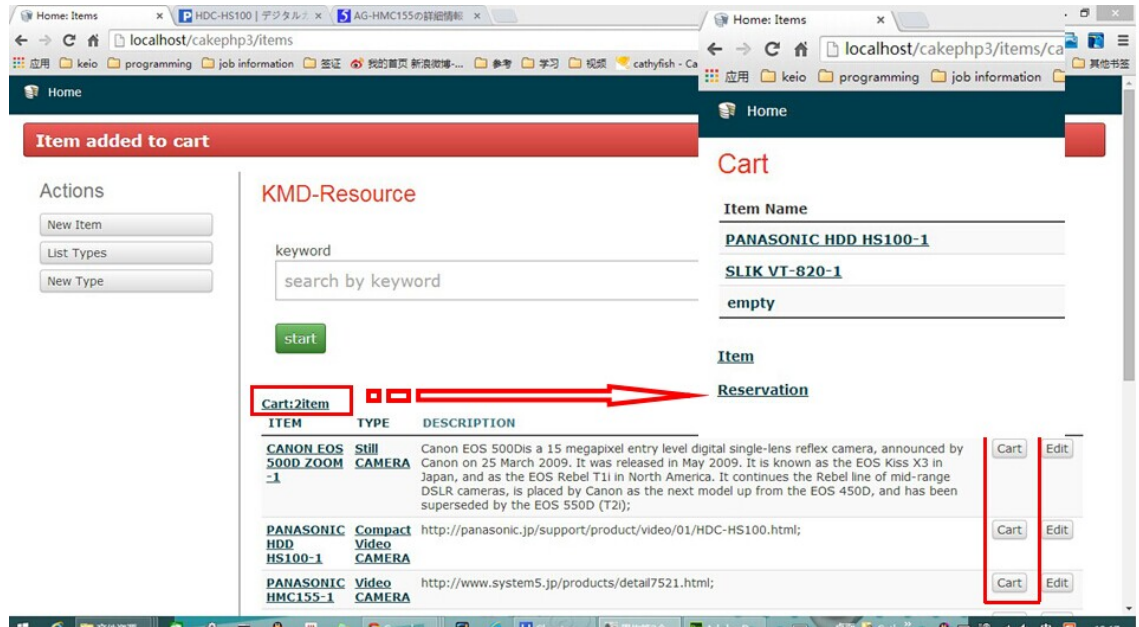


Figure 5.2: Example Page of Cart

Lending information

Lending information (Figure 5.3) related to the information of the user and the equipment information temporary reserved in the cart, other information including the time for borrowing, the objectives for borrowing and note for special remind will also be recorded.

5.2.2 Data Integration

Figure 5.4 describes the whole structure of the database designed for the the recommendation system.

Initial data in the objective_name field are set as: project, personal, and

应用 keio programming job information 签证 我的首页 新浪微博... 参考 学习 视频 cathyfish - CakeP... CakePHP | duckra... KMD Thesis Temp... 其他书...

Home

Add New Event

Borrower
Xieing Yu ▾

Start*
August ▾ 3 ▾ 2014 ▾ 7 ▾ 47 ▾ pm ▾

End*
August ▾ 3 ▾ 2014 ▾ 7 ▾ 47 ▾ pm ▾

☒ All Day

Objectives
Objectives ▾

Notes

Status
Lend ▾

Item
☒ PANASONIC HDD HS100-1

Item
☒ SLIK VT-820-1

Submit

Figure 5.3: Example Interface for Input Lending Information

event_crash_course, and event_show_case, event_plenary_meeting. Figure 5.5 explains the route for searching information from an objective to the related items.

While the objective(content) is personal or project, the route is described as figure 5.6. In this case, the note will be an important field for configuring deeper objectives.

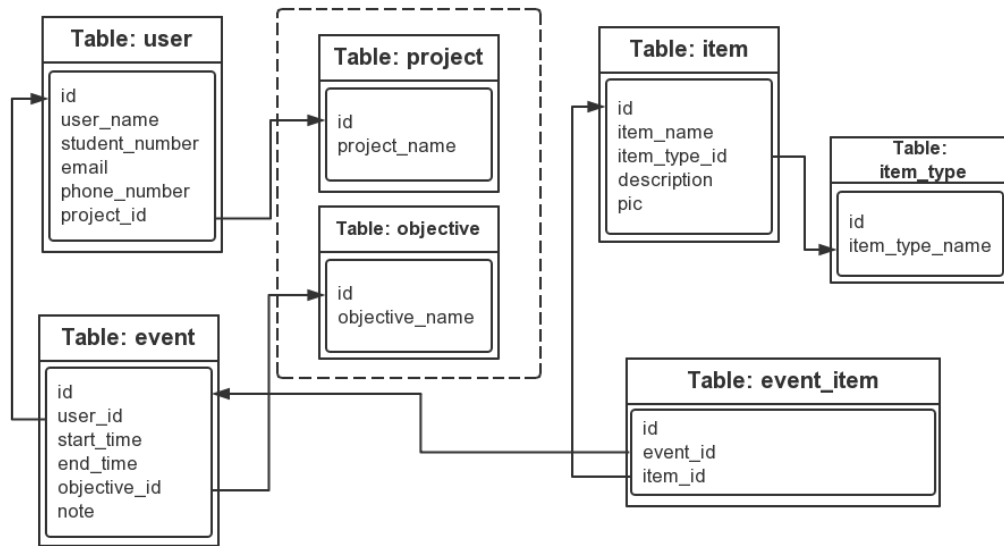


Figure 5.4: Database Structure

5.2.3 Output

The interface for showing the recommendation information is describe in the example page showed as Figure5.7. At the initial stage, the information for recommendation can be based on the result from data analysis from the current system.

For future, automatic recommendation is expected to be introduced as with the accumulation of data.

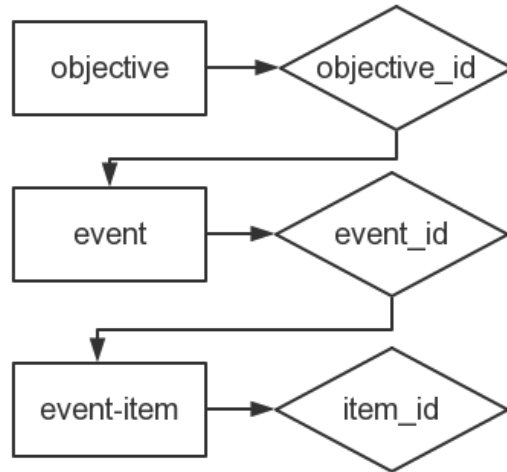


Figure 5.5: Rout for Information Flow

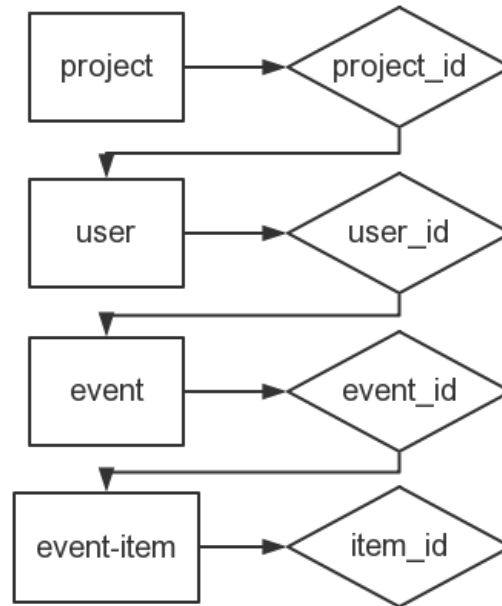


Figure 5.6: Rout for Information Flow(Project)

The screenshot shows a web browser window with the URL `localhost/cakephp/items`. The page has a dark blue header with a "Home" link. On the left, there's a sidebar with "Equipment you may need for:" containing links for "KMD Events" (Crash Course, Show Case, Plenary Meeting, KMD Forum) and "Projects" (View All). The main content area is titled "Item Lists" and contains a table with 5 items.

ITEM	TYPE
CANON EOS Kiss x3ZOOM -1	Still CAMERA
PANASONIC HDD HS100-1	Compact Video CAMERA
PANASONIC HMC155-1	Video CAMERA
PANASONIC HMC155-2	Compact Video CAMERA
SLIK VT-820-1	TRIPOD STAND

Page 1 of 1, showing 5 records out of 5 total, starting on record 1, ending on 5

< previous next >

Figure 5.7: Interface for Output

Chapter 6

Evaluation

Chapter 6 is the evaluation of the case study and the proposal discussed in Chapter 5, which focus on evaluation how much the result of the case study match the concept of the objective oriented recommendation, and discuss the merits and limitation of the proposal. Opportunities and difficulties in promoting the system into general business logistics is also a issue in the scope of this chapter.

6.1. Evaluation of the Case Study and Proposal

As we have anticipated in Chapter 3, the related objectives can be categorized into the audiovisual activities and features in users.

In this case, the KMD regular events are one of the aspect we find can be an objective for providing recommendation information. According to the result in Figure 4, we find the combination of the equipment and the time period of each equipment for each objectives are quite similar, that is because the KMD regular events themselves have lots in common, they show a strong image for a typical business presentation.

Objectives getting from the features in user reflected in the Real Project in this case, it indirectly indicates how strong the relationship between the project activities and audiovisual activities.

The proposal explained in Chapter 5 is a model of objective oriented recommendation system.

Specified fields of record information in user information, equipment infor-

mation and lending information provides with an efficient way to get the detail objectives. Based on the improved solution in inputting, it will be much more easier in analyze the equipment related to those objectives. This functional facilitate users to find the right item in short time, and enhance the efficiency in reducing the time to search for items to the users, and make better management and arrangement of all the equipment as the recommendation mechanism also analyze how much time an item will be needed in terms of each objectives.

The biggest limitation of the recommendation mechanism proposed is that the objectives we take as the content for establishing the recommendation mechanism is deeply influenced by the characteristic of the organization(Graduate School of Media Design of Keio University), which will may result to a change in the objectives while changes within the organizations take place.

6.2. Opportunities and Difficulties for Promotion into General Business Logistics

In the business logistic field, objective oriented recommendation mechanism is doable as long as we can get the purpose for the activities and features in the users within the certain industry or company. The objectives differs quite a lot according to the difference in industry, the business of the industry, cultural difference in management in different countries and variety of other detail differences.

For promoting this mechanism into use in general business logistics, several difficulties should taking into consideration.

1. In a general business logistics division, the objective may not be as clear as it in KMD resource management, uniqueness in KMD schedule and teaching content make the KMD unique and it shows a strong relationship between the users and the equipment in KMD resource, the objectives of the activities and the equipment. However, this features may not be so distinct in other occasion.

2. Complexity in the involved actors may also be a issue. The KMD resource management is relatively simple, amount of the types of equipment and user is limited. While in some other fields in business logistic, large amounts of items and thousands of user are involved, which lead to a intricate and complicated relationship between the objectives and other factors.

Chapter 7

Conclusion & Future Work

7.1. Conclusion

The study was set out to explore experiences while making a customized recommendation for business logistics in physical world. The mission of the business logistic is to make proper arrangement of all the items in the scope of business, distribute them to the right person at right time at right place. Based on the mission of the business logistics and the features in management, which usually combine with a specific purpose in a professional way, we propose a objective oriented recommendation in this thesis.

The methodology we used in this research is a case study of the KMD resource management. The TA experience lead me to the interest in the topic of this research, and it also prepared me with a well known of the environment, flow and the detail practice of the management. Description of the management environment reflects several points for improvement, database description and the data analyzing was regarded as an important step within the whole research process, it provided us with the evidences to examine the effectiveness of the basic conception and the expected results. The data analysis result indicates that lack of information in the database and the changes in the real world may be the factors we should taking into consideration to improve to establish the recommendation mechanism.

Proposal based on the result was a model of the recommendation system, it proved our anticipated results that the objectives for recommendation come from

the purpose of the activities within the business scope and the features in the users. Difference in the environment may result to the difficulties in promoting this mechanism into use in general business logistics.

In the end, we have to point out that the result of the knowledge we found as well as the proposal we came out in the research is based on the real facts and of practical instruction, it will be an important reference for strategic decision making for improving management in a concrete working environment.

7.2. Future Work

Future works in this study focus on the aspects stated below:

- So far we proposed a recommendation mechanism with the model how to realize, the next step is to put it into implementation and evaluate the performance of the system, for the further improvement of the system. Automatic recommendation is expected to be introduced as with the accumulation of data in future.
- Technologies for customized recommendation system is another field can be studied for further development of the work.
- Extend the objective oriented recommendation mechanism to a general field of business logistics industry with multiple actors and large scale business, and help the division with different objectives make a proper arrangement of the items is expected as another task for future work.

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