



Development of the Weblog System for Elementary School

A DISSERTATION

BY

MURAYAMA, Yoshiyuki

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Department of Information Engineering,
Graduate School of Science and Technology
Shinshu University

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MURAYAMA, Yoshiyuki

*Department of Information Engineering, Graduate School of Science and Technology,
Shinshu University, Wakasato, Nagano-city, Nagano 380-8553, JAPAN*

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abstract

This thesis describes the new weblog system developed for elementary school.

The School Weblog System is developed for elementary school teachers, which cut the overall cost of updating website.

As affairs now stand, the situation of updating website rate is low at almost all of elementary schools in Neyagawa.

The reason of this situation are a lot of case, but one of the most dangerous background is too low teacher's skill.

It is true that teachers must acquainted with it, because they demanded by local community.

Therefore, an administrator is selected at each of schools. In addition, education committee in Neyagawa city teaches how to update the website at educational training center.

But, in the case of current method that to edit the HTML source code by commercial software(e.g. IBM Homepage Builder) and to upload its code taking by FTP, we find a lot of problem.

The problem is that this method requires teachers of high skill about network technology, and strikes them as confusing.

That's why weblog system is suitable for updating school websites. Using weblog system can show the solution of difficulty and complication of updating.

No high skill of network technology that is how to use html generator, HTTP and FTP, is required. And teachers can update very easily like writing a dialy.

However, a lot of weblog system are not free software, and almost all of the free software is not suitable for elementary school.

These system which are not suitable, is to require the commercial which is not necessary at all for elementary school, and not to have several functions. For example, weblog sytem for elementary school need to have annual event calendar and to have documents downloading service. No weblog system exists which manages integrative functions like that.

Therefore, the purpose of this research is development of new weblog system for elementary school as open source software.

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Chapter 1

Introduction

1.1 Overview

As affairs now stand, the situation of updating website rate is low at almost all of elementary schools in Neyagawa city.

The reason of this are a lot of cases, but one of the most dangerous background is too low teacher's skill. It is true that teachers must acquainted with this skill, because they are demanded by local community. But, in the case of current method that to edit the **HTML** [1] by commercial software and to upload its code taking by **FTP**. There are a lot of problems.

The problems are that this method requires teachers of high skill about network technology, and strikes them as confusing.

That's why weblog system is suitable for updating school websites. Using weblog system can show the solution of difficulty and complication of updating.

However, a lot of weblog system are not free software, and almost all of the free software are not suitable for elementary school. These system which are not suitable, require some commercials which is not necessary at all for elementary school, and not to have several functions. For example, weblog system for elementary school needs to have annual event calendar and to have documents downloading service. No weblog system have there service.

Therefore, the main goal of this research project is to develop and evaluate practices and tools for the design and construction of weblog system specialized in elementary school.

1.2 Weblog

The word comes from another word, "Weblog", which refers to log of web. Therefore weblog is like personal diary website. But we notice some differences between diary and weblog. In general, the diary which you wrote is treated as secret.

However weblog is opened. And some weblog system can choose private or public mode. In addition, weblog is growing its scale. Institute for Information and Communications Policy (IICP) said that the total domestic weblogs which is opened on the Internet is 16.9 million at July, 2008[2]. And the total amount of data are about 42TB.

And the scale of blogger is about 27 million[3]. Thus, weblog is burgeon rapidly.

So, a lot of paper were published[4][5][6][7][8][9][10][11][12]. Takeda and Ohmukai said current and foresight weblog system[4][5][6].

Yamashita approached psychologically. Yamashita said why people write on a weblog. And she also researched the difference of writeing mind with name between Japanese and United States[7]. Maki and Hukami researched collaborative development of software platform with weblog[8]. Shiraishi suggested and

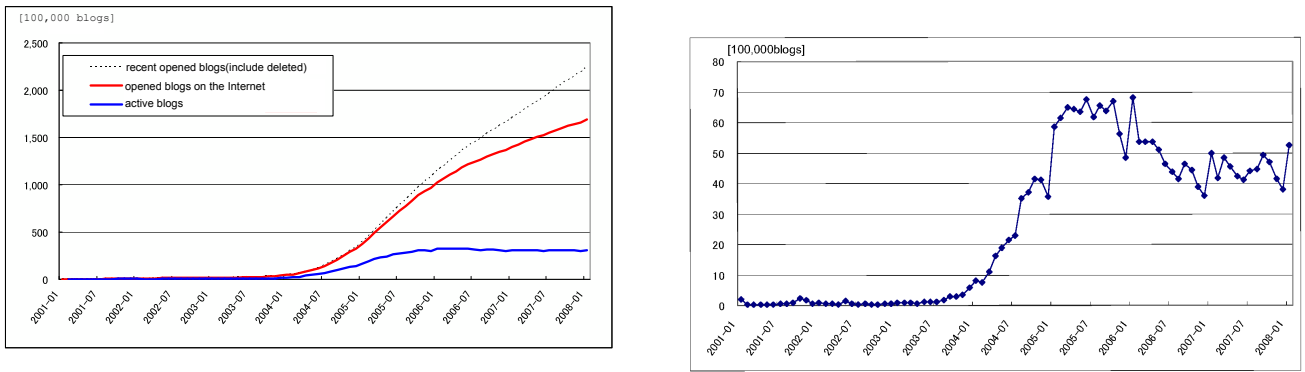


Figure 1.1: Left figure shows the monthly process of new set up weblogs and right figure shows the process of the total domestic weblogs. the Total weblog sites increased rapidly from 2004 to 2005. [Original from IICP [2]]

evaluated a weblog system for growth diagnosis of children[9]. Numa said a new approach of workshop with weblog[10]. Etoh and Miyashi developed and evaluated on e-learning weblog system[11].

Nakano took a survey of how teachers and parents think weblog for kindergarten[12]. Her research kindergarten took by cocolog weblog system service. Nakano said weblog system can show parents especially the father who cannot join events to children in a kindergarten. And she reasoned it is easy to frequent update for its usability. But, it is difficult to upload images. Moreover, weblog system is expected not transmission of information from kindergarten, but exchange of information.

She concluded it is very useful to use weblog system service for kindergarten. but, we have to consider not negligible parents who cannot use network service. Because it is preventable risk. The risk is digital divide. So, she said we have to publish paper based news.

Her research is surely applicable on elementary school. But, she cannot said the functions on her paper.

By the way, it is said that the source which made weblog to be famous is multiple acts of terror in United States. After 9-11, ordinary citizens discussed and exchanged messages using weblog systems; This was freed from the constraints of factitive mass media.

Furthermore, to start weblog is relatively simplicity. Therefore a lot of people who have not insisted ever, wrote their idea on the Internet with original source and scheme. Now, we can see a lot of weblog sites; the sites are thus curbstone journalism and personal diary and so on. On the contrary, the larger the total of weblog sites, the larger we find unusefulness weblog sites.

Therefore, it has been required which site is beneficial or not. Google Inc. approaches the matter from following method. The method is that a lot of people or computers link to beneficial sites. Another way of saying, worth while sites are linked to a lot of people or computers.

Google Inc. shows this idea as PageRank. A goodly amount of websites is ranked by this PageRank system. Google Inc. thinks important site is high level of PageRank. If your website is linked by other sites, the PageRank of your site is up. Moreover, if you want to up your PageRank, you should try to be linked by other sites of upper PageRank websites. Because Google Inc. the sites which is linked by upper PageRank websites, is important sites too.

That is to say, Information evaluates itself of the value individually, and shakeout itself. The philosophy of this system is from Web 2.0.

1.3 Web 2.0

Web 2.0 has become famous in mid-2005[13]. The word “Web 2.0” is coined in 1999[14]. It is characterized as facilitating communication, information sharing, interoperability, use-centered design and collaboration on the World Wide Web. It has led to the development and evolution of web-based communities, hosted services, and web applications. For example, social-networking, video-sharing, wikis, weblogs and mashups.

In 2004, John Batelle and Tim O’Reilly outlined their definition of the “Web as Platform”, where software applications are built upon the Web as opposed to upon the desktop.

Umeda said its importance and suggest Web 2.0 as revolution[15]. He argued about cheap revolution. And he thinks it is true that even if you have high quality of software and hardware for writing, creating music, creating movie, and so on, you cannot be a professional artist. However, it is true high quality of software and hardware enhance your capabilities, too. He said Web 2.0 simplify the above.

For example, Google Inc. released Google Maps API¹. This can show us maps and satellite images in almost all of the world include a few The Moon and Mars. Moreover it opened its API code. So, everyone who want to use it, can control this system taking by API at no cost. if we start our own website.

However, Web 2.0 is not new version of the Internet or new technology, but in reality refers to a second generation of web development.

That is, Web 2.0 thinks everyone on the Internet can’t be bad. Web 2.0 thinks everyone not passive recipient of services, but active express actor and to participate.

To implement these systems, it is necessary to open the services which are easy to use for developer. Therefore many Web 2.0 sites provide **APIs**, and often feature a rich, user-friendly interface based on **Ajax**. In addition, it based on similar client-side interactivity frameworks, or full client server application frameworks.

Ajax stands for Asynchronous Javascript And Xml. **Ajax** is built-in classes of **javascript** to communicate on HTTP². It uses asynchronous communication by XMLHttpRequest, and it partially rewrites web page by **DHTML**³ without updating as in response to connection results. Therefore, school weblog system has **Ajax** service.

1.4 Weblog System Services

There are myriad weblogs system in the world. The most easiest weblog system for setting up is to use Weblog system service like hatena-diary, cocolog, mixi diary and so on. MyVoice Communications, Inc surveyed well-known blog system service[16]. The result is shown in Fig. 1.2. we find FC2 and rakuten weblog system service are well used in Japan. A few elementary schools uses this service[17][18].

However, some of them has advertisings on the sites which is not necessary at all. And these are not designed for collaborative activity. Furthermore, All of these weblog system services have not documents uploading system and annual event calendar system. These weblog system service have some problems, as shown in Table 1.1.

Therefore, It is difficult to use these weblog service systems for elementary school.

And, There is other way of building weblog site. The way is to install existing weblog software like Movable Type, WordPress and BlognPlus.

These systems can build anything functions what you want, because of its editable source code. Accordingly, it is one solution for school weblog. However, it can only use under special environments.

For example, to use Movable Type demands ¥96,000. A lot of elementary schools will not able to pay

¹Application Program Interface

²HyperText Transfer Protocol

³Dynamic HyperText Markup Language. DHTML is a technology based on **HTML**, **javascript**, and **CSS**. It allows static **HTML** sites dynamic taking by **javascript** and **CSS**.

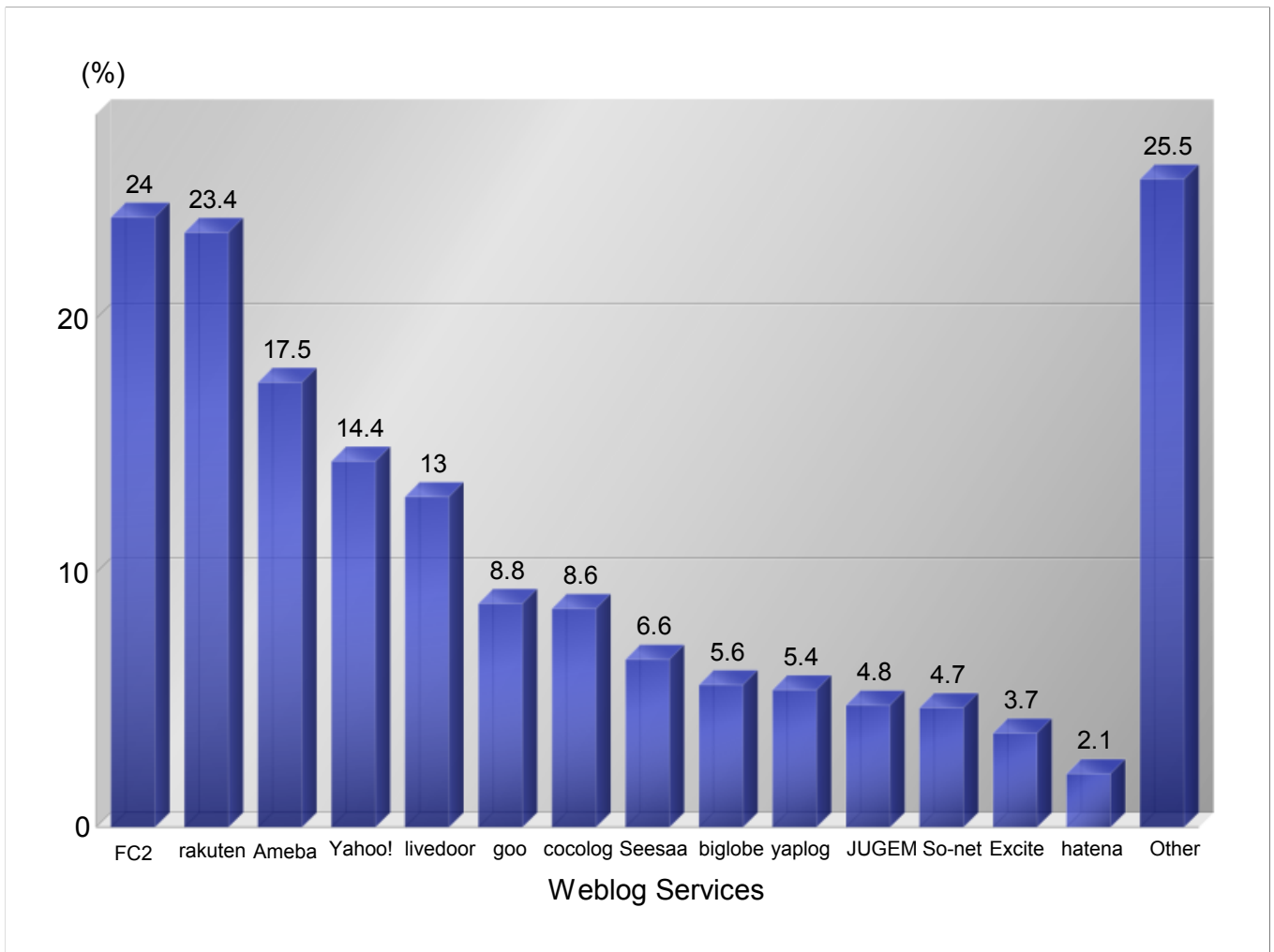


Figure 1.2: Weblog Services ratio in Japan at 2008. We find FC2 and rakuten weblog system service are well used. [Original from MyVoice Communications Inc.[16]]

such a high cost. And, WordPress requires all teachers of **RDBMS**⁴. To use **RDBMS** means that, always at least one teacher can control **MySQL** or **PostgreSQL** each elementary school. A lot of them will not be able to setup systems for too high skill. It is just not realistic.

In contrast, BlognPlus can choose using **RDBMS** or not. So, quite a number of teachers can use it easily. Unfortunately, BlognPlus cannot implement file upload system.

As in these cases, There are no weblog systems for elementary school.

1.5 School Weblog System

The purpose of school weblog system development is to provide huge benefits to teachers who must update their school websites. It is not to edit the **HTML** source code by commercial software(e.g. IBM Homepage Builder) and to upload its code taking by **FTP**, but only to use web browser like Microsoft Internet Explorer,

⁴Relational DataBase Management System

Table 1.1: Problems using weblog system service for elementary school. All of weblog service shown here are not suitable for elementary school by these reasons.

Service	the most dangerous problem
FC2	with advertisement
rakuten	with advertisement
Ameba	with advertisement
Yahoo!	with advertisement
livedoor	with advertisement
goo	with advertisement
cocolog	with advertisement
Seesaa	with advertisement(If you don't update over 60 days.)
biglobe	with advertisement
yaplog!	with advertisement
so-net	with advertisement(mobile site)
excite	with advertisement(RSS field)
hatena	cannot upload documents and annual plan.
Blogger	cannot upload documents and annual plan.

Mozilla FireFox, Google Chrome, and Apple Safari.

The development of this system is written in **PHP**^{[19][20]}. The resources of **PHP** are abounding. Therefore, one of the large features is that this system development can suggest solutions in a short period with using **PHP** resources.

And, this system is written in **PHP** for all web pages, so it is easy to change its specific comparatively.

Furthermore, Surely using **RDBMS** like **MySQL** and **PostgreSQL** rises its productivity. Because, **RDBMS** makes you not to develop on database access. And, **PHP5** has original database system.

However, if it occurred a incident that DB is broken by unknown reasons, the readability of users who are not developer is dramatically-low. Because to recognize **RDBMS** is quite more difficult than not use it. Therefore, it is risk factor.

Considering the benefits and the risks, this system has its database on **XML**⁵, **CSV**⁶, and **ini**⁷. And, This system is developed as Open Source Software.

⁵Extensible Markup Language

⁶Comma Separated Values

⁷initialization file

Chapter 2

Database System

2.1 Database on This System

This system has been developed for the teachers who are difficult to update website because of their low technical skills. Therefore, it needs to install this system on simple method as possible as we can.

When we build on client server system, we must consider the method how to storage the data by its scale.

For example, it is enough to storage the data in the program, when you build on a small system. But, if it is need to build on relatively moderate scale system, we must separate data from program for data independence.

That is to say, it is desired to hold only accessing data on each module connections.

To manage the data, it is the best thing to adopt **RDBMS** such as **MySQL** and **PostgreSQL**. And linking **RDBMS** and this system, it can build secured and high speed database.

However, it is requested users on some technical skill to use. Moreover, if the incident is occurred on this system, to recover the data is very difficult for a lot of users. For example, every users must study **SQL**. To consider average technical skill of teachers as of now, it is not realistic idea.

As described above, it is need to build the **CRUD**¹ System instead of using **RDBMS** which is fundamentally adopted.

Because of managing the database in this system, it is free to design the data architecture. Therefore, in this system, it is designed and operationed three file formats. The formats are **ini**[22], **CSV**[23], **XML**[21][24][26] that are easy to use in **PHP**. Because **PHP** has a lot of libraries to control there.

These file formats has each attribute. And, it is necessary to comparing “what is most appropriately” as the situation demands.

Therefore, it is discussed these file formats in the next section.

2.2 Database File System

In this section, we describe three file formats of data as we discussed in the Section 2.1.

These three file formats are based on ASCII² file system. it is simple to edit by text editor such as Vi, Emacs, Notepad and so on.

Next, it described advantages and disadvantages on these file format. This system is build on **CRUD** of each file formats.

The most distinction is file access speed. If the number of records is low, it is negligible. However, if it is the large volume of records, to consider the file format is abundant need.

¹CRUD means a Create, Read, Update, Delete functions. It is fundamental functions of database system.

²it is not Binary file for machine, but for human.

ini

Schema

This file format is a de facto standard for configuration files. These files are simple text files with a basic structure. They are commonly associated with almost all of the operating systems. The name “ini” comes from the filename extension usually used, “.ini”, that stands for “initialization”. Sometimes, files using the ini file format will use a different extension, such as “.cfg”, “.conf”, or “.txt”.

And, this file format is one-to-one correspondence. That is to say, one line indicates one record. In General, the basic element contained in an ini file is the parameter. Every parameter has a name and a value, delimited by an equals sign. The name appears to the left of the equals sign.

For example, it is constructed on `[variables]=[data]`.

Advantages

It is suitable for storing one-to-one correspondence. It is simple to design, because **PHP** has standard function to control it.

Disadvantages

Surely, it is suitable for storing one-to-one correspondence. Also, it is not suitable for this situation. If the number of data are unknown, it is difficult to use this file format. In addition, it is also difficult to understand the connection between data correlates.

It is difficult to automatically creating the data on program because its one-to-one correspondence character.

CSV

Schema

Comma separated values file is used for the digital storage of data structured in a table of lists form, where each associated item in a group is in association with others also separated by the commas of its set. Each line in the **CSV** file corresponds to a row in the table. Within a line, fields are separated by commas, each field belonging to one table column. Because it is a common and simple file format, **CSV** files are often used for moving tabular data between two different computer programs, for example between a database program and a spreadsheet program.

CSV is one implementation of a delimited text file, which uses a comma to separate values. For example, **CSV** is such as `[data],[data],[data],...`.

It is described more information and example in the Section 3.5.

Advantages

It can manage per group, because it can store multiple data in a line. It is simple to design, because **PHP** has standard function to parse and control it. Microsoft® Office Excel can access. Therefore it is simple to start.

Disadvantages

It is impossible to give the meaning to the data. When the data accessed by multiple websites, it can do nothing to change its specifications. Such as adding the element of data, it occurred. Because, it is need to rewrite all programs which access **CSV** file.

XML

Schema

XML is a general-purpose specification for creating custom markup languages. The term extensible is used to indicate that a markup-language designer has significant freedom in the choice of markup elements.

The characters which make up an **XML** document are divided into markup and content. Markup and content may be distinguished by the application of simple syntactic rules. All strings which constitute markup begin either with the character < and end with the next >, which is called “Tag”. Moreover, it has child tags. Therefore it have no concept on the record.

For example, **XML** is below:

```
<?xml version="1.0" encoding='UTF-8'?>
<item>
  <color>
    <red>
      <fruit>
        apple
      </fruit>
      <fruit>
        strawberry
      </fruit>
    </red>
    <green>
      <fruit>water melon</fruit>
    </green>
  </color>
</item>
```

It is described more information and example in the Section [3.5](#).

Advantages

XML has tag system. Therefore, it can give the meaning to the data. Moreover, it is able to make the data in group, because it can have child tags. Therefore it can change its specifications. Such as adding the element of data.

Disadvantages

It is tend to inevitably become a large file for its tag system. It has a cost to access time on accessing the data. It is difficult to access **XML** on **PHP** until version 4.

Thus, **ini** is available as the fundamental setting on the system.

In contrast, **CSV** and **XML** are available as the frequently accessed data such as daily diary.

In General, it is more preferable to adapt **CSV** which is rapid process on data than **XML**, because the access on the diary is frequency.

Meanwhile, this system has prospects of change its specifications by some reasons. The reason is that to updating or to be desired new functions by teachers and parents.

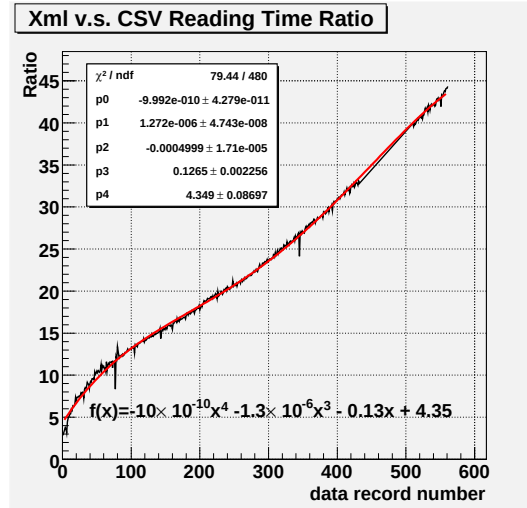


Figure 2.1: XML v.s. CSV access time ratio. It is discussed in Section 2.1.

To consider two tradeoffs, **XML** is used in many programs accessing data, such as diary data. **CSV** is used in small scale data. And, data access time ratio on **XML** v.s. **CSV** has been measured. More information is in Section 3.4. The file formats and database functions, which have been used in this system, are described in Table 2.1.

Table 2.1: The file formats and database functions, which have been used in this system. $[[name]]$ means multiple data.

file name	function	format
setup.ini	whole setting.	ini
setupmail	mail address encrypted by DES	-
log.dat	log	CSV
articlecount.dat	article number	-
category.dat	category information	CSV
counter.dat	total access number	-
countertoday.dat	today's count	CSV
diary.dat	category.dat for articlecount.dat	CSV
documentcategory.dat	the category for upload documents management	CSV
googlemapkey.dat	registration code for Google Maps	-
googlemaplocation.dat	information of the degrees of latitude and longitude on this school	CSV
link.dat	link information	CSV
rss.xml	RSS(RDF Site Summary) information	XML
weather.dat	today's prefectural weather information	-
$[[year]].xml$	school event information per year	XML
googlemapappoints.xml	map information	XML
number.dat	upload documents counter	-
listupdate.dat	last uploaded document information	CSV
list.dat	upload documents information for number.dat	CSV
$[[day]].xml$	diary information	XML

Chapter 3

Network Specification

3.1 Network Configuration

School Weblog system is exist on the Internet or Intranet. In General, this system is to be opened on the Internet. Therefore, this system is easy to update any time and any where using the Internet. Recently, mobile phone are able to access on the Internet, it can also access and update this system.

By contrast, because, it had been to use only static web page in Neyagawa city until 2008, we cannot build such a client server systems.

However, it is found that web server build on client server system in Neyagawa city. Therefore this system has been opened on the Internet, and home server has also been opened for development.

It is recognized as a major challenge for opening home server. The reason is why it costs for maintenance and electricity expense. It is required low cost of administrator.

Therefore, it has been used to build on Apple Mac mini Server[27]. Mac mini is micropower machine. The maximum electric power consumption of Mac mini is only about 75W. Usually, it indicates only about 35W.

Next, it is described how to build web server. First of all, we have to know is, there are used “IP address¹” on the Internet for specify the machine.

IP address uses 32 bit addresses, which limits the address space to 4,294,967,296(2^{32}) possible unique addresses[28]. However, 2^{32} (IPv4) is not enough in the world. Therefore, it distinguish Intranet from Internet. WAN means Internet world, and LAN means Intranet world[29].

In the WAN, it is strictly ruled by unique IP address. Therefore, it is to use global IP address.

In contrast, in the LAN, it is not ruled to decide IP address. However, IP address is usually decided on some rules. A famous rule is from Class A to Class E. It is decided the number of machines on the LAN. But, Class D is to use for multicast, and Class E is to use for test.

Table 3.1 indicates, IP Address Class definition. Because there are a few machines which not over 254 at my home, it is enough to build on Class C.

Table 3.1: IP Address Class. When you build home server and maintain, Usually there are not over 254 machines. Therefore it is enough to build on Class C

Class	The range of private IP address	The number of Networks	The number of Hosts
Class A	10.0.0.0~10.255.255.255	255	16,777,214
Class B	172.16.0.0~172.31.255.255	65,536	65,534
Class C	192.168.0.0~192.168.255.255	16,777,216	254

¹Internet Protocol Address

It is described how to open home server on the Internet. Usually the router allocate to private IP address for preparing the situation of multiple machines.

Now, this server machine for development is not allocated the global IP address, but private IP address. If this goes on, it cannot open server. Therefore, it need to set IP masquerade on the router which is mounted between LAN and WAN.

IP masquerade allocates port number every machines(usually private IP address) for more than one computer can access at the same time on one global IP address. And it works **NAT**².

But, If you use more than one machines on one global IP address, external use who access your computer cannot distinguish what is the server or not. Therefore, it needs to create **NAT** table and to assign what is the server port. Now, this case is concerned with web server, the router should be opened at 80 port.

Fig. 3.1 as shown here is router set up sample.

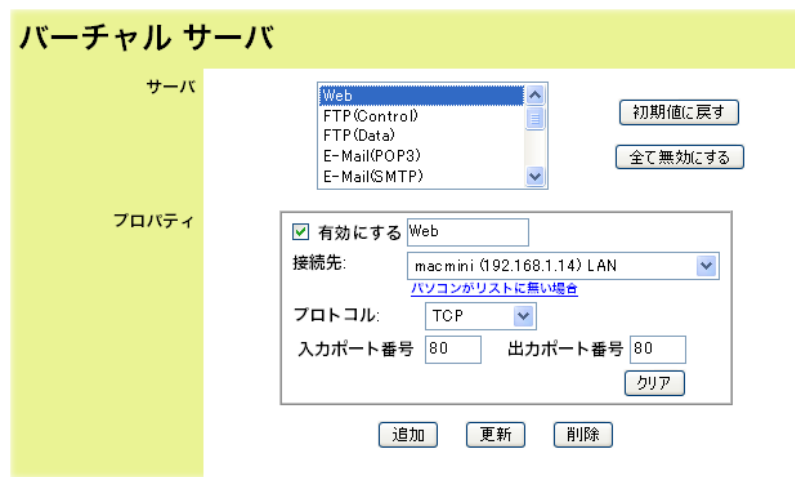


Figure 3.1: The 80 port should be opened, if you want to build web server.

Moreover, after opening the port, it need to set. Now, ISP³ has assigned global IP address dynamically. That is, each time, you connect to the Internet, or after a certain period of time, the global IP address is changed. DDNS is updateing DNS records and hostname at each time you connect.

It is distant idea, because to specify the server takes IP address. Therefore it is used DDNS⁴.

In particular, if it is checked to change the IP address, DDNS changes DNS record to new IP address on the host name. Fig. 3.2 as shown here is constructed network on this study for development.

²Network Address Translation

³Internet service provider

⁴Dynamic Domain Name Systems Service

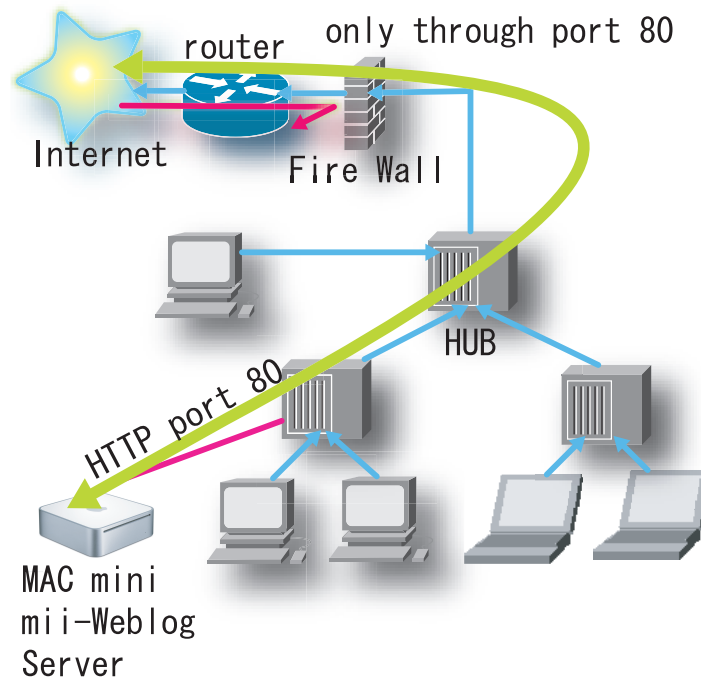


Figure 3.2: Except the 80 port is blocked by the function of the firewall of router

3.2 Server Configuration

The server is Apple Mac mini because it is high performance in spite of its low wattage. Fig. 3.3 shown is its appearance. Mobile phone is on the Mac mini for comparing its scale. And it is described the specification in the Table 3.2.



Figure 3.3: Apple MAC mini server. mobile phone is for preparing the scale. The scale is only about $16.5 \times 16.5 \times 5$ [cm]

Table 3.2: Server Specification. It is used Darwin kernel. Therefore we can use UNIX resources.

computer	Apple Mac mini
CPU	PowerPC G4 1.42GHz
secondary cache	512KB
RAM	512MB DDR SDRAM PC3200
OS	MAC OS X(10.4 Tiger)
httpd	Apache1.3.33
PHP	v5.1.2

3.3 Software Configuration

The software specification is shown in the Table 3.3, but it is written only concern with this study.

Table 3.3: Software Specification.

PHP version	5.1.2(more than 4.1)
upload_max_filesize	100M
GD library	2.1.10
mbstring.http_output	pass
mbstring.internal_encoding	EUC-JP
mbstring.language	Japanese

Now, This school weblog ststem for development is work on <http://ymlabo.ddo.jp/~ymlab/blog/>

This system is took by **PHP**script language. Software configuration on this system is shown in the Fig.3.4.

That is, this system accesses by **PHP**, and the result put into **HTML** . After this communication, it marges the **HTML** , **javascript**, and **CSS**. Finally, it send the data to server program.

Sample code is shown below. **PHP**is worked only from `<?php`, to `>` code. This program is add from 1 to 100, and output the result.

It is same as

$$\sum_{i=1}^{100} i = 5050.$$

```
<html>
<head>
  <title>
    Exsample
  </title>
</head>
<body>
  <h1>
    sumup from 1 to 100
  </h1>
  <p>
<?php
```

```

$sum = 0;
for ( $i = 1; $i <= 100; $i++ ) {
    $sum += $i;
}
print "Result: ".$sum."\n";
?>
</p>
</body>
</html>

```

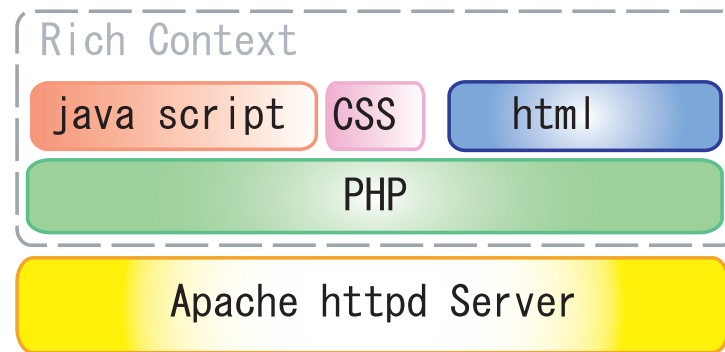


Figure 3.4: Software configuration. The base is Apache httpd server. And **PHP** output the result into **HTML CSS javascript**.

3.4 Database

This system controls originally by **ini**, **CSV** and **XML** without using **RDBMS** such as **MySQL** or **PostgreSQL**.

The data which is needed is shown here.

```

setup information category list
diary update Google Maps key
links QR code
article id total access number
RSS today's prefectual weather
current location update documents category
school event today's access number
stylesheet javascript
page header page footer
diary info update document list
free area recently update documets

```

It is unreal that to integrate this data. And it is necessary to access more fast.

PHP5 supports easy access to directly parse on **XML**. However, **PHP4** has been unsupported. Therefore, This system takes a library[30] on **PHP**. This library can transform data from **XML** to **PHP** array. And it can also transform data from **PHP** array to **XML**.

3.5 The Comparison of Access Time on XML and CSV

XML data sample is shown below. **XML** can give the name on each tags. Therefore **XML** can add the meaning to every elements

```
<?xml version = "1.0" ?>
<description>This is Students-Point Information.</description>
<student>
  <familyname>Osaka</familyname>
  <firstname>Taro</firstname>
  <major>particle-physics</major>
  <points>
    <linear_algebra>100</linear_algebra>
    <theory_of_relativity>95</theory_of_relativity>
    <mechanics>75</machanics>
  </points>
</student>
<student>
  <familyname>Neyagawa</familyname>
  <firstname>Hanako</firstname>
  <major>plasma-physics</major>
  <points>
    <linear_algebra>95</linear_algebra>
    <solid_state_physics>60</solid_state_physics>
  </points>
</student>
```

This sample is points information on examination of student. Now, two student is registered. the name of student are Osaka Taro and Neyagawa Hanako. Taro is majored in elementary particle physics, and Hanako majored in plasma physics.

And, Taro has got course credits;The course is linear algebras(100 pt), relativity(95 pt), mechanics(75 pt). Hanako has got it; The course is linear algebras(95 pt), solid state physics(60 pt).

The data shown below is **CSV** data.

```
#This is Students-Point Information.
#familyname,firstname,major,linear_algebra,theory_of_relativity,machanics,solid_state_physics
Osaka,Taro,particle-physics,100,95,75,0
Neyagawa,Hanako,plasma-physics,95,0,0,60
```

It is commonly-noted that line head is started by “#”, which means the line is to be ignored in **CSV** formatted file.

Therefore this sample is used “#” as comments. Of course, this process is to be built by system.

To compare **XML** file and **CSV** file, **CSV** file is more small size than **XML** overwhelmingly.

Small data means small access time, that is, it can build high performance web sites.

Chapter 4

Capability and Features

4.1 Top page

This system is client server system, it needs CRUD with web browser. Allmost all of operating system have equiped web browser. And there are variety of browser types and versions. That makes it increasingly difficult to develop system. To solve this problem, it need to integrate browser specification. W3C announces and recommends the standardization. However, it has been ignored yet(especially Microsoft Internet Explorer®). Therefore it needs to buid on the server. The top page is shown in the Fig. 4.1.



Figure 4.1: Top view of the school weblog system. It is mainly separated into 3 parts.

When it is separated into 3 category such as “left”, “center”, “right”. The left part is displayed, which is category or weather forecast information functions. The center part is displayed, which is main sentences such as diary, school event, and uploaded documents. The right part is displayed, which is complementary function such as search system, calendar information, and the location of the school.

4.2 Administrative Privileges Screen

The link to the administrative privileges screen is situated in the right upper part of the top screen. Fig. 4.2 shown here is the link. If we click this link, we can go to administrative privileges.

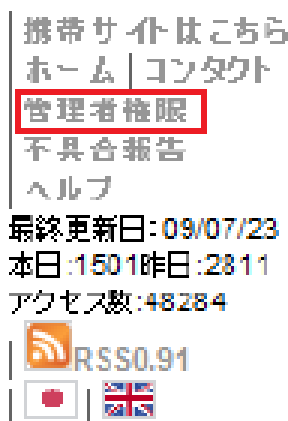


Figure 4.2: How to access Administrative Privileges Screen. Top page upper right has a link.

The function list of the administrator can access is shown in the Table 4.1. This site is fundamentally blocked by password system.

Table 4.1: Function list on administrator

diary	We can write the diary. This diary can use mathematical expression or movie
seting	We can set up initial setting.
category	We can set category to each article.
plan	We can set up school event on the Calendar.
link	We can set up links.
upload documents	We can upload documents.
weather forecast	We can show prefectural forecast information on the top page.
detail weather forecast	We can show area forecast information on the top page.
QR	We can create QR code for mobile site access.
Google Maps	We can show our school location, and can show marker what you want.
access analysis	We can access ayalysys taking by Google Analytics.
password	We can build password system taking by .htaccess and PHP session.

4.3 Diary

This site is most main page. It is able to be written daily diary. And, it includes rich context taking by **HTML**. It also includes YouTube movies.

4.3.1 Specifications

This system is designed for multi articles in one day. The data of diary is managed by **XML**. You can see it below.

In particular, When it was written articles, the system create *[year-month]* directory and *[filename].xml* file. Example is shown here. However, it is edited simplicity from original source code. `<diarynum>` means the number of articles in this day. The example is only one article.

```
<?xml version="1.0" ?>
<diary>
  <year>2009</year>
  <month>06</month>
  <day>10</day>
  <diarynum>3</diarynum>
  <article>
    <no>122</no>
    <diarycount>3</diarycount>
    <title>毎パソと、校区の様子の学習をしました</title>
    <category>JYQFDIIZ</category>
    <contents>毎日パソコンコンクールにも段々と慣れてきて、
    ずいぶんしっかりと打てるようになってきました。
```

先生、まえよりも〇点あがったー！とか、
先生、〇〇点やったと報告に来る子が増えてきました。

また、google 社が提供する google map street view を使って、
簡単に校区の中を移動しました。
「この道しってる！」とか、「児童公園にはいかれへんの？」
と喜んでいたと思います。

```
</contents>
<images>
  <isoneline>on</isoneline>
  <image>
    <imagealt></imagealt>
    <imageurl>2009-06/img/1031.jpg</imageurl>
  </image>
  <image>
    <imagealt></imagealt>
    <imageurl>2009-06/img/1032.jpg</imageurl>
  </image>
  <image>
    <imagealt></imagealt>
    <imageurl>2009-06/img/1033.jpg</imageurl>
  </image>
</images>
```

```

<comments>
  <commentnum>46</commentnum>
  <comment>
    <username>dummy</username>
    <contents>dummycontents</contents>
    <timestamp>time();</timestamp>
  </comment>
  <comment>
    <username>男子 5</username>
    <contents>今日は毎パソの練習で、1 4 8 点で点数がのびました。この調子でがんばりたいです。</contents>
    <timestamp>1244610500</timestamp>
  </comment>
  <comment>
    <username>男子 1 0 番</username>
    <contents>今日点が 5 2 点になりました。</contents>
    <timestamp>1244610515</timestamp>
  </comment>
</comments>
</article>
</diary>

```

If you want more than one article in today, The system adds `<article>~</article>` into `<diary>~</diary>` on **XML**.

And, it is also adding rich context. It is correspondence to **HTML**, **T_EX**, and Youtube forms. For example, **HTML** form is directly input **HTML** such as “This is a `<strong>pen</strong>`”. **T_EX** form is original Tags such as Hatena[31].

4.3.2 Features

This diary has a category attribute on each articles. The name of the category is able to create category setting functino, which is given later.

For example, if you registered “1st grader”, “2nd grader”, and so on, you can search refinement. The screen is shown in the Fig. 4.3.

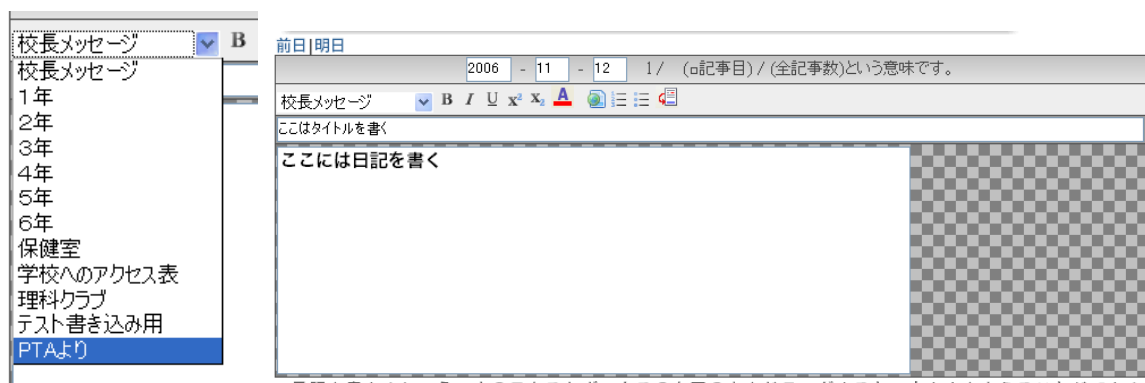


Figure 4.3: You can add the category attribute in each article. The right is title and writing message view.

This system supported uploading less than 3 image file a article such as Fig. 4.4. The uploaded images are stored in the database.

If you upload with compress checkbox, system compress automatically. The max size of width is 640px. Moreover, this system create another file which is compressed 160px, whether it was checked or not. Because, it needs to consider mobile phone. Mobile phone requests low resolution of that image for packet costs.

The uploaded image is output such as in the Fig.4.5. The images is zoomed out. There are delete checkbox instead of reference button. The method of delete images is check delete checkbox, and submit write diary button.

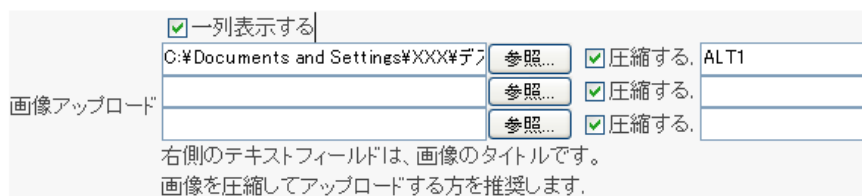


Figure 4.4: This is uploading image screen. This system supported uploading less than 3 image file a article



Figure 4.5: This is how to delete uploaded images. There are delete checkbox instead of reference button. Therefore the method of delete images is check delete checkbox, and submit write diary button.

This system support multi articles a day. We call the order, “diary count”. Clicking right arrow burron, you can create next article which diary count is incremented by one. Fig. 4.6 is the sample. By the way, the word 1/ 2 shown in the Fig. 4.6 means [*diarycount*] / [total diary count in a day]



Figure 4.6: Diary count architecture makes The [*day*].xml write many articles.

4.4 Administrator Seting

4.4.1 Specifications

The data on this page is set .ini file which is parsed by **PHP**. Any one is allowed to see data because it is opened. However, the email address has two contradicting demands. The school email address is to be opened on the Internet. However, If opening the email address, spammer attacks this email address with delight.

The most spam mail is collect the e-mail address on the Internet automatically. Therefore, opened e-mail address is to set up encrypted.

This system registers the e-mail address with encryption by **DES**. and put the encrypted e-mail address on th browser.

DES is reversible cipher, it is it can decoding. In this case, if it takes artifact cipher, user also cannot know the e-mail address. Therefore, this system takes thus thing. spam crawler is blocked by its encrypted word, and browser can encrypt the e-mail address. Users are not conscioues of ciphyer.

Surely, it is exposed that spammer discovered with a way to penetrate the key code. Therefore, you have to maintain permissions in an appropriate.

For example, e-mail address of Mii elementary school in Neyagawa is registered as shown below.

```
69-+>398U2</0dI7+36>9a+g7/U-97I
+21
```

4.4.2 Features

The initial data which is registered by administator is that.

1. **The title of this system**

Setting this system title. It is equals to set the <title> tags.

2. **The title image.**

Setting the Image in the top page. If you set nothing, previous information is stored.

3. **Add the link on the title image.**

We can choose add the link to the top page or not on uploaded title image.

4. **Link target**

Setting the target attribute on <a href>. Default is “_blank”.

5. **Comment input policy**

Setting a comment input policy. We can choose 1 of 4 setting mode.

1. Everyone can write the comment.

2. Everyone can write the comment, However it needs password which is opened on the screen to prevent spammer from writing.

3. Everyone cannot write the comment, It needs password.

4. No one can write the comment.

6. **The number of items a page.**

Setting the limit of items a page. Default is 10.

7. **The format of date**

Setting the parameter of the date. It follows **PHP** rules. %Y means year, %m means month, and %d means day. Default is %Y-%m-%d.

8. **Marquee attribute**

Setting the word that can see on the top page with marquee. For example, today's school information.

9. Street address

Setting the street address. Nothing is allowed.

10. Zip code

Setting the zip code. Nothing is allowed.

11. Dial number

Setting the dial number. Nothing is allowed.

12. Fax number

Setting the fax number. Nothing is allowed.

13. E-mail address

Setting the e-mail address. Nothing is allowed. the e-mail address is encrypted, taking by **DES**.

14. URL

Setting the URL of this site. For example, your website is “http://hogehoge.com/babu/pabu/blog/”. In this case, you write “http://hogehoge.com/babu/pabu/blog/index.php”.

15. Abstract

Setting the abstract message, which is used in **RSS**.

16. Languages

Setting the language, which is used in **RSS**. Default is “ja”.

17. Google Analytics number

Google Analytics is the most strong access analysis function. In nature, it should include **javascript** code.

18. Furigana API URL

If you want to set your articles with Furigana, set the Furigana **API**. Now, it cannot upload this program in Neyagawa city by taking binary programs. Therefore it is linked to development machine. Default is “http://ymlabo.ddo.jp/ ymlab/webservice/mecab/mecabfurigana.php”.

19. The number of history information of uploaded documents a page

Setting the max number of history information of uploaded documents a page. It is printed on the right part of the page.

20. The number of new article information

Setting the max number of new article information.

21. Plan

Setting whether the event calendar information is output or not.

22. Documents

Setting whether the uploaded document information is output or not.

23. Link

Setting whether the link information is output or not.

24. Location

Setting whether the location information is output or not.

25. School map

Setting whether the map of the school is output or not. It is strongly recommended that it is set after setting Google Maps setting.

26. Weather information

Setting whether the weather forecast information is output or not. It is strongly recommended that it is set after setting weather forecast setting.

27. Area weather information

Setting whether the area weather forecast information is output or not. It is strongly recommended that it is set after setting area weather forecast information. The are weather forecast information is not only to set prefectural, but to set more detail area.

28. New article information

Setting whether the new article information is output or not.

29. QR code

Setting whether ths qr code is output or not.

30. Calendar

Setting whether the calendar information is output or not.

31. Menu

Setting whether the menu information is output or not. The menu is fundamentalary to be checked. However The menu is not support this system. Therefore, you should design.

32. Google site search

Setting whether the Google search information is output or not.

33. The number of items a page in the mobile sites

Setting the number of article items a page in the mobile site. Default is 10.

34. Comments

Setting whether the comments is output or not.

35. The Past article filter

Setting whether the past article filter is output or not. If it is chosen be to output, you should choose Ext library mode or Accordion.js mode.

36. Furigana filter

Setting whether the Furigana filter is output or not. Furigana filter is work on development server. Therefore, if the development server was down, it would not use this service.

4.5 Category

4.5.1 specifications

To set the category, it can have the category information each daily diary. And, after writing, you can see filtered articles such as principal message, 1st grader, 2nd grader, etc. The screen of setting category is shown in the Fig. 4.7.

	カテゴリ名	順番	ユニークID
1	校長メッセージ	1	DMAMNSKZ
2	#各学年	2	IJDAPRAS
3	1年	3	XZJMJQGJ
4	2年	4	YPSVCGVY
5	3年	5	GTUWYRYZ
6	4年	6	GHMUSTRI

Figure 4.7: The screen of category setting. To set the category makes each article categorized.

The category which is registered is for filtering. It is able to be categorized in each article. The category name is to be expected in Japanese language. A lot of Japanese character code make an already difficult situation even more difficult. Moreover, There are a lot of indistinguishable Chinese character such as “高” and “”. Therefore, the system creates unique ID table. Each category name has each unique ID. Unique ID are almost never overlapped.

In particular, when adding the new category name, this system randomly-generated unique ID which is based on 8 word alphabets in uppercase. In theory, the system can be expressed in 26^8 different ways¹. However, user can ignore it.

The database list table is shown here. It is based on **CSV**. The separate word is “<>”. Therefore, if the category named include “<>” word, the system transform < and > to < and >.

Moreover, if the word, “#” in head of line, is used for categorizing category name. Therefore categorizing category word can not appear on writing diary screen. The number between category name and unique ID is display order. Category name is shown in number order.

```
principal message<>1<>DMAMNSKZ
#grades<>2<>IJDAPRAS
1st grader<>3<>XZJMJQGJ
2nd grader<>4<>YPSVCGVY
#teacher's office<>5<>JHGAEHRS
school-provided lunch<>6<>JHWEHERT
```

4.5.2 Features

First of all, it needs to add new category name. Selecting the radio button named adding new category name, it appears the textbox to add new category name. And, you input it. The sample shown in the Fig. 4.8 is “by PTA”. After that, it appears confirm dialog, and click OK to successful.

If we succeed adding category name, we can confirm the result. Fig. 4.9 shows its sample. The center numerical number (14) means the order. Right part is unique ID, we discuss above.

The added category name can be confirmed on the top page. Fig. 4.10 shows it. If it clicked the category name, we can see filtered articles by category name.

¹208,827,064,576



Figure 4.8: The screen of adding new category name. After submitting, it appears confirm dialog.

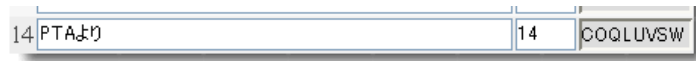


Figure 4.9: On adding category name, on reflecting.

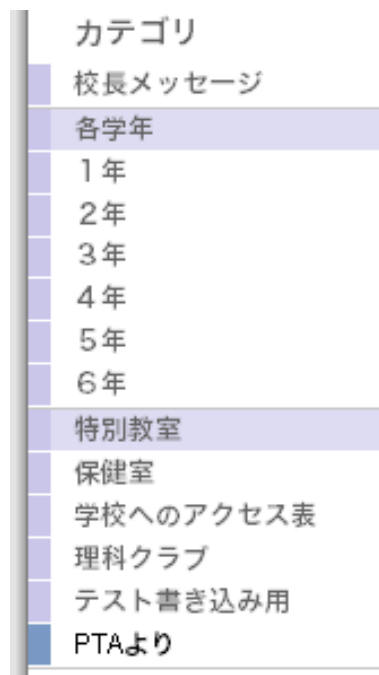


Figure 4.10: Clicking the category name shown above, we can see filtered articles on the top page.

4.6 Event Plan

4.6.1 Specifications

To set the plan, it can output the school event plan in annual or monthly calendar. It has been designed that the message can update a year which taking uploading file or a day. Event Plan updates taking by **XML**. The detail is shown here.

```
<?xml version="1.0" ?>
<doc>
  <article>
    <month>5</month>
    <day>1</day>
    <contents>Visit children at their homes</contents>
  </article>
```

月間行事予定

先月 4月 5月 6月 7月 8月 9月 10月 11月 12月 1月 2月 3月 来月

2006年 11月

内容
1日 水 障担連
2日 木 Eタイム・委員会
3日 金 文化の日・市民文化祭セレモニー
4日 土 (鉢かづきフェスタ)
5日 日
6日 月 学年会
7日 火 体重測定(低)・初任者研
8日 水 体重測定(中)・河北研
9日 木 Eタイム・体重測定(高)・クラブ・校長会・初任者研
10日 金 あいさつ運動
11日 土 市PTA音楽祭
12日 日

Figure 4.11: The screen of school plan. It can both a day and a year updating.

```

<article>
  <month>6</month>
  <day>1</day>
  <contents>dental checkup at 4th,5th,6th grader,
committee conference,beginning teachers' training,cleaning the pool
</contents>
</article>
</doc>

```

This XML file above means the school plan at May 1st, and June 1st. The day is based on between <article> and </article>. It is no use to sort by days. System sorts it.

4.6.2 Features

Fig.4.12 shows setting screen. The box filled with blue is today. It cannot change. The box filled with yellow is selected day. If you want to assign, input data on the textbox, and click submit button.

2006年 11月 10日

2006November 11月

日	月	火	水	木	金	土
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

2006年11月10日の行事

あいさつ運動

登録 リセット

Figure 4.12: School Plan Screen. It can update a year and a day.

It can update a year. Fig. 4.13 is the sample data. The sequence is shown below. First of all, downloading the sample file, which is based on Microsoft Excel® file.

The sample file is opened on the Internet. The **URI** is “http://ymlabo.ddo.jp/~ymlab/blog/admin/sample.zip”. But, it needs to transform Excel file to **CSV**. It is very easy way to use Excel.

After uploading **CSV**, the system retransform to the **XML** and stored.

Figure 4.13: The sample file. We can easily create taking by Spread Sheet Application such as Microsoft Excel® or OpenOffice.

Moreover, it can use with **Ajax** service. It needs no screen transition.

4.7 Link

4.7.1 Specifications

Link function is also based on **CSV** such as category setting in the Section 4.5. To set up the links, it can show the hyper links which are external web sites. The detail is shown in the Fig. 4.15. The links that have been registered are shown above. The right part of the name is the link name. And the box which is underneath, is to add a new link.

Next, it is described how to add a new link. When it is added, the new link, click the radio button whose name is “add”. On checking the radio button, we can find the new textbox. After input the URL and alt attribute, click **regist** makes it successful. The example is shown in the Fig. 4.16.

After submitting, it reflects immediately on the Fig. 4.15 such as Fig. 4.17.

Finally, the information which is registered, is reflected on the top page. If you over the link by mouse cursor, it shows linked **URL** screen, which is external sites, is displayed. Therefore users are easy to recognize it is external.



Figure 4.14: This plan system is supported Ajax service.



Figure 4.15: The link setting screen.



Figure 4.16: The Example of adding the link. On checking the radio button, we can input new link information.



Figure 4.17: After adding the new link, it immediately reflected.

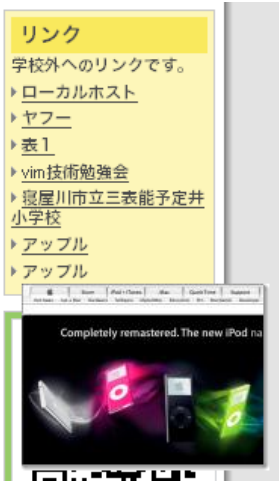


Figure 4.18: It is displayed the linked sites. Therefore users is easy to recognize it.

4.8 Uploaded Documents

4.8.1 Specifications

To set up uploaded documents, it can distribute the files. And, it also has a categorise mode. The function makes it categorise uploaded documents such as letter by the school, or letter by the class.

Uploaded documents has its database which indicates the file path. Moreover, it is need to have function which categorise itself. Thus, this function is complication. To categorise the uploaded documents is named as large classification function.

Large classification function is also build on the **CSV** file format such as Section 4.5.

Moreover, it decides the file path by managing the unique ID on the large classification function. And, it also manages the file name as unique ID. That is, primary key is set by the ID of large classification item. And it is created the database system which marges the key and upload file location.

4.8.2 Features

There is 3 setting items in the uploaded documents. They are large classification setting, uploading documents, documents view, update, and delete.

On setting the large classification, it can view each class as shown in the Fig. 4.19. () means the number of downloaded.

行事
▶ lhaca(1)
▶ kるさがり(1)
運動会
▶ 運動会流れ.xls(3)
▶ 運動会流れ.pdf(1)
研究員
▶ ICT_VB(3)

Figure 4.19: Uploaded documents is ccategorized by large classification setting. This sample shows large classification that is event, school athletic meet, and research associate.

To add new large classification, you should appear the textbox by checking “add” radio button. After that, input the name of new large classification, and submit.

On submitting it, the confirmation dialog is displayed. We can confirm in the Fig. 4.20.

If you want to change the name of large classification, we can directly access on the textbox such as Fig. 4.20. Equally, to delete is submitting with the textbox empty.

Figure 4.20: The uploaded documents is categorized by large classification.

Next, it is dicuss how to upload the documents. it needs it had been registered more than one large classifications. The combo box can be chosen after registered.

Figure 4.21: Select the uploading documents toothe large classification.

The uploading documents is selected adter clicking browsing button. The last, it is decided the name of documents. However, in inteternal process, it is work on the unique ID too. After submitting, upload process is launched as shown in the Fig. 4.22.

Figure 4.22: After selecting the uploading documents, it needs to decide the link name.

On succeeding uploading, the result is shown in the screen. After uploading process, we can confirm on the top page. And if you want to check what documents have been uploaded, you can see on clicking the uploaded documents list link such as Fig. 4.23.

Additionally, uploaded documents is able to be rename itself and to be deleted. You can do it on the edit screen such as Fig. 4.24.

The method of rename is changing its name on the text box. And this system can multiple deleting. All the checkbox which is checked is deleted after submitting.

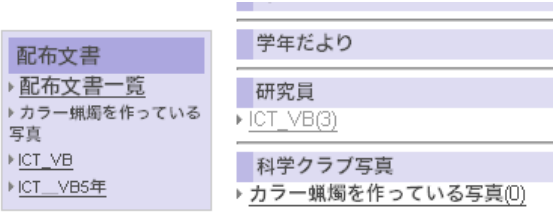


Figure 4.23: The uploaded documents is checked on the top page, and downloaded itself.

チェックした配布文書を削除し、リンク名を下記の通り変更する。

カテゴリ名	ユニークID	番号	リンク名	拡張子	D.L.数	削除
ふえ	TQMJJQQBO	10012	vi_powered	.gif	17	☐
ふえ	TQMJJQQBO	10016	くりさがり	.ppt	19	☐
ふえ	TQMJJQQBO	10026	kulaumid	.mid	2	☐
ふえ	TQMJJQQBO	10028	background	.gif	13	☐
学年だより	EHBYGZRE	10014	winter.jpg	.jpg	5	☐
ICT研究員	VYDXOIGO	10015	アンパンマン	.ppt	7	☐
ICT研究員	VYDXOIGO	10020	くりさがりのある引き算	.ppt	6	☐
行事	CZLVOFGW	10017	lhaca	.exe	1	☐
行事	CZLVOFGW	10021	くるさがり	.ppt	1	☐
運動会	COZHJJAP	10018	運動会流れ.xls	.xls	3	☐
運動会	COZHJJAP	10019	運動会流れ.pdf	.pdf	1	☐
scratch	VUCAUWVY	10024	op55No1クーラウ	.mid	2	☐
研究員	OLZDXQQR	10031	ICT_VB	.zip	3	☐
科学クラブ写真	ZMOFTOKF	10032	カラー蠟燭を作っている	.jpg	1	☐

Figure 4.24: The uploaded documents is able to be edited on the Internet browser.

4.9 Weather Forecast

4.9.1 Specifications

Weather setting makes this system to display the today's weather forecasting in prefectural. This function takes weather forecast plug-in. This plugin is provided by livedoor Co., Ltd.[32].

This plug-in is used by taking **javascript**. Therefore this system is storing the prefectural information, and **PHP** margs its prefectural id and template. After marging, **PHP** output **javascript** automatically.

This function has no cost.

4.9.2 Features

The method of setting is much easy. After reading the sentence of weather forecast service, and setting its prefecture, it is displayed on the top page.

The sample is shown in the Fig.4.25. All we need to do is choose the prefecture from the combobox. Hokkaido has 4 areas because of its too large size.

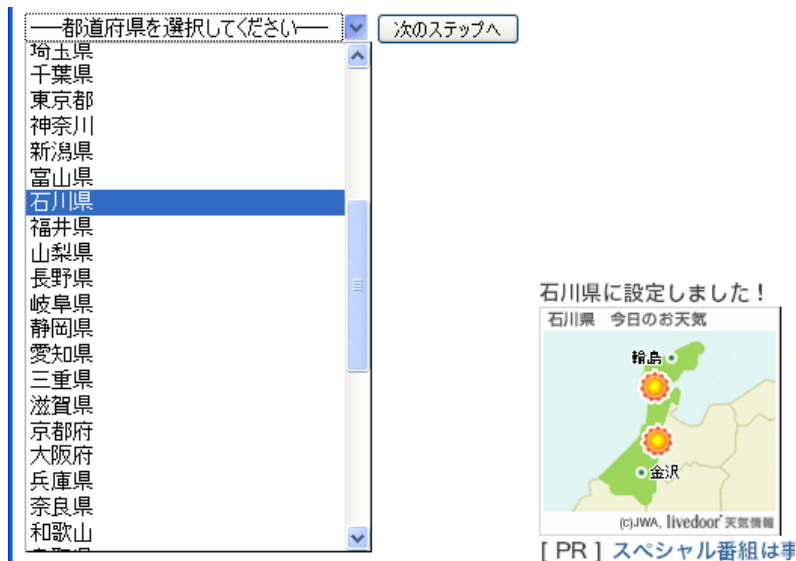


Figure 4.25: This function is took by weather forecast plug-in of livedoor Co., Ltd..

4.10 Detail Weather Forecast

4.10.1 Specifications

Detail weather forecast setting makes this system to display a week weather forecast. This function takes weather forecast information web services. This **API** is provided by libedoor Co., Ltd as Weather Hacks[33].

This web service provides the **XML** code. Therefore this system is straging the area information. **PHP** get the **XML** and analysys it. after that, **PHP** create a **DHTML** and output on the top page.

This function has no cost too.

4.10.2 Features

The method of setting is much easy. After reading the sentence of detail weather forecast service, and setting its area. This screen is based on **Ajax** . Therefore, you have no use to update its site. when it has been displayed on the top page.

The sample is shown in the Fig.4.26. All we need to do is choose the area from the list. There are many areas a prefecture.

This service also display weather advisories and warnings. Fig.4.27 shows the images, which is displayed when it has occured.

4.11 QR code

4.11.1 Specifications

It is conjectured that a great number of parents brows this site by mobile phone. Therefore, this system is designed for computers and mobile phones. However, Mobile site is far distinct from PC site. The reason is why mobile phone demands low packet as possible. For example, The image is not see on the mobile phone. And, we also consider its web design. To consider the situation, this system is designed separated management.

To use this function, mobile phone user needs no input the URL. This system creates a QR code. Therefore, only shooting a photograph, they can move this site.



Figure 4.26: This function is took by Weather Hacks of livedoor Co., Ltd.. This setting screen is based on Ajax .



Figure 4.27: Weather advisory and warning.

The top page of mobile sites is defined as `index.php`². The site uses QR code create library[34].

However, This library just support **PHP**. To create image on **PHP** needs a Graphic library. Therefore, in this case, it has been used no GD library[35].

4.11.2 Features

It needs to register the URL of this site information such as Fig. 4.29 in a administrative privileges screen for launching this function.

It is recommended that it input not only domain name, but file name because server unrecognition. Incidentally, To add `index.php` as server default index is that to add the word into the `DirectoryIndex` of `httpd.conf`. And restart Apache makes it success.

After that, On submitting the button, this system create QR code automatically. It shows at a top page as shown in Fig. 4.30.

²PC site is `index.php`

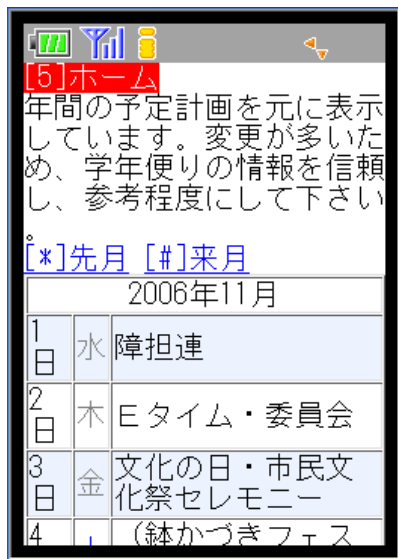


Figure 4.28: The image is for mobile phone.



Figure 4.29: To create QR code needs to register base URL.



Figure 4.30: QR code is shown in the top page.

4.12 Google Maps

4.12.1 Specifications

This system add the marker on the Google Maps[36]. If clicking the marker, you can see more detail sentence. This function can also put images.

Google Maps uses on the **API**, which is provided by Google Inc.³. User can use it free taking **javascript**. Google Maps is made for **Ajax** technology.

To use Google Maps is free, but it demands free registration code. The name of the code is Google Maps Key. Google Maps Key is distributed for each URL.

Google Maps Key is distributed on <http://www.google.com/apis/maps/signup.html>.

³Hereinafter called as Google.

4.12.2 Features

This function has two types. The one is school location setting service.



Figure 4.31: This function is able to register the school location.

Moreover, This system is able to register what you want to check on the map. Fig. 4.32 shows a sample.



Figure 4.32: It can register any where on the world.

The method of registration is to move mouse over the red cross shape on what you want. And, input the title, contents, and uploading image path. However, the image path is not elective.

After registering, it shows a red balloon. When it is clicked, it shows a call-out, which is written that you wrote such as Fig. 4.33.

4.13 Access Analysys

4.13.1 Specifications

This system provide access information. This takes Google Analytics[37]. However, The version is changed. Therefore, it challenges for the future of updating its system. Fig. 4.34 as shown here is the sample.

To use this function is to get the free account. The URL is .

Next, it sets up with Google Analytics servie on the google account. To set up is by .

The tracking code which is written by **javascript**. The citation is shown below.

```
<script src="http://www.google-analytics.com/urchin.js" type="text/javascript">
</script>
<script type="text/javascript">
_uacct = "UA-780831-1";
urchinTracker();
</script>
```



Figure 4.33: The registered place is shown as the marker. And it can confirm right menu.

This tracking code is not changed except `_uacct`. Therefore, This system is straging the `_uacct` on the administrative privileges. And it creates the **javascript** code automatically.

Moreover, this system has easy access analysys mode. It output the log file per 1MB. The information which can get is the date, referer, IP address, and host name.

However, The router in Neyagawa prevents the system from the information by its VPN. Therefore, in Neyagawa, it can only to use easy access analysys mode.

4.14 Password

4.14.1 Specifications

To set the password, Spammer cannot access administrative screen. The entity of the password is used on `.htaccess` function in Apache web server. That is, the method of the password system is creating `.htaccess` and `.htpasswd` file. This system supports basic authentication. Therefore, it is processed on the **DES**.

The encrypted password from "abcABC123" is shown here.

Xf1awIWM0Sn1E

However, in Neyagawa, it cannot support `.htaccess` service. Therefore, it also support **PHP** session system.

4.14.2 Features

The method of register the password is confirmation of id and password is corresponds to registered one. Therefore, it needs to register the id and password. There is a sample screen in the Fig. 4.35.

The strings which is allowed on the password is alphabet and numerical word. And this system allows no pass word mode for testing.

And it also supports all delete mode.

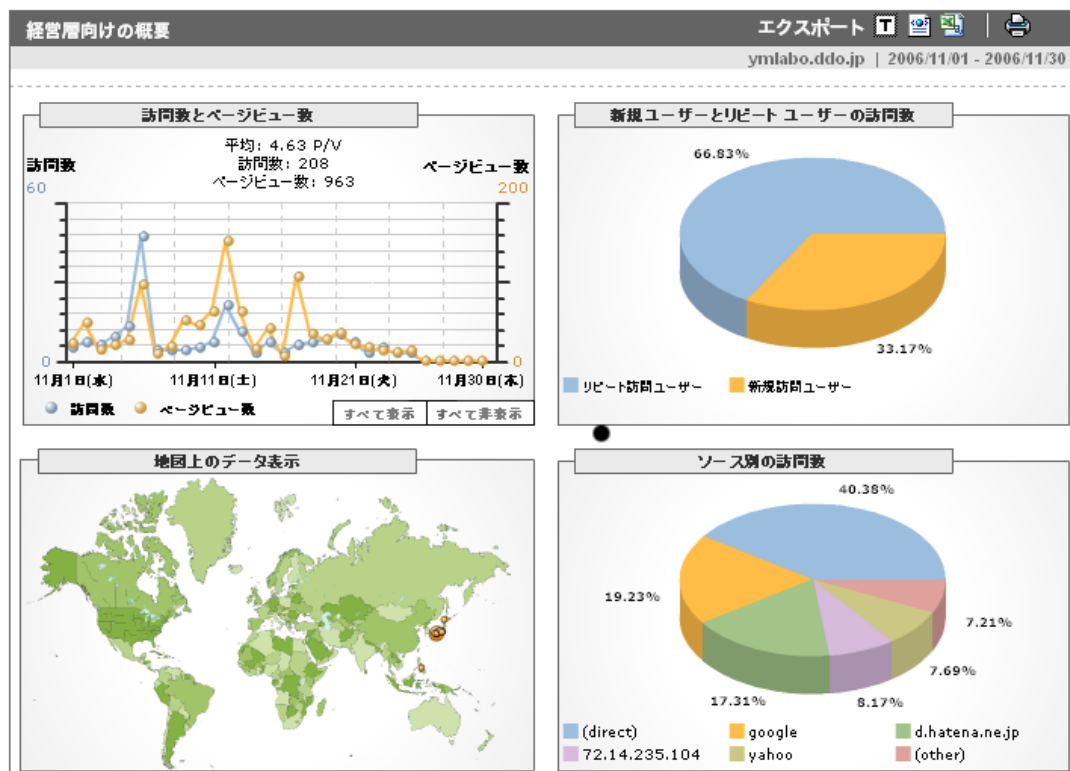


Figure 4.34: The sample of Google Analytics. However Google Analytics changes its specification. Therefore it challenges for the future.

パスワード設定

パスワードの強度レベルは
た、この強度レベルは参考程

ID:(20字まで)

password

password再入力

以下の条件で登録してもよいですか
パスワードは、既に暗号化していま

ID: mii

Pass: vdcJejnZUluPo

Figure 4.35: The screen of password setting. After setting, everyone who do not know its password cannot access to the administrative screen.

4.15 Furigana function

4.15.1 Specifications

4.15.2 Features

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Aug. 2009 MURAYAMA, Yoshiyuki

Appendix A

Comparison of the access time between XML and CSV

When building the data, to consider its high-speed performance, stability, and flexibility, it is a general case to take **RDBMS** such as **MySQL** or **PostgreSQL** regardless of the client server systems.

However, To adopt such a **RDBMS** requires the teacher to have the knowledge about **SQL**, when an incident has occurred.

Under normal conditions, it is recommended that all teachers have its skill. However, it is difficult. Therefore, this system is designed as a management database into the system.

The database of this system is based on 3 file formats. The formats are **XML**, **CSV**, and **ini**.

To consider their file format attribute, **ini** is used for initial data setting. **XML** is used for complicated or is expected to change its specifications. And the other is used for **CSV**. Table 2.1 shows a detail.

However, it is expected that **XML** file format is more considerable time than **CSV** for its structure. This section has been described that the comparison of the access time between **XML** and **CSV**, using on **PHP**.

A.1 Comparison of the access time on a few records.

To compare the access time of **XML** and **CSV**, it needs a multitude of data on each file format. After collecting the data, it can analyze. First of all, The procedure is to output the histograms on each file format and to search the histogram peak. And, Fitting the peak by Gaussian distribution. If the number of degrees of freedom of reduced chi square¹ is nearly equals to 1, it is believed that the fitted function of Gaussian distribution is able to approximate the histograms[38][39][40].

In this experiment, The access time (2 records) had been measured on 40,000 times. The result is shown in the Fig. A.1. The average of **XML** access time is about 7.7[ms], and **CSV** is 1.0[ms].

CSV is 7 times higher performance than **XML** in spite of a few its records. And unexpected peak had been found. It is considered the operating system tasks.

The record of measured data is only 2 records, it is negligible. However, The more its records, The larger its difference in an exponential manner, because the access time depends on the number of the data.

With that, it had been measured the access time on each record. The elements of the records are created by pseudo random number. And logged the ratio of the access time with **XML** and **CSV**. The result is shown in the Fig. A.2, Fig. A.3. In addition, the $f(x)$ in the figures is fitting result by cubic function.

And, This measurement is the computer which is opened on the web. It is deleted because of the x-axis from 400 to 500 occurred noise.

¹ χ^2/ndf

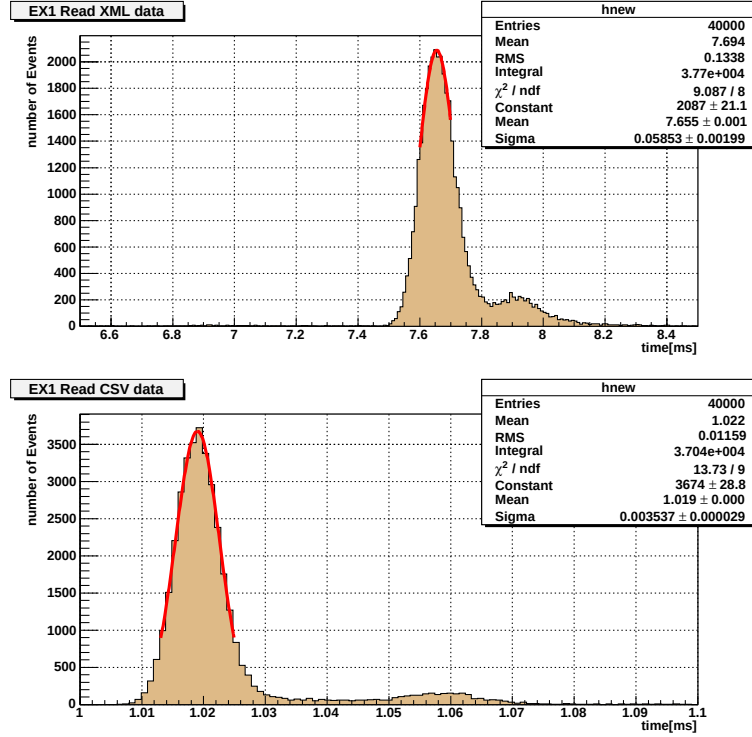


Figure A.1: The access time comparison on **XML** v.s. **CSV**. It had been measured at 40,000 times. The measured data has been took in 3.5. **CSV** is 7 times higher performance than **XML** inspite of a few its records.

In the Fig. A.2, it is considered that the more records, the much more access time. And, to know its augmentation factor, it is fitted by cubic function. To compare the high order number which is sensitive affected, **XML** is $2.3 \times 10^{-3} \pm 1.8 \times 10^{-6}$. And **CSV** is $1.7 \times 10^{-6} \pm 1.8 \times 10^{-6}$.

It is strongly difference from **XML** and **CSV**. Moreover, it is found that the ratio v.s. data record numbner is consistently on the increase.

Thus, in this system, it has to design **XML** data lowly. Therefore, the diary data is designed per a day for too large file size. To prevent from duplication, the data is in the $[year]$ - $[month]$ directories.

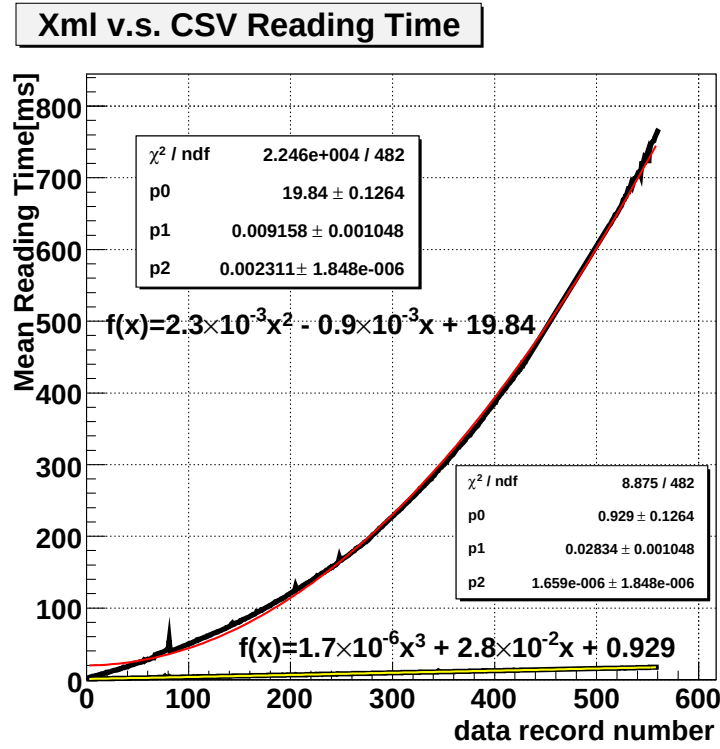


Figure A.2: The comparison of the access time on XML and CSV. The more record number, The much more access time.

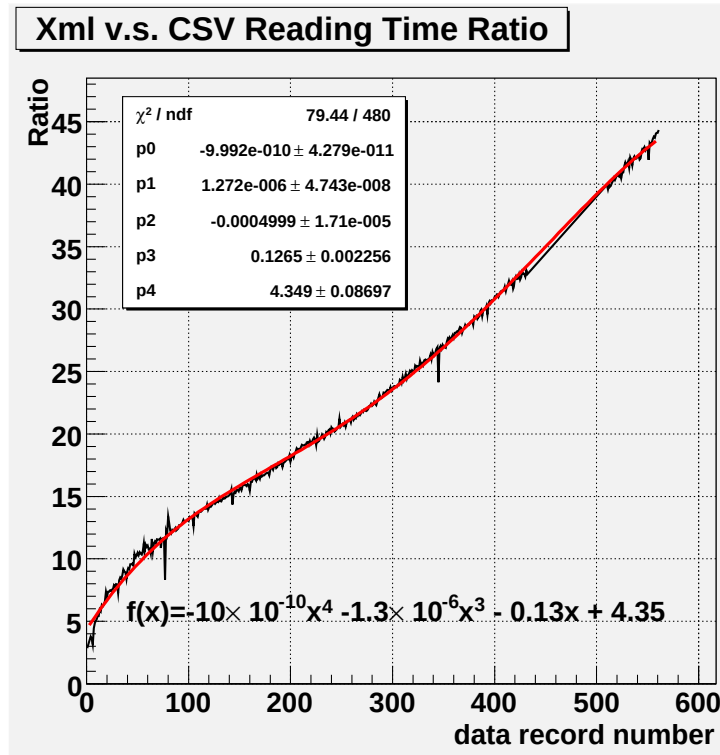


Figure A.3: The comparison of the access time ratio on XML and CSV. The more record number, The much more access time.

Appendix B

χ^2 test of goodness of fit.

B.1 Overview

χ^2 test of goodness of fit is, statistical test.

χ^2 自由度検定とはとは、条件が同じデータを相当数取得し、ヒストグラムに出力したとき、ヒストグラムのピークがデータの平均であるということを、より強く主張するために行う検定である。具体的には、ヒストグラムのピークの周りを正規分布関数でフィッティングし、それを χ^2 自由度検定をかけた時に出力される χ^2/ndf ¹が、1 に近ければ近いほど、信頼性があることを示している。

本研究では、データベースのアクセスに **XML** と **CSV** の場合を比較した。ここでは、**XML** 及び **CSV** のデータ平均アクセス時間を算出した時の χ^2 確率関数の導出を行い、 χ^2/ndf について述べる。

B.2 χ^2 確率関数

確率変数 X が標準正規分布 $N(0, 1)$ に従うとする。標準正規分布とは、平均が 0、分散が 1 の正規分布のこととで、

$$N(0, 1) = \phi(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}} \quad (\text{B.1})$$

に従う。

このとき、 $Z = X^2$ の従う分布密度関数 $T_1(z)$ を求める。

確率変数 z の分布関数 $F(z)$ は

$$F(z) \equiv \text{Probability}(X^2 < z) \quad (\text{B.2})$$

で定義される。 $X^2 < z$ であるので、 $F(z)$ は、

$$-\sqrt{z} < X < \sqrt{z} \quad (\text{B.3})$$

である。従って、

$$F(z) = \int_{-\sqrt{z}}^{\sqrt{z}} \phi(x) dx. \quad (\text{B.4})$$

(B.1) より、 $\phi(x)$ は偶関数なので、

$$F(z) = 2 \int_0^{\sqrt{z}} \phi(x) dx \quad (\text{B.5})$$

と、変形できる。

¹number degree freedom of reduced χ square

z の分布密度関数 $T_1(z)$ は、この分布関数を z で微分すればよく、

$$\begin{aligned}
 T_1(z) &= \frac{dF(z)}{dz}, \\
 &= \frac{d}{dz} \left(2 \int_0^{\sqrt{z}} \phi(x) dx \right), \\
 &= 2\phi(\sqrt{z}) \frac{d}{dz} \sqrt{z}, \\
 &= 2 \left(\frac{1}{\sqrt{2\pi}} e^{-\frac{z}{2}} \right) \cdot \frac{1}{2} z^{-\frac{1}{2}}, \\
 &= \frac{1}{\sqrt{2\pi}} z^{-\frac{1}{2}} e^{-\frac{z}{2}}.
 \end{aligned} \tag{B.6}$$

従って、(B.6) と、(B.3) の z の境界条件を考慮すると、

$$T_1(z) = \begin{cases} \frac{1}{\sqrt{2\pi}} z^{-\frac{1}{2}} e^{-\frac{z}{2}} & (z > 0) \\ 0 & (z \leq 0) \end{cases} \tag{B.7}$$

となる.

次に、 $Z = X_1^2 + X_2^2$ が従う $T_2(z)$ を求める. $T_2(z)$ は、畳み込み積分で求めることができる. ただし、 $y \leq 0$ のとき、 $T_1(y) = 0$ であるので、変域は制約される. 従って、

$$T_2(z) = \begin{cases} \int_0^z T_1(z-y) T_1(y) dy & (z > 0) \\ 0 & (z \leq 0) \end{cases} \tag{B.8}$$

ここで、(B.7) を適用する.

$$\begin{aligned}
 T_2(z) &= \int_0^z \frac{1}{\sqrt{2\pi}} (z-y)^{-\frac{1}{2}} e^{-\frac{(z-y)}{2}} \cdot \frac{1}{\sqrt{2\pi}} y^{-\frac{1}{2}} e^{-\frac{y}{2}} dy, \\
 &= \frac{1}{2\pi} e^{-\frac{z}{2}} \int_0^z (z-y)^{-\frac{1}{2}} y^{-\frac{1}{2}} dy, \\
 &= \frac{1}{2\pi} e^{-\frac{z}{2}} z \int_0^1 \sqrt{\frac{zy-y^2}{z^2}} \frac{dy}{z}, \\
 &= \frac{1}{2\pi} e^{-\frac{z}{2}} z \int_0^1 \sqrt{\frac{y}{z} - \left(\frac{y}{z}\right)^2} \frac{dy}{z}.
 \end{aligned} \tag{B.9}$$

$t = \frac{y}{z}$ とすると、 $dy = z dt$ となるので、代入すると、

$$T_2(z) = \frac{1}{2\pi} e^{-\frac{z}{2}} z \int_0^1 \sqrt{t(1-t)} dt \tag{B.10}$$

ここで、右辺積分部は、

$$B(z, w) = B(w, z) \equiv \int_0^1 t^{z-1} (1-t)^{w-1} dt \tag{B.11}$$

で定義されるベータ関数で記述できる. 従って、 $z = 1/2, w = 1/2$ とすると

$$T_2(z) = \frac{1}{2\pi} e^{-\frac{z}{2}} z B\left(\frac{1}{2}, \frac{1}{2}\right) \tag{B.12}$$

と変形できる.

さらに、ベータ関数は

$$\Gamma(z) \equiv \int_0^\infty t^{z-1} e^{-t} dt \quad (\text{B.13})$$

で、定義されるガンマ関数と、

$$B(z, w) = \frac{\Gamma(z)\Gamma(w)}{\Gamma(z+w)} \quad (\text{B.14})$$

の関係があるので、それを適用すると、

$$T_2(z) = \frac{1}{2\pi} e^{-\frac{z}{2}} z \frac{\Gamma(\frac{1}{2})\Gamma(\frac{1}{2})}{\Gamma(1)}. \quad (\text{B.15})$$

である。ここで、 $n! = \Gamma(n+1)$ と鏡映公式

$$\Gamma(1-z) = \frac{\pi}{\Gamma(z)\sin(\pi z)} = \frac{\pi z}{\Gamma(1+z)\sin(\pi z)} \quad (\text{B.16})$$

を用いると、

$$\begin{aligned} \Gamma\left(1 - \frac{1}{2}\right) &= \frac{\pi}{\Gamma(\frac{1}{2})\sin(\frac{1}{2}\pi)}, \\ \Gamma\left(\frac{1}{2}\right) &= \sqrt{\pi}. \end{aligned} \quad (\text{B.17})$$

これを、(B.15) に適用すると、

$$\begin{aligned} T_2(z) &= \frac{1}{2\pi} e^{-\frac{z}{2}} z \frac{\sqrt{\pi}\sqrt{\pi}}{1}, \\ &= \frac{1}{2} z e^{-\frac{z}{2}} \end{aligned} \quad (\text{B.18})$$

である。

これを一般化すると、 ν 個の変数 $X_1, X_2, \dots, X_\nu$ が互いに独立で、それぞれが $N(0, 1)$ に従うとき、 $Z = X_1^2 + X_2^2 + \dots + X_\nu^2$ の分布 $T_\nu(z)$ は、

$$T_\nu(z) = \begin{cases} \frac{1}{2^{\frac{\nu}{2}}\Gamma(\frac{\nu}{2})} z^{\frac{(\nu-2)}{2}} e^{-\frac{z}{2}} & (z > 0) \\ 0 & (z \leq 0) \end{cases} \quad (\text{B.19})$$

となる。これは畳み込み積分の性質

$$\int_0^z T_{n-1}(z-y)T_1(y)dy \quad (\text{B.20})$$

を利用すると、帰納的に説明できる。

この、(B.19) に従う分布を、自由度 ν の χ^2 分布と呼び、 χ^2 検定をする際に必要な関数である。Fig. B.1 に、それぞれ自由度 $\nu = 1, 2, 5, 48$ の場合の χ^2 分布を示す。このように、自由度によって、ピークが次第に丸くなっていき、その極大値は小さくなっていく。 χ^2 検定とは、観測度数を N_i 、期待度数を n_i とするとき、

$$\chi^2 = \sum_i \frac{N_i - n_i}{n_i} \quad (\text{B.21})$$

を求めたときの χ^2 の値が、有意水準 α に対して T_ν よりも大きい、小さいかを比較する。 χ^2 が大きいと、帰無仮説はあまり成立しそうにないといえる。

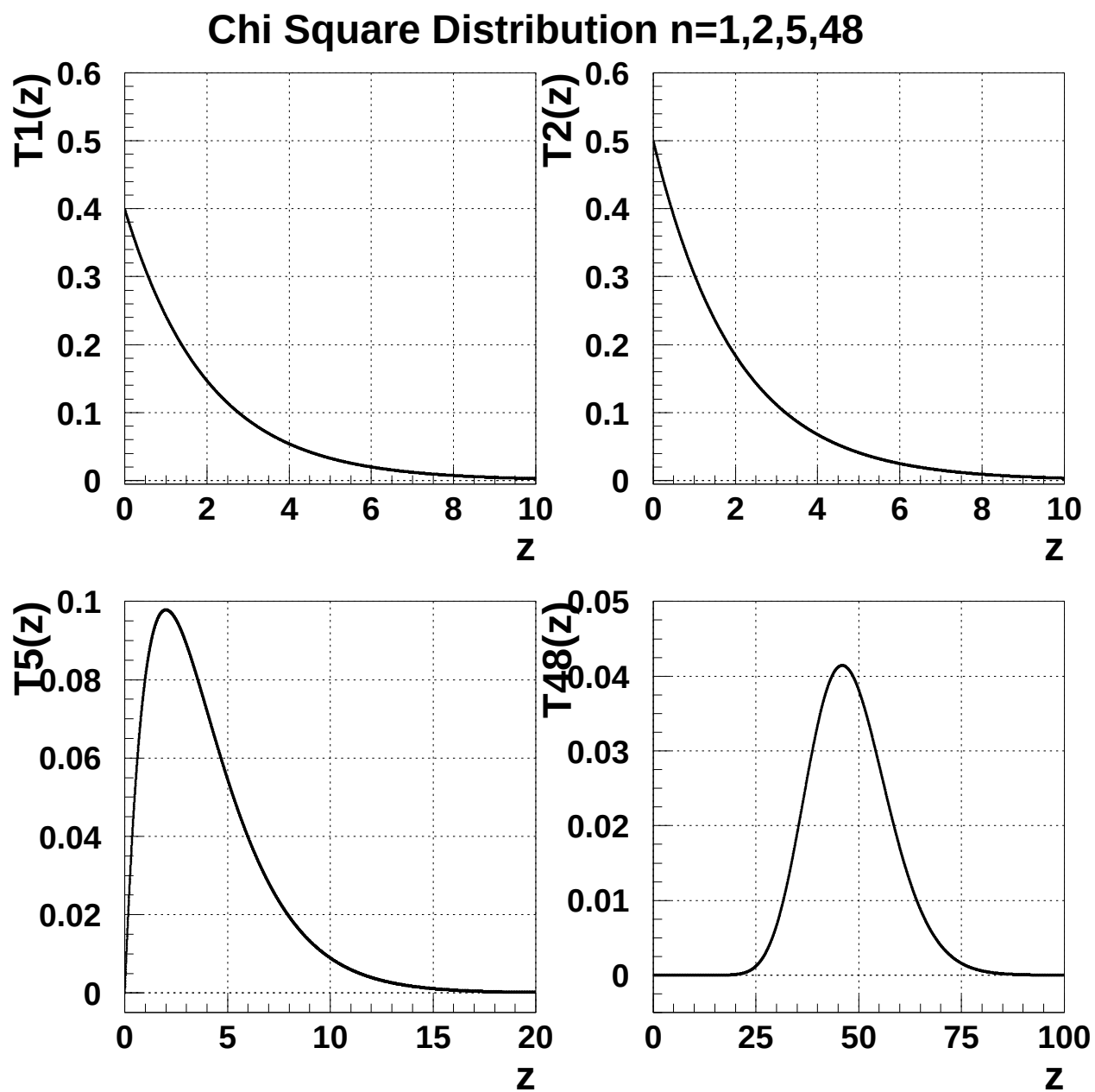


Figure B.1: $\nu = 1, 2, 5, 48$ の場合の χ^2 分布.

B.3 Fitting

実験で取得したデータ点 y_i が、理想的なモデルである $y(x)$ のまわりに、それぞれランダムな正規分布に従う測定誤差を持っているとする。さらに、各々の正規分布の標準偏差 σ はすべての測定点で同一とする。このときデータの組の現れる確率は各々の点の確率の積として書くことができ、

$$P = \prod_{i=1}^N \left\{ \exp \left[-\frac{1}{2} \left(\frac{y_i - y(x_i)}{\sigma} \right)^2 \right] \Delta y \right\} \quad (\text{B.22})$$

である。

さらに、 P に対して、その対数をとると、乗算部分は加算にできるため、負号を付けると

$$-\ln P^2 = \left[\sum_{i=1}^N \frac{[y_i - y(x_i)]^2}{\sigma^2} \right] - N \ln \Delta y, \quad (\text{B.23})$$

と式変形できる。

次に、データ点 (x_i, y_i) がそれぞれ標準偏差 σ_i を持つとすると、(B.23) は、 σ に添字 i を付けたものに書き換えられる。よってモデルパラメータの最尤推定量は次の量を最小にすることによって得られる。

$$\chi^2 \equiv \sum_{i=1}^N \left(\frac{y_i - y(x_i; a_1 \cdots a_M)}{\sigma_i} \right)^2. \quad (\text{B.24})$$

測定誤差が正規分布に乗っていればいほど、 χ^2 は、正規分布する量を一つずつ分散 1 に正規化して 2 乗もの N 個の合計に近づく。

χ^2 の最小値の確率分布は解析的に導くことが可能で、自由度 $N - M$ の χ^2 分布は、B.2 章で示した。

こうして計算した確率は、モデルの当てはまりの良さの度合いを定量的に与える。求めた確率が小さいならば、逸脱が偶然のゆらぎである可能性は低い。このときはモデルが間違っているか、測定誤差 σ を捏造しているか、測定誤差が正規分布から外れているかである。

χ^2 確率は、測定誤差が正規分布に従うという仮定の信頼性を直接測る量ではなく、誤差の正規性を仮定して導かれた確率である。

しかし、ほとんどの場合、誤差が正規でないと外れ値がおおくなり、確率が小さくなる。

結果として、まずまずの良さで測定誤差が、正規分布に従っているときの典型的な χ^2 の値は $\chi^2 \approx \nu$ である。つまり、 ν が大きくなると、統計量 χ^2 は、平均値 ν 、標準偏差 $\sqrt{2\nu}$ の正規分布に漸近的に近づく。これは、図 B.1 より明らかである。

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