Geographic Information System Mapping of Universitas Negeri Surabaya

by Dedy Prehanto

Submission date: 05-Oct-2021 08:10PM (UTC+0700)
Submission ID: 1665896282
File name: Nuryana_2020_J._Phys.__Conf._Ser._1569_022016.pdf (632.81K)
Word count: 4256
Character count: 22212

Journal of Physics: Conference Series

PAPER · OPEN ACCESS

Geographic Information System Mapping of Universitas Negeri Surabaya Facilities (Case Study: Universitas Negeri Surabaya Ketintang)

To cite this article: IKD Nuryana *et al* 2020 *J. Phys.: Conf. Ser.* **1569** 022016

View the article online for updates and enhancements.

This content was downloaded from IP address 110.139.82.196 on 05/10/2021 at 00:55

Geographic Information System Mapping of Universitas Negeri Surabaya Facilities (Case Study: Universitas Negeri Surabaya Ketintang)

IKD Nuryana[1], S R Nurdin[1], IGPE Prismana[1], D R Prehanto[1]

[1]Informatics Engineering Department, Universitas Negeri Surabaya, Indonesia 60231

dwinuryana@unesa.ac.id

Abstract. The main obstacle for visitors who visit the state university of Surabaya for the first time was difficulty to find certain place or building. In the searching process, most of visitors were confused to find place or building or facility of Surabaya state university because they don't know about the scope of it so it was required lot of times to find that. Based on statement above so it was used some open source softwares include arciew, postgresql, postgis, mapserver, quantumgis, and framework pmapper to made geographic information system (GIS) based on web that can be used for visitors as aids to find out the layout and information about facilities and buildings of Surabaya state university. Because of it so the visitors will not require lot of times to find the location of facility and building. Result of this system was can help visitors in searching process of facilities and buildings, so the visitors were able to find out about the facilities and buildings information, and roominess of Surabaya state university easily.

1. Introduction

Universitas Negeri Surabaya is one of the universities in Surabaya that manages seven faculties and is divided into several places including in the Tongue there are the Faculty of Education (FIP), the Language and Literature Faculty (FBS), the Faculty of Sports Science (FIK), and in Ketintang is a Faculty of Mathematics and Natural Sciences (FMIPA), Faculty of Social Sciences (FIS), Faculty of Economics (FE) and Faculty of Engineering (FT). The Surabaya State University manages several study programs, education and non-education, with diploma, undergraduate (S1), and postgraduate degrees which consist of two levels (S2) and third degree (S3).

Surabaya State University has many facilities including library building, BAAK building, rector building, language center building, multi-purpose building, postgraduate building and many more buildings located at Surabaya State University. In each building there are several rooms that can be used, for example in the lecture hall there are classrooms, laboratories, and so on. There are many facilities available at Surabaya State University, so a floor plan is made on the environment of the Surabaya State University, but the plan owned by Surabaya State University does not provide complete information so that the information provided about the facilities at Surabaya State University is incomplete and location plan is difficult to find and access.

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd

As a result, campus visitors did not know about the Surabaya State University campus environment, other than that Surabaya State University visitors had difficulties and confusion in finding a place or a building to be addressed. In addition to campus visitors, the old female students were less aware of the campus environment. In order for the facilities available at Surabaya State University to provide optimal information for campus visitors and old female students, a geographic information system is needed for mapping facilities in Surabaya State University[5]. It is necessary to have an information system to help visitors understand the layout of the Surabaya State University environment. With the existence of an information system is useful for presenting complete and useful information for recipients of future planning decision making [10]. In addition to decision makers, the information system can be used as an auxiliary media to evaluate whether the planning is in accordance with its use [6].

GIS is an information system that shows information in the form of geographical maps as data interface[2]. The analysis used in GIS is overlay analysis as an integrated data process between various layers[3]. Analysis needs to be more than one layer that is physically staged and will be analyzed visually. GIS also requires spatial analysis as a group of techniques that can be used as GIS data processing[1].

Based on the above problems, the authors consider it important about the introduction of the campus environment based on the facilities contained in Surabaya State University. The problems that will be discussed in this study are How to build a geographic information system mapping facilities in the Surabaya State University campus and can conduct a room search process and provide information on the area of space, inventory and the amount of space in the Surabaya State University campus environment?.

The benefit of this research is to help visitors of Surabaya State University to find out the facilities contained in the campus environment and information about these facilities and can make it easier to find a room in the Surabaya State University building.

2. Method

Context Diagram

A DFD is a graph consisting of nodes and directed arcs. A node may be process, a data store, an auxiliary node (fork and join) or a terminator that is either an input or an output of the system. Arcs represented by arrows, correspond to data flows. Both nodes and arcs should be labeled[4].

DFD Level 0 (Context) describes the overall process contained in the system, and describes the relationship of the system with the entity or shows the actors involved in the system, namely admin, broad admin, map admin, and inventory admin, all admins act as application administrators and there are user actors[7].

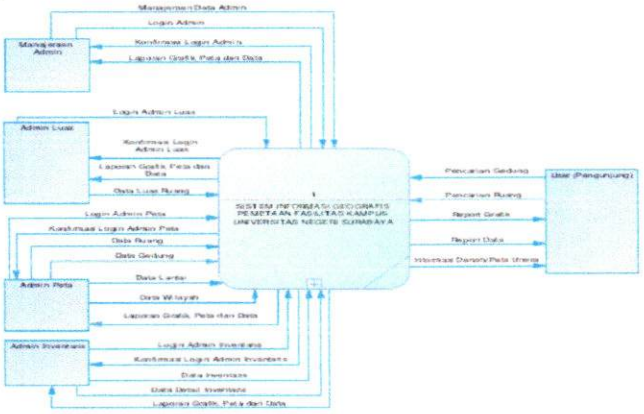


Figure 1 DFD Context Diagram

DFD Level 1

In DFD Level 1 there are 4 processes in it, namely: login process, master data processing, facility search process and report process. In the system to be built, all procedures are carried out by the admin, while the user as the party will see the results.

1. Login, the process to enter the system that can only be done by the admin.
2. Master Data, a process that manages all data in the system.
3. Searching is a process to search for facilities according to criteria.
4. Report, is a report of data that has been managed.

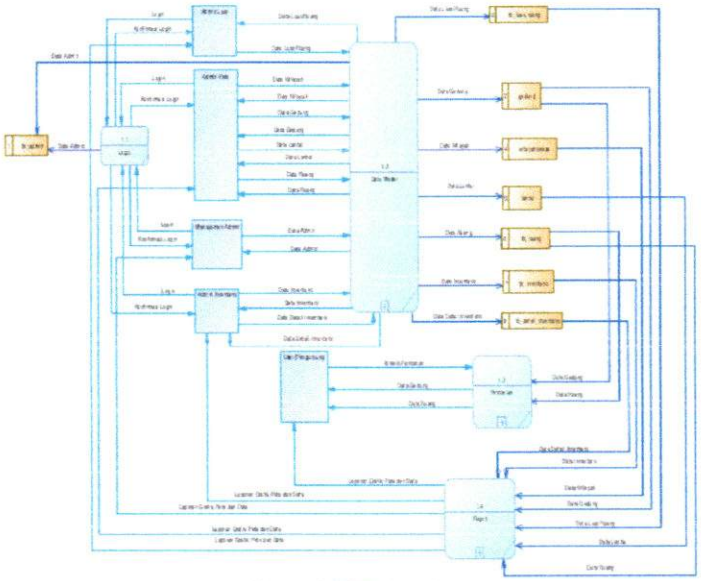


Figure 2 DFD Level 1

DFD Level 2 Proses 2 (Data Master)

In DFD Level 2 Process 2 or the master data process is a solution to the Master Data process and all activities at Level 2. This process is done by the admin. In this level DFD there are 8 processes, namely:

1. Admin Data Management, is a process for managing admin data.
2. Spacious Data Management Space, is a process for processing data on space.
3. Building Data Management, is a process for processing building data.
4. Regional Data Management, is a process for processing regional data.
5. Floor Data Management, is a process for processing floor data.
6. Space Data Management, is a process for processing space data.
7. Data Inventory Management, is a process for processing inventory data.
8. Inventory Detail Management, is a process to process inventory detail data.

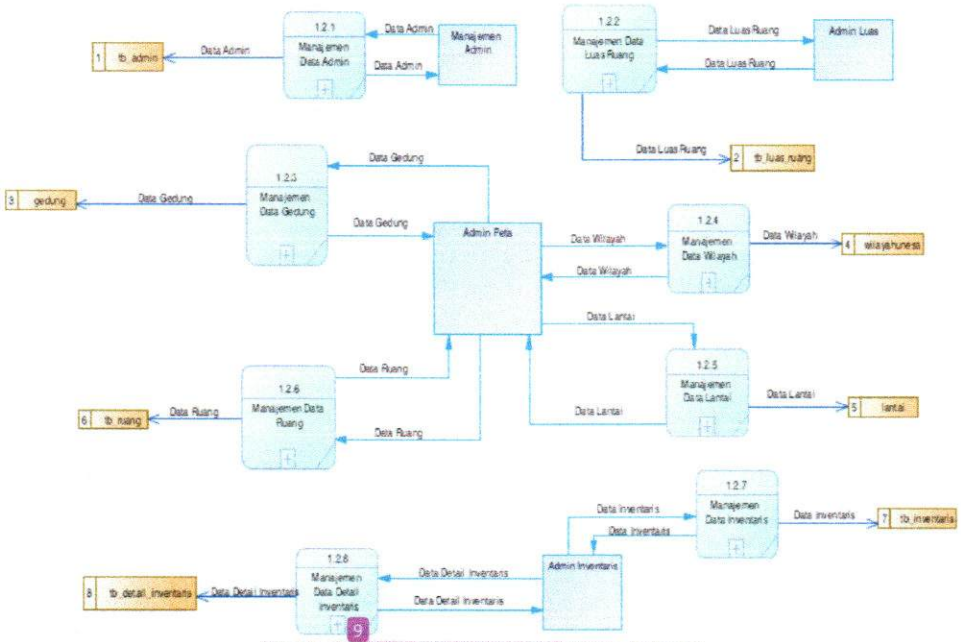


Figure 3 DFD Level 2 Proses 2 (Data Master)

DFD Level 2 Proses 3 (Searching Process)

In DFD Level 2 Process 3 or this search is a solution to the search process. In this DFD there are 2 processes, namely:

1. Filter Criteria, is a process for filtering criteria that have been entered by users or visitors.
2. Search, is a process of finding facilities that match the criteria that have been entered by the user (visitor).

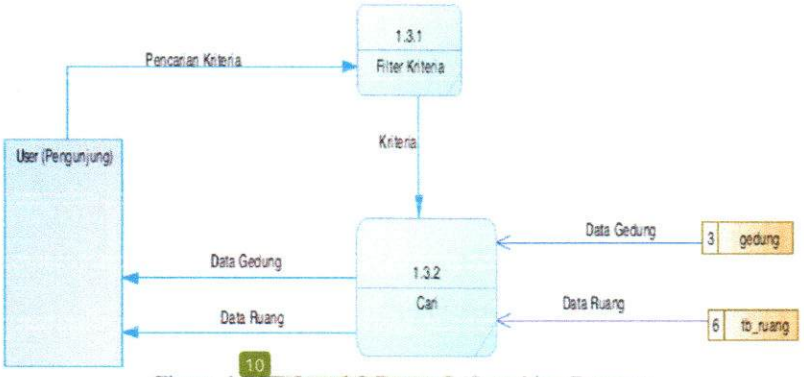


Figure 4 DFD Level 2 Proses 3 (Searching Process)

DFD Level 2 Proses 4 (Report)

In Level 2 DFD Process 4 or this report is a solution to the report process. In DFD Level 2 Process 4, there are 3 processes, where the data will be processed to get a report. 3 The process in DFD level 2 process 4 is

1. Graph Report,
2. Report Plan
3. Data Report

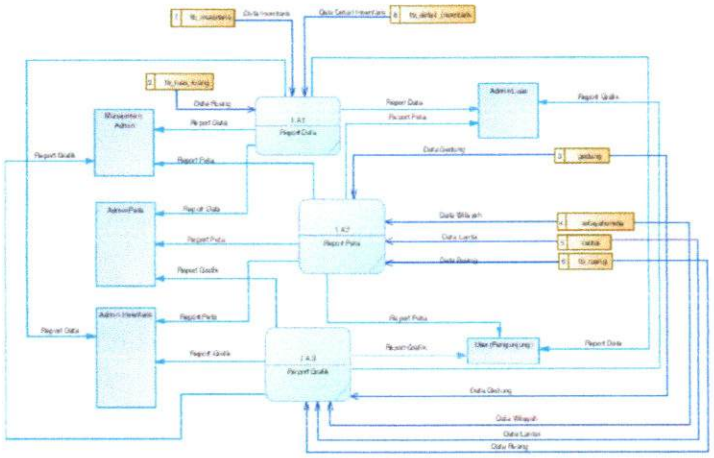


Figure 5 DFD Level 2 Proses 4 (Report)

CDM

In the Conceptual Data Model (CDM) database design, 8 data stores are obtained as a storage area for data from several processes to be carried out, where data stores are obtained from after planning Data Flow Diagrams (DFD).

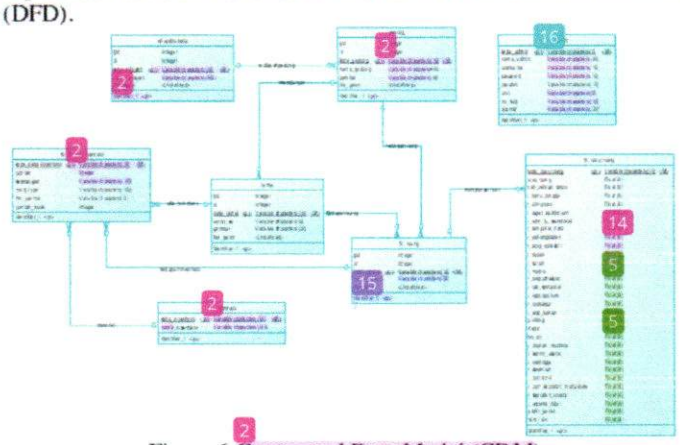


Figure 6 Conceptual Data Model (CDM)

PDM

From the Conceptual Data Model (CDM) that has been created, it can be generated to the Physical Data Model (PDM) form. The following is the result of generating CDM to PDM:

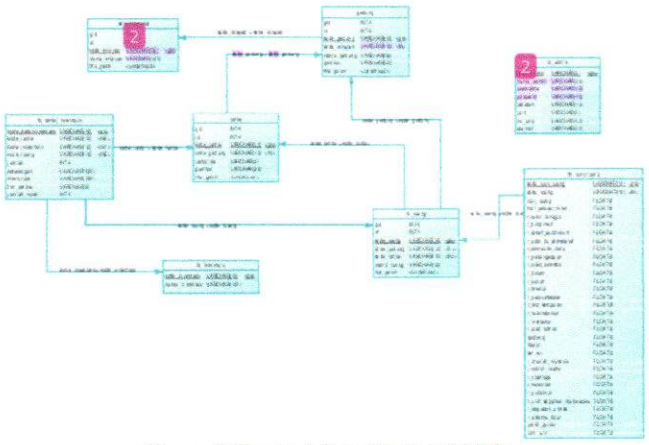


Figure 7 Physical Data Model (PDM)

3. Results and Discussion

Display of Geographic Information Mapping System Facilities of Surabaya State University Campus located in Ketintang area. Next looks:

Home Page

On this page the user (visitor) can access it without having to log in, including the admin can also access this page without logging in first. This page is the start page of the application or system on the run. On this page there are many menus that have pages and their respective functions. If the admin will access the page then the admin can choose the login menu. On this page there is also a slide image that is displayed and there are links that lead to the report graph, report data and floor plans of the application or system[9].

Figure 8 Home Page

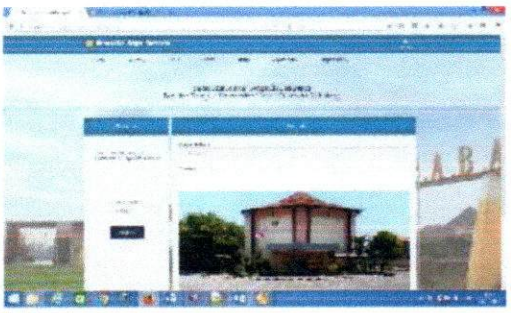


Figure 9 Page of Building Facilities

Page of Building Facilities

On this page is displaying information in the form of images from building facilities. Selecting the building first, the image data from the selected building will appear. The information provided on this page is the building name and building image.

Plan page

On this page showing a mapping of Surabaya State University campus facilities, the facility is a facility in the form of a building. On this page also provides information about facilities available at Surabaya State University, to display information on these facilities then by clicking the identify () icon located on the map or floor plan then clicking on the facility on the map or floor plan[8]. Users (visitors) can zoom in or out on the map. In addition to providing information, maps or floor plans can also be downloaded or printed.

Figure 10 Floor Plan

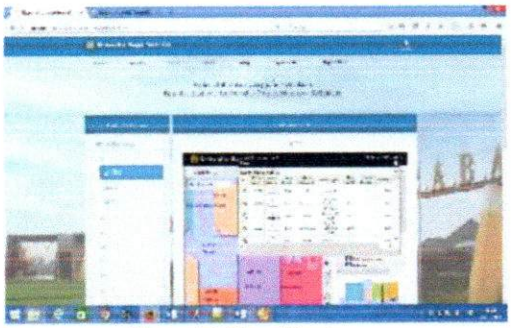


Figure 11 Floor Yard

Page Plan

On this page provides information about the room each floor of the building. In addition to providing information on the name of the room and space code also provides information about the inventory of the room, as well as information about the room can be downloaded.

Page of Room Plan

This page is used to search the room, so that it can provide information about the room in what building, what floor, in what area

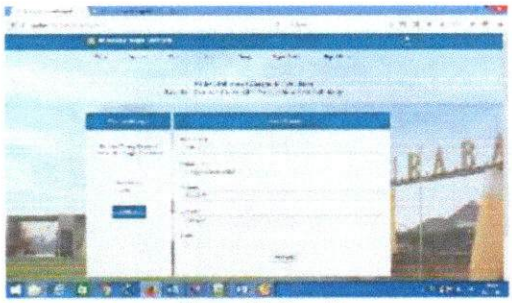


Figure 12 Page Space

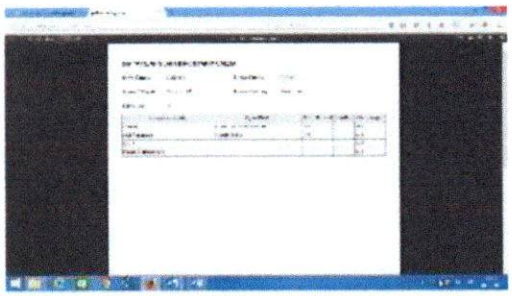


Figure 13 PDF Room Information and Inventory

There is a download link for downloading information provided and there is an inventory of the room you are looking for.

Page of Number Chart Building Report

The page of the Graph Number of Building provides information about the number of buildings in each area at Surabaya State University, it can be concluded that the area that has the most buildings is the FMIPA area with 15 buildings and the area with few buildings is the Unipress area.

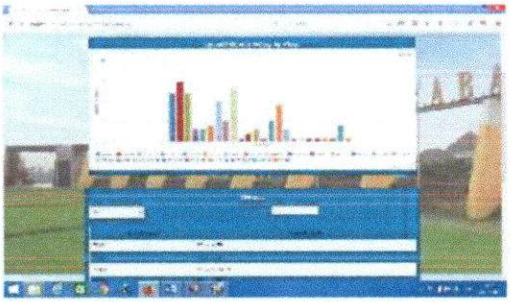


Figure 14 Page Report Number of Building Charts

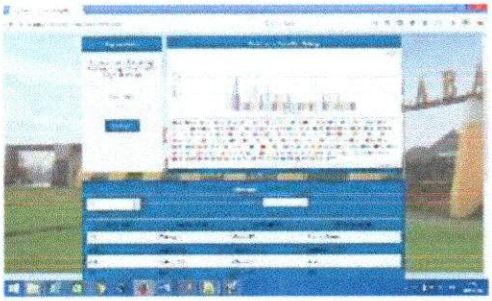


Figure 15 Page Graph Report Number of Floors

Page Number Chart Floor Report

The Graph Number Floor Report page provides information on the number of floors of each building in one area. The highest number of floors in all buildings in Surabaya State University is the A8 building, where the A8 building is included in the FT area and has 4 floors.

Total Area Data Report page

The Extensive Amount Data Report page provides information about the broad number based on the selected category. The data report on the total area consists of area per room, total area per floor, total area per building and total area per area. Data from a large amount can be downloaded in pdf format. The following is a report on the amount of space per data and PDF results from report on extensive data:

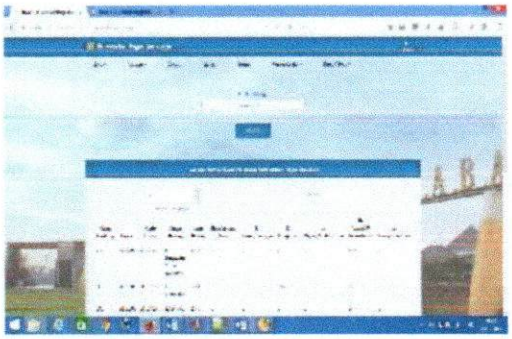


Figure 16 Total Data Report Page

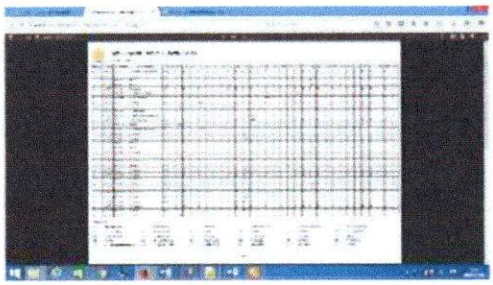


Figure 17 Pdf of Extensive Amount of Data Report

The Data Report Page Amount of Space

This Report Number Data Space page gives information about the amount of space. Data Report The amount of space consists of the number of per-floor space, number of roars per building and number of spaces per area. Data on the amount of space can be downloaded in pdf format. The following is a data report on the amount of space per floor:

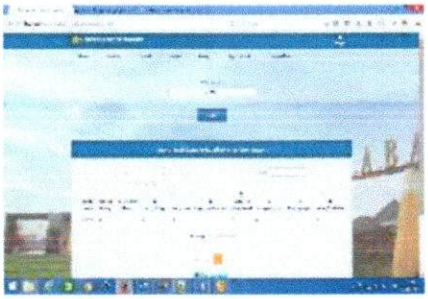


Figure 18 Page Report Data Amount of Space

PDF results from report data amount of space:

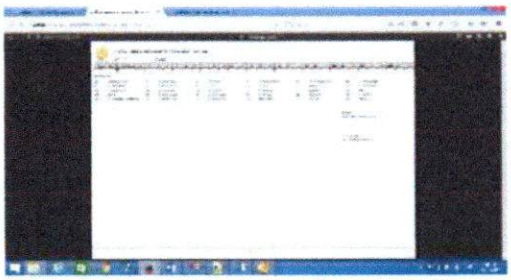


Figure 19 Pdf From Data Report Amount of Space

Page Report Data Amount of Inventory

Page Report Amount of Inventory Data, provides information about the amount of inventory. Data Report The total inventory consists of the amount of inventory per room, the amount of inventory per floor and the amount of inventory per building. Inventory amount data can be downloaded in pdf format. The following report data on the amount of building inventory:

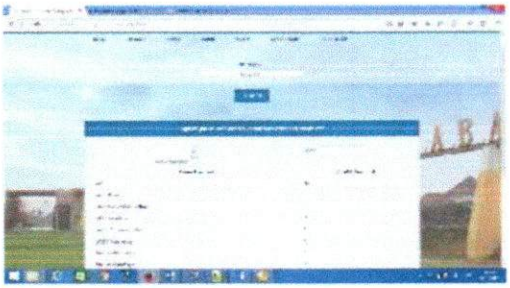


Figure 20 Page Report Data Amount of Inventory

Pdf results from report inventory amount data:

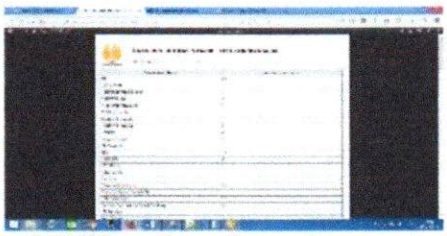


Figure 21 Pdf From Report Data on Inventory Amount

PDF results from the report inventory amount data in detail:

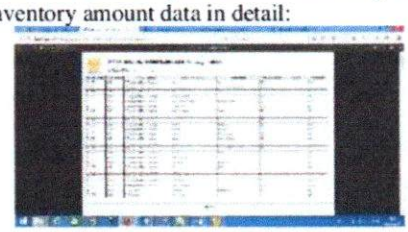


Figure 22 Pdf From Report Data Amount of Inventory in Detail

Report Data History Inventory page

Page Report History Data Inventory, provide information about the report inventory history data per room. Inventory history data can be downloaded in pdf format.

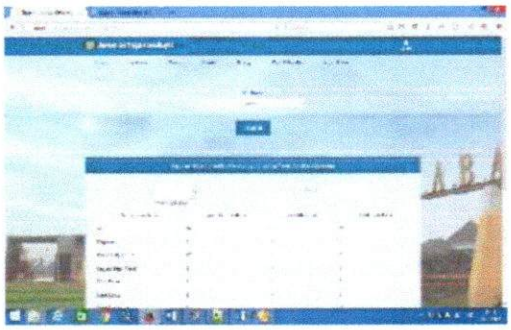


Figure 23 Report Data History Page Inventory

The pdf result from the inventory history data report:

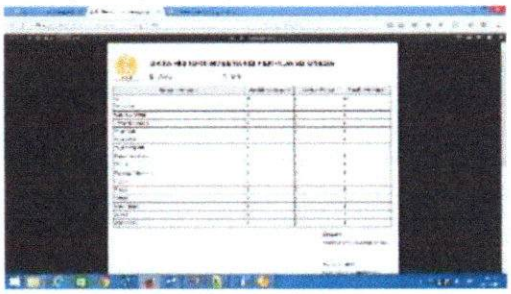
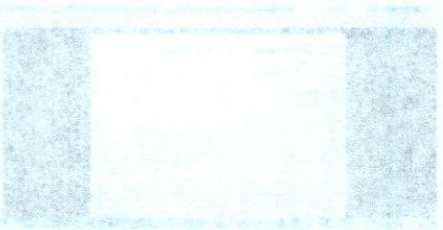
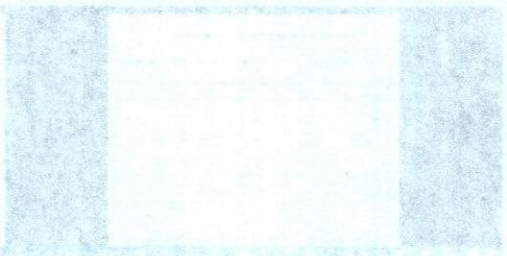


Figure 24 Pdf From Report Data History Inventory





4. Conclusion

The conclusions obtained from the Geographic Information System (GIS) Mapping of Surabaya State University Campus Facilities made are:

1. With the geographic information system mapping campus facilities built using arcview, postgresql, postgis, mapserver, quantumgis, and pmapper tools, this system is easily accessible for visitors to view the overall plan or map of Surabaya State University and floor plan each floor of the building to find out the location of each building.
2. The search process for campus and room facilities can be done quickly so that it can find out the location of building and room facilities and can provide information about campus facilities such as space, number of spaces, inventory amount and inventory history in the campus room. Information provided to visitors can be in the form of graphics and data in pdf format.

The information system built in the completion of this final project is still far from perfect, for this information system is expected to be a material or a reference for readers and other developers, so that better geographic information system mapping facilities can be created, some suggestions that able to develop a similar system that is even better including:

1. Add more detailed information on space facilities.
2. Use of different tools-tools from the system that has been made by use of frameworks other than pmapper, different database usage, and use tools for different maps or floor plans

5. References

[1] Anugrah, W., Suryono, Suseno, J. E. 2018. Real-time Geographic Information System (GIS) for Monitoring the Area of Potential Water Level Using Rule Based System. E3S Web of Conferences 31, 11019.

[2] Aryanto, D. E., Hardiman, G. 2018. Assessment of groundwater recharge potential zone using GIS approach in Purworejo regency, Central Java province, Indonesia. E3S Web of Conferences 31, 12002.

[3] Letsoin, H. S., Santoso, A. J., Suyoto. 2018. Designing Web-based GIS Application by CSF Method: A Case Study in Boven Digoel Papua. E3S Web of Conferences 31, 12005.

[4] Meng, F., Chu, D., Zhan, D. 2010. Transformation from Data Flow Diagram to UML2.0 Activity Diagram.

[5] Nuryadi, R. 2005. *Panduan Mengguanakan MapServer*. Bandung: Informatika.

[6] Permadi, G. S., Adi K, and Gernowo R. 2018. Application Mail Tracking Using RSA Algorithm As Security Data and HOT-Fit a Model for Evaluation System. E3S Web of Conferences 31, 11007.

[7] Permadi, G. S., Vitadiar, T. Z. 2017. SISTEM INFORMASI LAPORAN DANA BANTUAN OPERASIONAL SEKOLAH (BOS) BERBASIS DESKTOP (Studi Kasus Pada SMP Negeri 3 Ponorogo). INOVATE Vol 2 No 1.

[8] Prahasta, E. 2009. *Sistem Informasi Geografis: Tutorial ArcView*. Bandung: Informatika.

[9] Prahasta, E. 2012. *Tutorial PostGreSql, PostGis dan PgRouting*. Bandung: Informatika.

[10] Vitadiar T Z, Farikhin, and Surarso B. 2018. Production Planning and Planting Pattern Scheduling Information System for Horticulture. E3S Web of Conferences 31, 10004.

Geographic Information System Mapping of Universitas Negeri Surabaya

ORIGINALITY REPORT

17%	13%	14%	8%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Negeri Surabaya The State University of Surabaya Student Paper	7%
2	repository.dinamika.ac.id Internet Source	2%
3	Fanchao Meng, Dianhui Chu, Dechen Zhan. "Transformation from Data Flow Diagram to UML2.0 activity diagram", 2010 IEEE International Conference on Progress in Informatics and Computing, 2010 Publication	1%
4	Wirdah Anugrah, Suryono Suryono, Jatmiko Endro Suseno. "Real-time Geographic Information System (GIS) for Monitoring the Area of Potential Water Level Using Rule Based System", E3S Web of Conferences, 2018 Publication	1%
5	download.enet.eu Internet Source	1%

6	repository.uim.ac.id Internet Source	1 %
7	repository.unair.ac.id Internet Source	1 %
8	en.unesa.ac.id Internet Source	<1 %
9	eprints.jeb.polinela.ac.id Internet Source	<1 %
10	text-id.123dok.com Internet Source	<1 %
11	repository.uin-suska.ac.id Internet Source	<1 %
12	T Prihanto, K Fathoni, B Prasetiyo. "Achievement of green campus indications based on assessment indicators on H-BAT program Universitas Negeri Semarang", IOP Conference Series: Earth and Environmental Science, 2021 Publication	<1 %
13	pendidikan-matematika.fmipa.unesa.ac.id Internet Source	<1 %
14	etheses.dur.ac.uk Internet Source	<1 %
15	Steven Putera Suryanto, Timothy John Pattiasina, Anggya Soetarmono.	<1 %

"Perancangan dan Pengembangan Toko Online dengan Metode Interaction Flow Modeling Language (Studi Kasus Toko Winata)", Teknika, 2017
Publication

16 Tri Sagirani. "PERANCANGAN SISTEM INFORMASI BAGI USAHA MIKRO KECIL DAN MENENGAH DALAM MENINGKATKAN LAYANAN PADA PELANGGAN", Jurnal Komunika : Jurnal Komunikasi, Media dan Informatika, 2018 <1 %
Publication

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		