

DEVELOPMENT OF GNU/LINUX DISTRIBUTIONS

B. Tech Computer Semester - VIII

Prepared At



**Bhaskaracharya Institute for Space Applications & Geo-informatics
Govt.of Gujarat, Science & Technology, Gandhinagar**

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Submitted to



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NIRMA UNIVERSITY, AHMEDABAD-382481

MAY 2013

DEVELOPMENT OF GNU/LINUX DISTRIBUTION

Major Project

Prepared at



ISO 9001:2008
ISO 27001:2005

**Bhaskaracharya Institute for Space Applications & Geo-informatics
Govt.of Gujarat,Science & Technology, Gandhinagar
Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Technology in (Computer Engineering)**

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BISAG Certificate

This is to certify that the project report compiled by **Mr Arpan Chavda(09bce006)** and **Mr Hitesh Piprotar(09bce054)** students of 8th Semester B.Tech from Department Of Computer Science, Institute of Technology, Nirma University have completed their final semester project satisfactorily. To the best of our knowledge this is an original and bonafide work done by them. They have worked on Development of GNU/Linux Distributions, starting from January 7th, 2012 to April 24th, 2013. During their tenure at this Institute, they were found to be sincere and meticulous in their work. We appreciate their enthusiasm & dedication towards the work assigned to them. We wish them every success.

Mr. Miren Karamta

Project Manager,
BISAG, Gandhinagar

T. P. Singh

Director,
BISAG, Gandhinagar

Nirma Certificate

This is to certify that the Major Project entitled "**Development of GNU/Linux Distributions**" submitted by **Arpan Chavda (09BCE006)** and **Hitesh Piprotar (09BCE054)**, towards the partial fulfillment of the requirements for the degree of Bachelor of Technology in Computer Engineering of Nirma University, Ahmedabad is the record of work carried out by them under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted for examination. The results embodied in this Project work, to the best of my knowledge, haven't been submitted to any other university or institution for award of any degree or diploma.

Dr. Sanjay Garg

Head Of Department,
Dept. of Computer Science & Engg.,
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About the company

Introduction of the company



Figure 1: BISAG

The applications of space technologies and geo-informatics contribute significantly towards socio-economic development of the society. Recognizing the importance and need of Space technology and geo-informatics for developmental planning purposes, the Government of Gujarat established the Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG) in the year 1997, as the State nodal agency to utilize space technology and geo-informatics for various developmental activities of the State.

Since its foundation, the Institute has experienced extensive growth in the spheres of space technology and geo-informatics. The objective with which BISAG was established is manifested in the extent of services its renders to almost all departments of the State. Year after year the institute has been endeavoring to increase its outreach to disseminate the use of geo-informatics up to grassroots level. In this span of eleven years, BISAG has assumed multi-dimensional roles and achieved several milestones to become an integral part of the development process of the Gujarat State. **Profile**

BISAGs has strengthened its role as a facility provider, a technology developer and as a facilitator for transferring technology to the grass root level. Further reinforcing

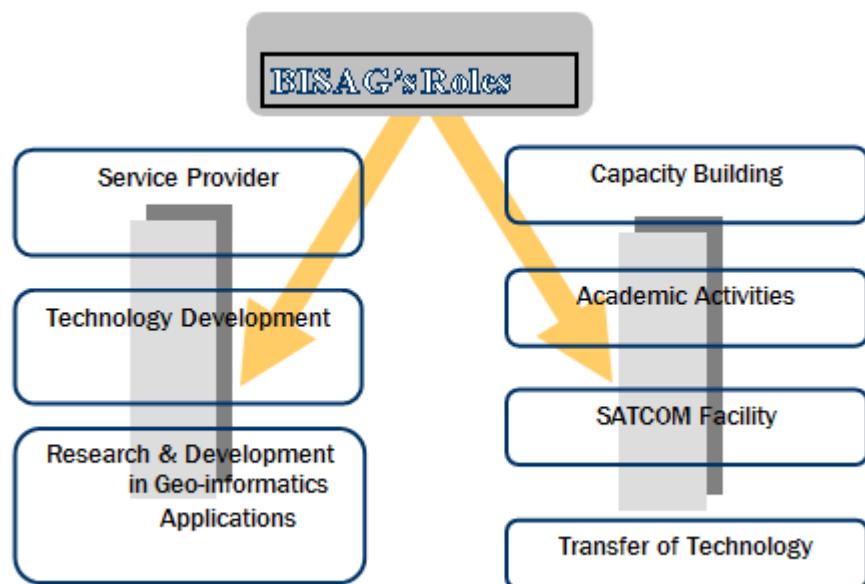


Figure 2: BISAG's Role

its functions, BISAG has achieved ISO 9001:2008 and ISO 27001:2005 certifications for quality management and security management services respectively. This has led to an organized and systematic development of its services and outputs.

Activities Of BISAG

BISAGs activities are multi-fold and have expanded in a big way and focused on the following:

- **Satellite Communication :** Promoting and facilitating the use of satellite broadcasting networks for distant interactive training, education and extensions
- **Remote Sensing :** Inventory mapping, developmental planning and monitoring of natural and man-made resources

- **Geo-informatics System :** Conceptualizing, creating and organizing multi-purpose common geo-spatial database for sectoral and thematic applications for various users
- **Photogrammetry :** Creation of Digital Elevation Model, Terrain characteristics, Resource planning,etc.
- **Global Navigation Satellite System :** Location based services, geo-referencing, engineering applications and research
- **Software Development :** For providing low-cost Decision Support Systems, desktop as well as web-based geo-informatics applications to users for wider usage.
- **Disaster Management :** For preparing geo-spatial information to provide necessary inputs to the Government to assess and mitigate extent of damage in the event of a disaster
- **Education, Research and Training :** For providing education, research and training facilities to promote number of end users through the Academy for Geo-informatics.
- **Value Added Services :** For providing services which can be customized as per the needs of the users.
- **Technology Transfer :** Transferring technology to a large number of end users.

Units of BISAG

BISAG initially set up to carry out Space Technology applications, has evolved into an Academic Institute, a Centre for Research and Technology Innovations, a Facility Provider, a Technology Developer and a Facilitator for transferring technology to the grass root level. BISAG is the first such State Centre having such multifarious

activities with ISO certification. BISAG has gradually progressed over the years and has grown into several units. Each unit focuses on specific functions and objectives to ensure efficiency in over all activities of the institute.

- **Gujarat Satellite Communication Network (GUJSAT):** SATCOM facilitates the promotion and facilitation of the use of broadcast and teleconferencing networks for distant interactive training, education and extension.
- **Centre for Geo-Informatics Applications:** The Centre for Geo-informatics provides services for the developmental and planning activities pertaining to Agriculture, Land and Water Resources Management, Wasteland/ Watershed development, Forestry, Disaster Management, Infrastructure etc.
- **Software Development:** For wider usage of geo-spatial applications, customised software are developed by the Software Development Team. The institute has provided many indigenous software solutions in the field of Geographic Information Systems, Decision Support Systems and Image Processing.
- **Academy of Geo-informatics:** The Academy for Geo-informatics carries out Education, Research and Training activities.
- **Disaster Management Information cell:** BISAG works closely with the Gujarat State Disaster Management Authority (GSDMA), for assessment of existing situation through integrated analysis and for planning appropriate preventive and preparatory measures, providing necessary support through data generation and analysis.

Infrastructure Developement

The growth and progress of any institute is gauged by the infrastructure it develops and possesses. BISAG has a sound infrastructure setup that has developed in tandem with the growth of the institute. Having started with one building, there are now dedicated facilities for different units. The laboratories are equipped with state-of the

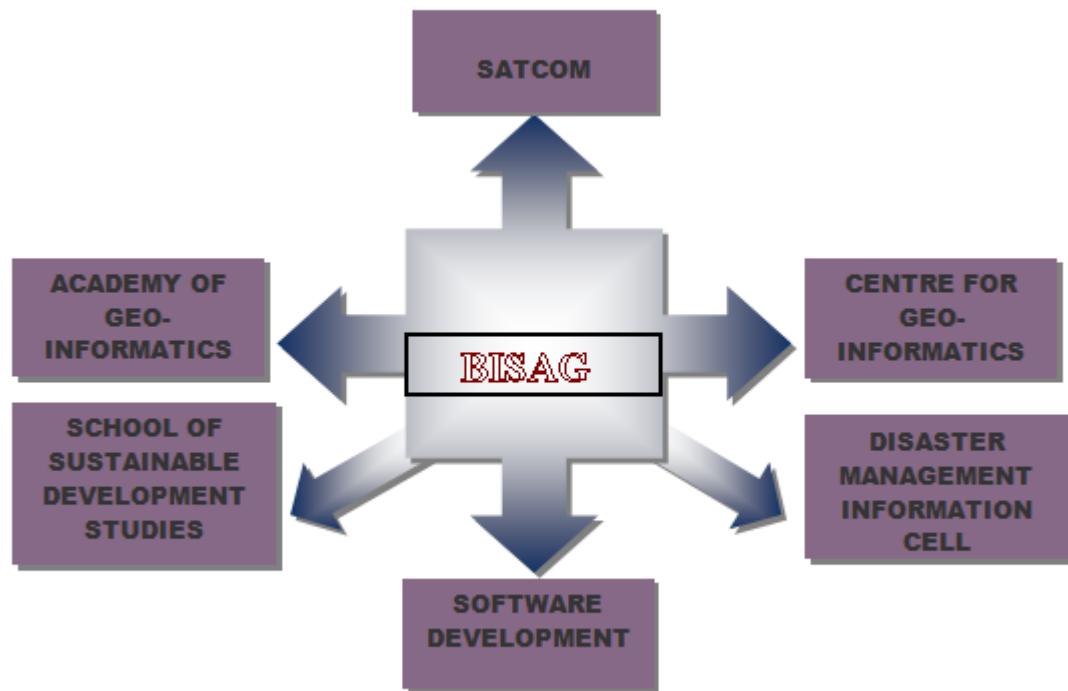


Figure 3: Units of BISAG

art technology with latest Hardware and Software required for executing its activities. BISAG also has a rich satellite data archive, which includes Satellite data of different spatial, spectral and temporal resolutions.

Collaborations of BISAG...Creating A Sense Of Ownership

BISAG works with almost all Government Departments and Organizations. Each of these Departments/Organization contributes in preparation of the respective projects. With strong Government support and proactive efforts on part of the staff of BISAG, the list of Collaborators is expanding and increasing.

Institutional Strengthening BISAG has achieved institutional strengthening through:

- **Reinforcement of Decision Support Systems**

Developing customized solutions as per user requirements through partnerships

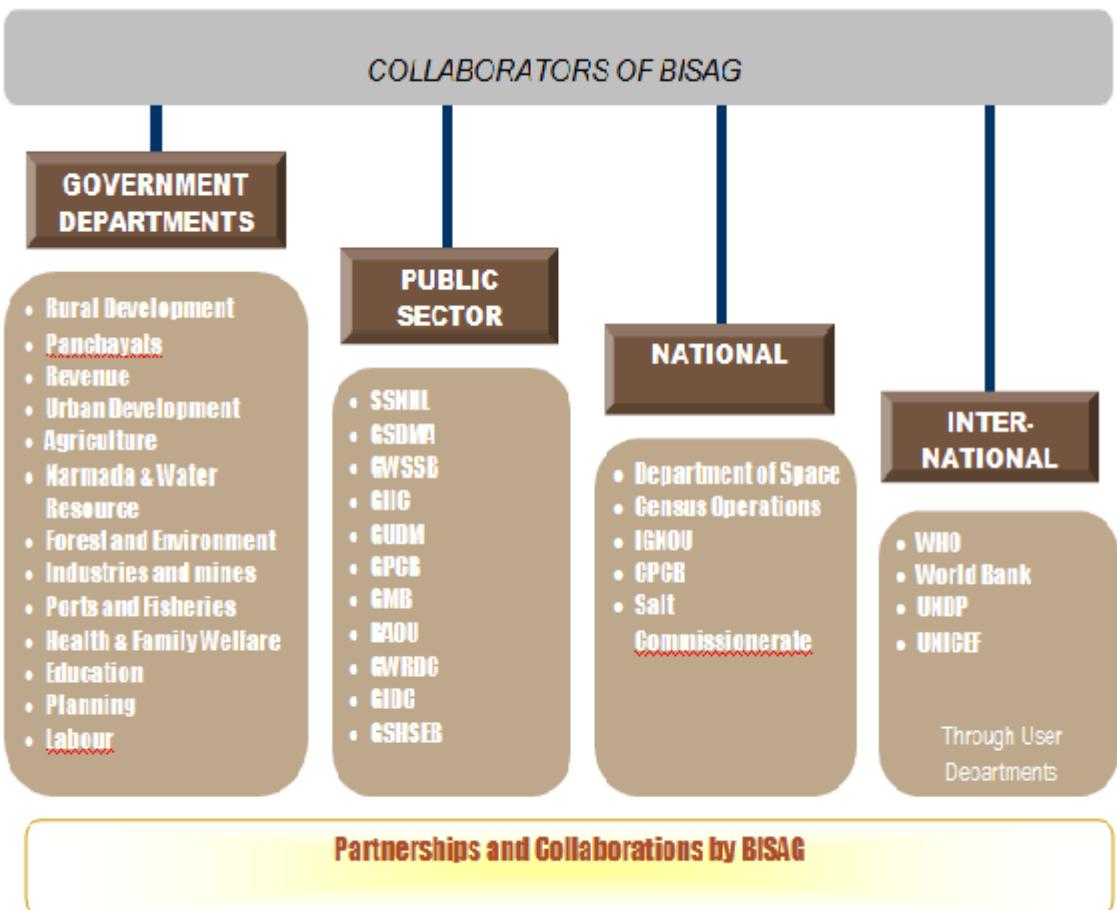


Figure 4: Partnerships and Collaborations by BISAG

and collaborations, which are affordable and easy to use. Areas of natural and manmade resources, socio-economic parameters, are being effectively addressed with the help of Geo-informatics.

- **Establishing Linkage between Government and People through GUJSAT**

GUJSAT facility is being constantly employed for the promotion and facilitation of the use of teleconferencing networks for distant interactive training, edu-

tion and extension. Experts, leaders, specialists and professionals can conduct their programs from a central location reaching out to remote areas through two-way audio-video channel making them interactive and meaningful.

- **Developing Innovative Education Programmes**

Innovative educational programmes are conducted regularly through GUJSAT, allowing people residing in remote areas to have an access to good quality educational and awareness programmes.

- **Solving real life problems through Human Resource Development**

The institute has a young multi-disciplinary team of professionals and a continuing induction programme. Multi-nationals and IT agencies pick up the trained staff that in turn is replaced by new people. This results in availability of more and more trained manpower in the realm of space applications. Every year BISAG provides training to about 300 students in the field of Geo-informatics.

- **Creation of the multipurpose sectoral comprehensive databases for the entire state of Gujarat**

The institute has made efforts towards conceptualization, creation and organization of multi-purpose common digital database for sectoral / integrated decision support systems. This has provided impetus to planning and developmental activities at grass root level as well as monitoring and management potential in various disciplines like water resources, land resources, disaster management, infrastructure, urban management.

Communication

The project was undertaken at BISAG, Gandhinagar and BISAG can be contacted at the following:-

Near Ch-0 Circle,

IndulalYagnikMarg,

Gandhinagar-Ahmedabad highway,

Gandhinagar-382007

Gujarat, India

Phone No:- +91 79 23213081/82/90

Candidates Declaration

We declare that final semester report entitled **DEVELOPMENT OF GNU/LINUX DISTRIBUTIONS** is our own work conducted under the supervision of the external guide **Mr. Miren Karamta** from BISAG (Bhaskaracharya Institute for Space Applications & Geo-informatics). We further declare that to the best of my knowledge the report for B.Tech Computer Science final semester does not contain part of the work which has been submitted for the award of Bachelor Degree either in this or any other university without proper citation.

Candidate 1s Signature

Arpan Chavda

Student ID: 09BCE006

Candidate 2s Signature

Hitesh Piprotar

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Acknowledgements

Gratitude is a feeling which is more eloquent than words, more tranquil than silence.

We are grateful to **T.P.Singh**, Director (BISAG) for giving us this opportunity to work the guidance of renowned people of the field of GIS also providing us with the required resources in the company. We would like to express our endless thanks to our external guide **Mr. Miren Karamta**, Project Manager at Bhaskaracharya Institute of Space Application and Geo-informatics for their sincere and dedicated guidance throughout the project development. Also our hearty gratitude to our Head of Department and internal guide, **Dr. Sanjay Garg** for giving us encouragement and technical support on the project.

The blessings of God and our family members made the way for completion of the major project. We are very much grateful to them.

We are immensely thankful to our friends, who always stood beside and motivated me throughout this course.

Arpan Chavda

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Abstract

Main idea behind this major project is to develope two GNU/Linux distributions ,DMLinux and OpenGujarat.Both are free and opensource operating systems.First Distribution namely **DMLinux**(Developers Mono Linux) originally forked form Ubuntu is to enhance the life of developers.The purpose of DMLinux aims to develope such an operating systems that provides prudtive GUI and applications pre-installed which can help developer's in his/her everydays task.Second distribution namely **OpenGujarat** is developed in Gujarati language.This operating system is developed for those people which dont know english language.Whole GUI is in Gujarati language.This is developed for the government offices,schools,BISAG,Gujarati people and other vernacular medium students.The main perpose of OpenGujarat is to remove licensing of windows products like Windows XP/7,Office 2003/07 and provide free and opensource alternative of it.

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Chapter 1

Introduction

1.1 The System

1.1.1 Definition of System

The proposed system "Development of GNU/Linuxdistribution" is designed to work on Linux environment. There are two distributions.

a. DMLinux

- DMLinux stands for developers mono Linux. It is an Open source and Free GNU/Linux Operating system originally forked from Ubuntu. DMLinux is developed for developers and Computer Science/I.T. students.

b. OpenGujarat

- Development of this distribution is an idea of BISAG director Mr.T.P Singh to design an operating system which is completely in regional language(Gujarati) ,so that it can be used by all the students of gujarat

students who have some problems in understanding English language. So these students find it easy to use which is in regional language.

1.1.2 Concerned Audiences And Users

Users of the system are as follows:-

- a. DMLinux: Developers, Coders, Programmers, Software engineers, Students.
- b. OpenGujarat:BISAG, Offices of Govt. of Gujarat, and other regional people of Gujarat

1.1.3 Purpose and Objective

- a. **DMLinux:** The purpose of DMLinux aims to provide all packages and all the softwares to developers and students who dont have very high speed internet connection or who lives in remote area. This system requires no activation unlike in windows. So developers dont have to bother about taking license and activation of os and all these stuffs.
- b. **OpenGujarat:** The purpose of OpenGujarat is to provide os to Gujarat students which is completely in regional language (Gujarati).

1.1.4 About Existing system

- There are so many existing Linux distributions with different-different desktop environment like KDE,GNOME SHELL,UNITY,XFCE,LXDE are available now a days like for hacking **Backtrack**,**Blackbuntu** are there,if you go for server distribution **Annvix**,**Scientific Linux** are there.If you want an os for embedded system then **ELinOS** exists but there is no distribution available in

market for developers .So **DMLinux** is unique distribution for developers and there is no alternative available. There is no Linux distribuition available which is completely in gujarati language so **OpenGujarat** is also an unique distribution which is in regional language(Gujarati)

1.1.5 Proposed System

Functional Requirements

a. DMLinux

- **Features of DMLinux**

- Productive GUI(DE)
- Language support like python,perl,ruby,etc.
- Inbuilt essential IDEs like eclipse,netbeans,Qt
- Inbuilt android development SDK support with eclipse
- Markdown support
- Inbuilt Hardware based programming IDE like Arduino,Logisim
- Customized DE with Eye-candy theme and icons
- Inbuilt Web server (Apache,tomcat and Glassfish)
- Aptana studio IDE for web developers
- Customised Firfox with FirefoxOS application development toolkit for mobile phones
- Linux app development utilities like quickly toolkit
- ISO size : around 3 GB

- **System modules of DMLinux**

- **Core Module:**

- * This module contains all core files means Kernel,device drivers, network utilities,etc. This will be available in Ubuntu minimal disc(27

MB). We are not going to touch this files for development.

– **Application module:**

- * This module contains all necessary applications needed for software developers.
- * All inclusion of application is based on our analysis and reviews of some developers working in some companies and our alumni.
- * We will try to develop following application after completion of system build.
 - **Auto ON Utility:** Boot PC at given user time when PC is already in shutdown.
 - **LAMP front end:** Apache MySQL and PHP front end to manage this running services
 - **Repo-cloner:** Local server package management utility
 - **Multi Document converter:** source markdown to multiple document format conversion.

– **Desktop Environment module:**

- * This module contains desktop environment provided in DMLinux. We have chosen GNOME Shell 3.6 as Desktop environment for DMLinux.
- * We will customize gnome shell to make more useful and productive than its original version.

b. **OpenGujarat**

• **Features of OpenGujarat**

- Developed in Gujarati
- Very lightweight
- Can run with 256mb RAM

- Inbuilt Gujarati dictionary(developed by us) support
- Simple Desktop Environment having Windows type mock-up
- ISO size : around 900mb

- **System modules of OpenGujarat**

- **Core Module:**

- * This module contains all core files means Kernel,device drivers, network utilities,etc. This will be available in Ubuntu minimal disc(27 MB). We are not going to touch this files for development.

- **Application module:**

- * This module contains all necessary applications needed for simple tasks.
 - * All inclusion of application is based on requirement of BISAG.
 - * We will try to develop following application after completion of system build.
 - English to Gujarati Dictionary

- **Desktop Environment module:**

- * This module contains desktop environment provided in DMLinux. We have choosen XFCE 4.1 for OpenGujarat.

Non-Functional Requirements

- Reliability of the system is of primary importance. As the system is internet based and would be accessed many times by various different clients for various different purposes, it should entirely robust and reliable.
- Maintainability The system should be designed to be easily maintainable and get the least complaints from the users and would guarantee high customer satisfaction and minimum downtime.

- Adaptability: The system must be entirely adaptable and should easily gel with the parent modules without causing much of rework or displacement.
- Extensibility: The system should be designed to be extensible to changes. Changes might be a result of
 - User requirement change.
 - Compliance to follow some new company policy.
- Facility provided by the technology employed should be utilized to its maximum. This refers to strict employment of the tools and technology being used.
- Development should be in accordance to the Software Design Document. This rule stresses the importance of the Software Design documents. They are the main source of requirements for off site developers. And depending on various versions of the SDD the change requests are recorded. Finally the extra effort involved in solving these change requests is recovered from the client.
- All deliverables should undergo a self review by the developer. This business rule stresses on the rechecking process to be carried out by the developer. This implies that once the deliverable undergoes QA it should be with minimum errors and in turn involve minimum rework.
 - Security and Privacy Requirements
 - Environmental Requirements
 - Computer Resource Requirements
 - Computer Hardware Requirements
 - Computer Hardware Resource Utilization Requirements
 - Computer Software Requirements
 - Software Quality Factors
 - Packaging Requirements

- Precedence and Criticality of Requirements
 - The system must be user friendly
 - It must be persistant
 - Future Modification and requirement can be adaptable.
 - The system must be maintainable.

1.2 Project Profile

1.2.1 Project Title

Development of GNU/Linux distribution

1.2.2 Scope of Project

- a. **Scope for DMLinux:** Developers, Coders, Programmers, Software engineers
 - b. **Scope for OpenGujarat:** BISAG, Offices of Govt. of Gujarat, and other regional people of Gujarat

1.2.3 Project Team

External Project Guide : Mr. Miren Karamta

Internal Project Guide : Dr. Sanjay Garg

Team Members : Arpan Chavda

Hitesh Piprotar

1.2.4 Hardware/Software environment in company

a. DMLinux

- Processor: Pentium 4 or later & Freq. 1GHz or more
 - Minimum RAM: 1 GB RAM

- Recommended Space: approximate 8 to 9 GB
- Color Monitor, Keyboard and Mouse
- Internet or Intranet

b. OpenGujarat

- Processor: Pentium 4 or later & Freq. 1GHz or more
- Minimum RAM: 1 GB RAM
- Recommended Space: approximate 8 to 9 GB
- Color Monitor, Keyboard and Mouse
- Internet or Intranet

1.2.5 Project plan



The Gantt chart displays the project timeline with tasks listed in rows. The columns represent the task name, begin date, end date, and duration.

Name	Begin date	End date	Duration
Requirement gathering,Market Analysis & PJR Submission	1/7/13	1/15/13	7
Features,Analysis and Gathering resource,PPR Submission	1/16/13	1/22/13	5
Diagrams,SRS & Planning	1/23/13	1/30/13	6
System Development of DMLinux and OpenGujarat	1/31/13	3/18/13	33
Application Development related to DMLinux and OpenGujarat	2/28/13	4/10/13	30
Implementation and Integration of system modules and application	4/11/13	4/17/13	5
Testing and Installation	4/18/13	4/24/13	5

Figure 1.1: Project Plan

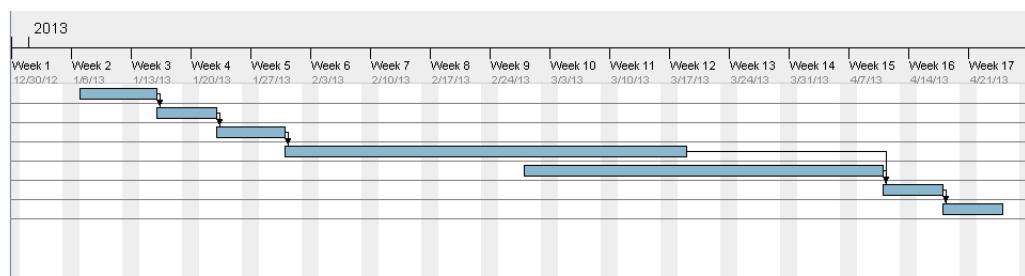


Figure 1.2: Project Plan - Timeline

Chapter 2

System Analysis

2.1 Feasibility Study

The Objective of the Feasibility study: The purpose of the Feasibility study is to find out if an information system project can be done and to suggest possible alternate solution. Feasibility study of the system is very important stage during the system design. Feasibility study is a test of a system proposal according to its workability impact on the organization, ability to meet user needs, and effective use of resources. (Hardware, Software, or other equipments), It is also use to determine whether the system gives benefit to people or society or not? Feasibility study decides whether the proposed system is properly developed or not or it properly work as per the expectation of the company or not.

Need for Feasibility Study: A feasibility study is written approach to evaluating your idea and can help you identify:

- If your idea is viable or not
- Useful facts and figures to aid decision-making
- Alternative approaches and solutions to putting your idea into practice

There are many reasons why new community ventures fail, but lack of planning and

research is the main one. As you plan, your knowledge of your market, customers and the environment in which you will work will grow. This process considers all areas of your idea and ensures you have something concrete on paper.

What does a feasibility study involve?

It can involve some or all of the following:

- An assessment of the current market
- An assessment of your potential position in the market
- An evaluation of the possible options for entry into the market
- A short list of the possible options

There are some aspects in feasibility study portion of the preliminary investigation.

- a. Technical Feasibility.
- b. Economic Feasibility.
- c. Operational Feasibility.
- d. Social Feasibility.
- e. Legal Feasibility
- f. Time Feasibility of the project.

2.1.1 Technical feasibility

A large part of determining resources has to do with assessing technical feasibility. It must be find out whether current technical resources can be upgraded or added in a manner that fulfills the request under consideration. It is willing to improve its technical abilities of the project will be handled on the computerized concept so it has to improve some hardware and software abilities to maintain this system and it billing to improve and give all the supported facilities. Here, the Proposed System which

is to be developed requires Hardware as well as Software Resources. A Hardware requirement includes PC with 40GB Hard disk and 1GB RAM. Software requirement includes Java. File requirement: Shape Files or geo referenced .jpg or .tiff file It may be affordable for any organization to employ new professional thus, the requirement makes it technical feasible.

2.1.2 Economic feasibility

Economic feasibility looks at the financial aspects of the project. Economic feasibility concerns with the returns from the investments in a project. It determines whether it is worthwhile to invest the money in the proposed system. It is not worthwhile spending a lot of money on a project for no returns. To carry out an economic feasibility for a system, it is necessary to place actual money value against any purchases or activities needed to implement the project. The proposed system that is going to develop its benefit is indirect benefit and cost is direct cost that is to be paid. It costs for its development and hiring of the Server space. But it gives indirect benefit to businessmans tourist etc.

2.1.3 Operational feasibility

The System will hold good GUI facilities which attract the user to use the System. The System will be developed using new technologies so the user will even get a chance work with and learn new technology and environment. Company is having sufficient employees for designing, implementing, testing, deploying and the training the employee to uses that system. In the system operational feasibility checks, whether the user who is going to use the system is able to work with the softwares with which the system is coded and also the mind of the user going to use the system. If the user does not understand or is able to work on the system further development is of waste.

2.1.4 Social feasibility

The System is going to be developed is it beneficial to society? Yes, as this System gives the details of the district to the user and admin and user can edit the shape files and get better view of the map also by having charts can save as image which can be useful as map

2.1.5 Legal feasibility

The Proposed System should be such that the System do not misguide or gives wrong information to user. The System should give proper information and should be reliable source of information to user.

2.1.6 Time feasibility

The Proposed System is a Desktop Application so it will take some duration of time to satisfy the objective of completing the System (Application). The duration that is allocated to develop the System is quite feasible in respect to time. 4 months is enough to develop System.

2.2 Requirement Analysis

2.2.1 Facts finding techniques

The client in most cases is not sure of what exactly is desired and has a poor understanding of the computing environment

- Inception of the Project
- Basic Elicitation
 - Problems of Scope
 - Problems of Understanding

- Problems of Volatility
- Elaboration
- Negotiation
- Specification
- Validation
- Management (Continuous)
- The following techniques are present unambiguously throughout the project and possess enormous power with regard to requirement gathering.

Interview

The requirement analysis phase begins after the inception of the project. The first phase of interviews is mainly a kind of informal discussions with the client. In this phase the analysts who are the evangelists in the process of requirement elicitation generally do the following:

- Ask a set of Informal Context Free Questions regarding the system.
- Talk through with the client to know his intention with regard to the project.
- Define a business case for the idea along with the performance of certain kind of market analysis.
- Identify a working description of the projects scope.

The later phases of interviews involve the following kind of facets:

- Discussion on the Division of the entire thing into manageable and doable modules.
- Module wise interviews with the various personnel involved.

- Certain kind of debatable presentations which may be clubbed with brainstorming or prototyping sessions.

This mode of requirement gathering is the one that provides the maximum amount of information regarding the project and hence is used very effectively. This mode can turn into all various forms ranging from strict one room interviews to large debatable discussions.

Questionnaire

This mode of requirement elicitation is generally employed during change management and while laying out basic system explanations. Questionnaires used in the project are framed keeping into mind the following things:

- Amount and the kind of information to be extracted through this channel.
- The kind of stake holder to whom the questionnaire is addressed.
- The reusability and abstractness of these questionnaires.

Record Review

The records analyzed by me were mainly the following:

- Software Design Document This gave me the actual requirements of the GUI plus the backend logic right till statement of logical queries which may be employed in some or the other form. It also incorporated the sample GUI so that any changes to the prototypes submitted earlier can be checked and tracked.
- Technical SRS (with Business Analysis) This was a typical SRS that gave me the specific requirements along with the Business rules that need to be employed.
- Class Diagrams The class diagram made me understand the entire architecture that was employed and allowed me to extend it in my system.

Observation

This is also the method employed very widely in the project being developed. The developers working onsite generally engage in the observation of the following things:

- Work Environment of the organization.
- The technical expertise of the employees of the organization.
- The volume of customers entertained.
- The kind of system expected.
- The resistance in the organization due while the organization gets the system installed.
- The usage of any of the available systems.

During the continuous management phase that starts once the system is installed and is running the observation regarding system usage, system inconveniences and system benefits is carried out.

Chapter 3

System Diagram

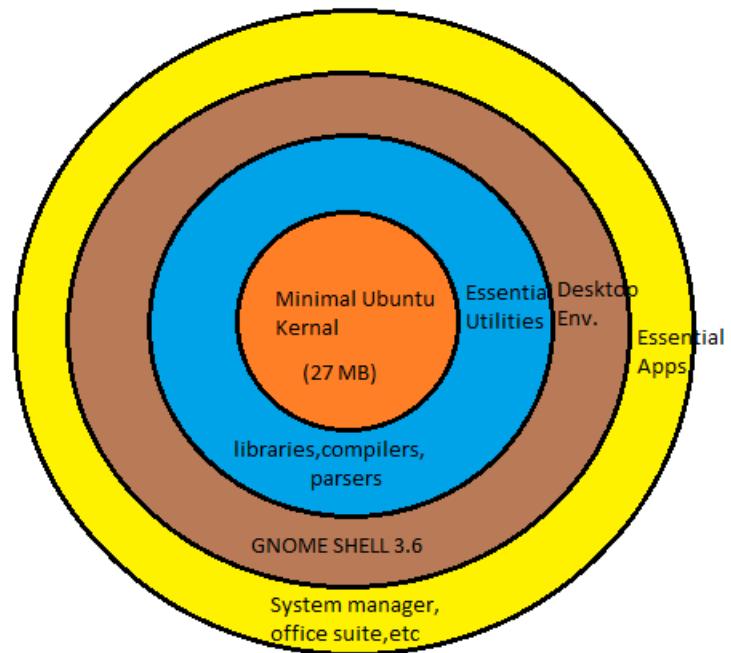


Figure 3.1: Layered diagram of System

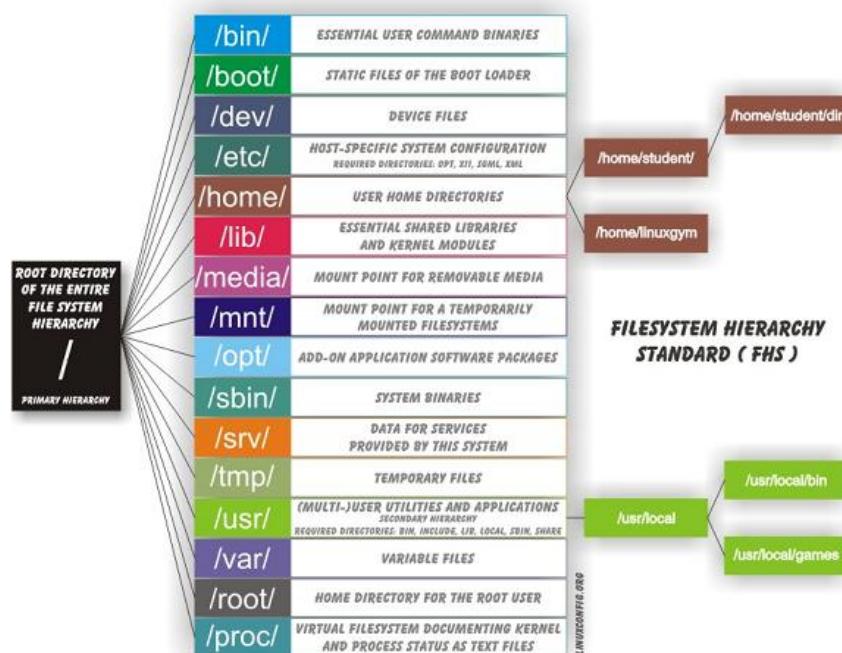


Figure 3.2: Linux File directories diagram

Chapter 4

Application Development

We have developed some basic utilites that are going to enhance operating system experience.

4.1 UTILITIES

- a. Auto ON Utility:

This application is developed with the aim of booting up PC at given time from shut down. This software is developed for Linux systems not for windows.

- b. LAMP(Front end)

This application is developed with the aim to handle LAMP Services(Apache, MySQL and PHP Services installed inside Linux system)

- c. Repocloner

Repocloner is an application to make local apt repository for intranet based servers. This application is for server side which has linux installed.

- d. Multidoc Converter

This application is developed with aim to convert multiple document formats between each other.

4.2 Gujarati Dictionary

4.2.1 Purpose

This dictionary is general dictionary that will provide meaning of given English words into gujarati meaning. Dictionary is going to develop for OpenGujarat as well as this dictionary can be ported or installed in other system.

4.2.2 Current Alternative Application

There is no dictionary (English to Gujarati) available for any linux(debian or RPM package management system) operating system till now. This is our first time development in this space.

4.2.3 Porting System

We will try to port this dictionary on multiple platform in short time. We have short time so we will try to use other third party application to port our dictionary in desired system. Our dictionary can be insalled on Windows,Mac OS X,Android and Linux system.

4.2.4 Component of Dictionary Development

Dictionary Front End

Dictionary front end means Dicitonary look up program. The application that gives interface between database and user to manipulate information in easy way.

- LINUX :

STAR DICT (APPLICATION) or GOLDEN DICT(APPLICATION):

This front end application is available on Ubuntu repository. You can install via following commands.

- ANDROID:

Golden Dict(Application):

This front end application can be downloaded from Google play store.(Link)

4.2.5 Dictionary back end

Dictionary back end means the database that includes English words and meaning of that words in Gujarati. Database is provided by GujaratiLexicon.com. This database contains around 52,000 words.

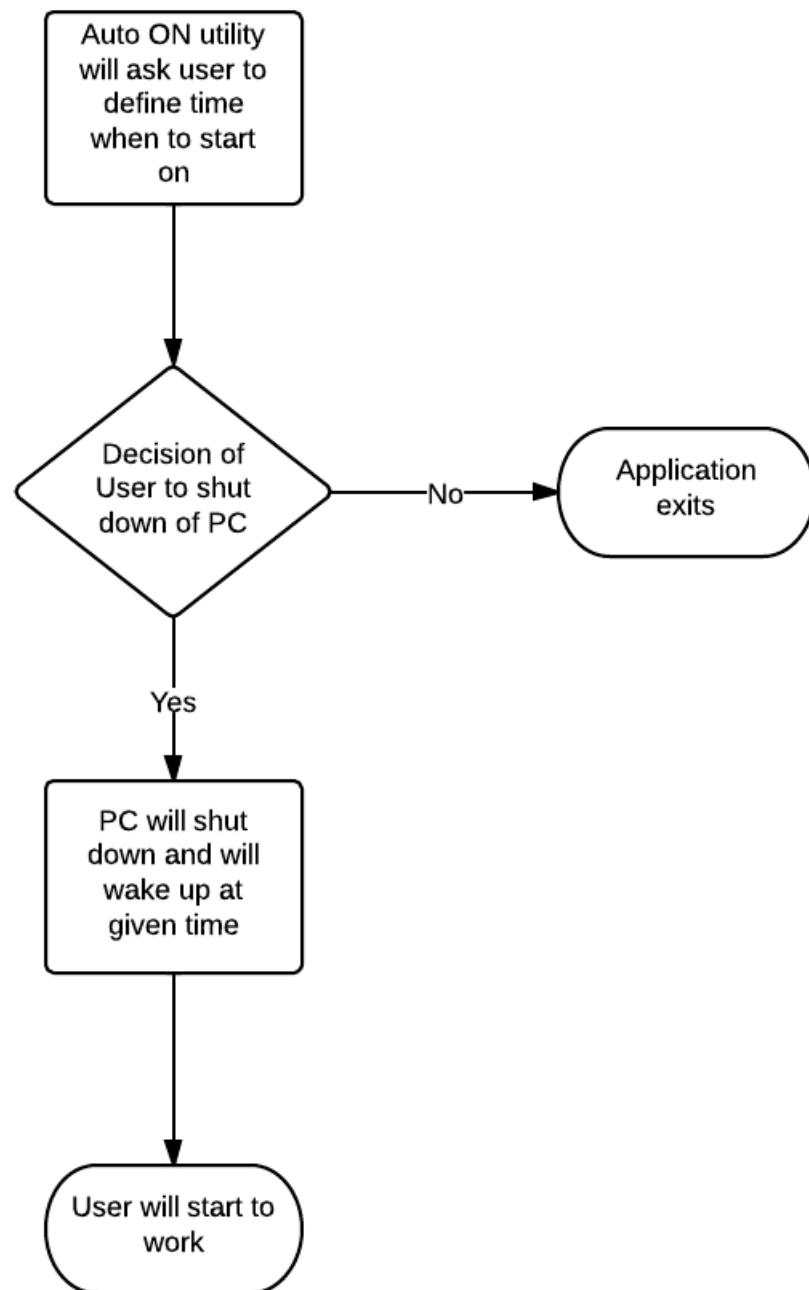


Figure 4.1: Auto ON Utility Flowchart

Chapter 5

User Manuals

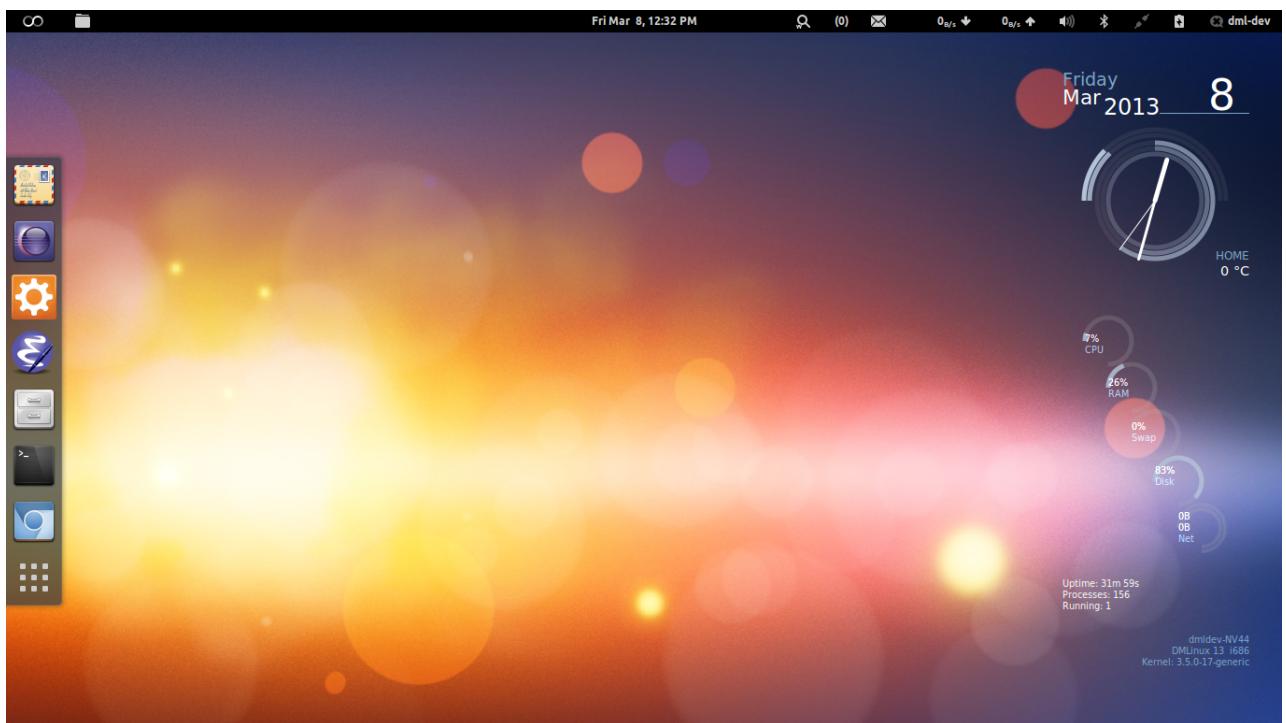


Figure 5.1: Main outlook of DMLinux

Description: Above is the Desktop of DMLinux Operating system. It features GNOME Shell 3.6 inside it. Theme and icons are added by us.

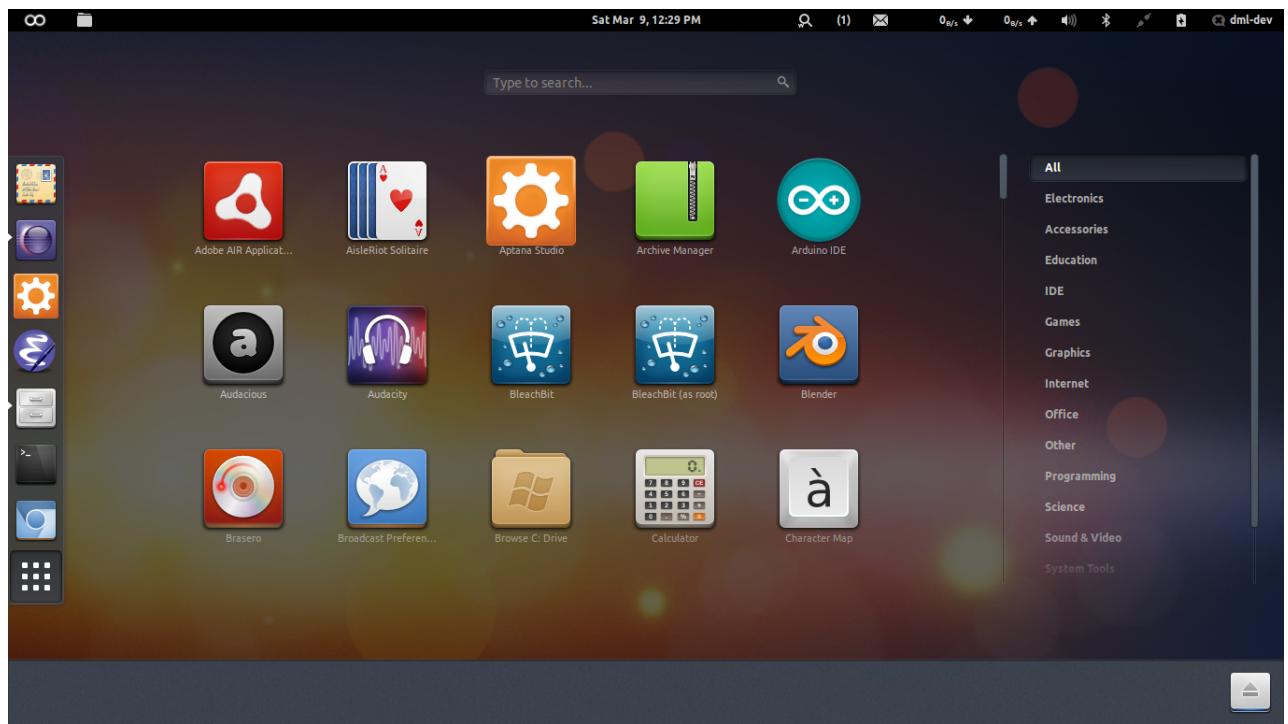


Figure 5.2: Application Menu

Description: Above is the screenshot of Application Menu provided in DMLinux .It offeres catogary wise application list.

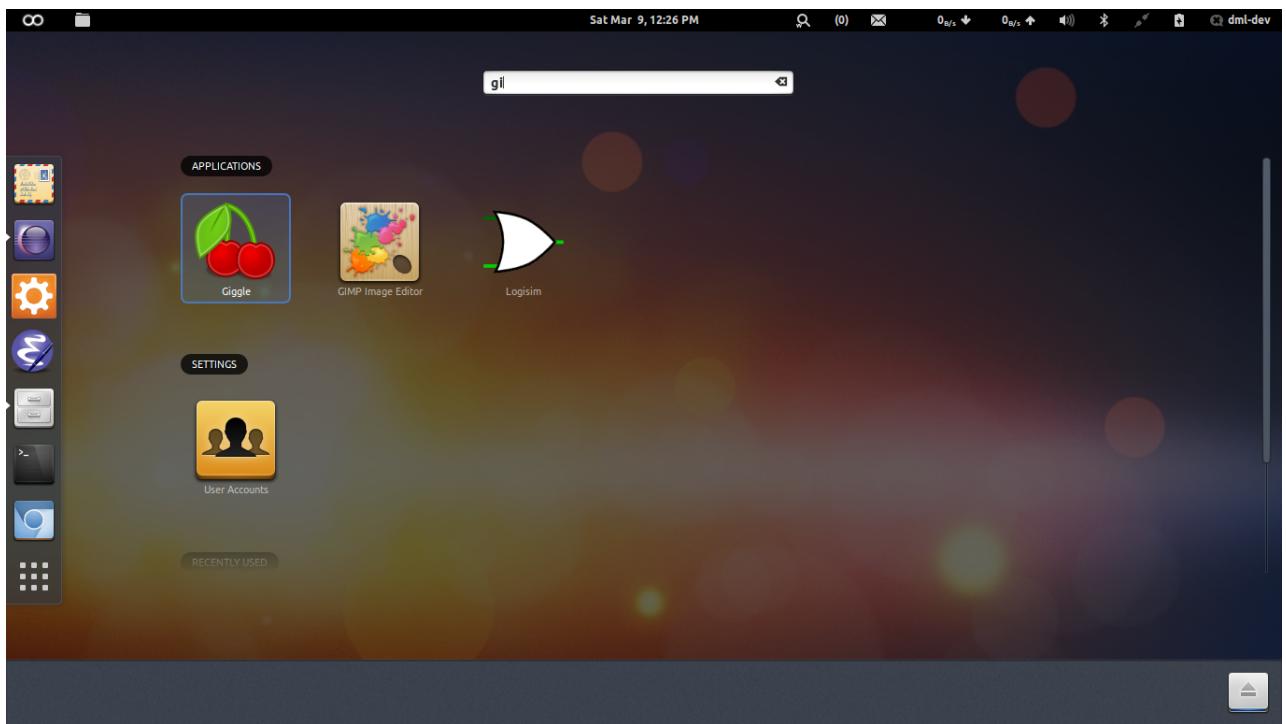


Figure 5.3: Search Dash

Description: By pressing Windows Key, User enters in search dash. Here user can search any application, files, settings etc in installed system.

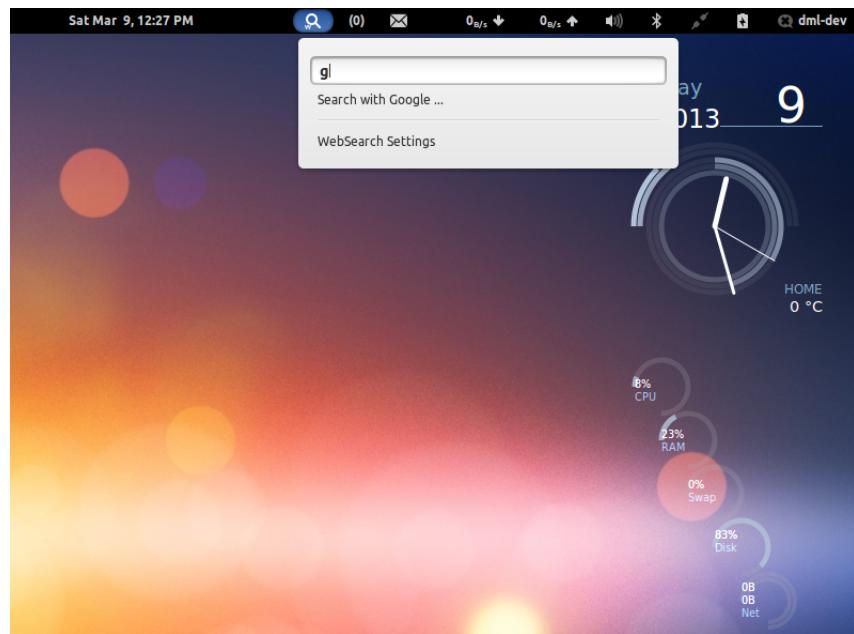


Figure 5.4: Inbuilt Web Search Applet

Description: It is useful applet attached with top panel. User can search on web sites like google and wikipedia directly from here.

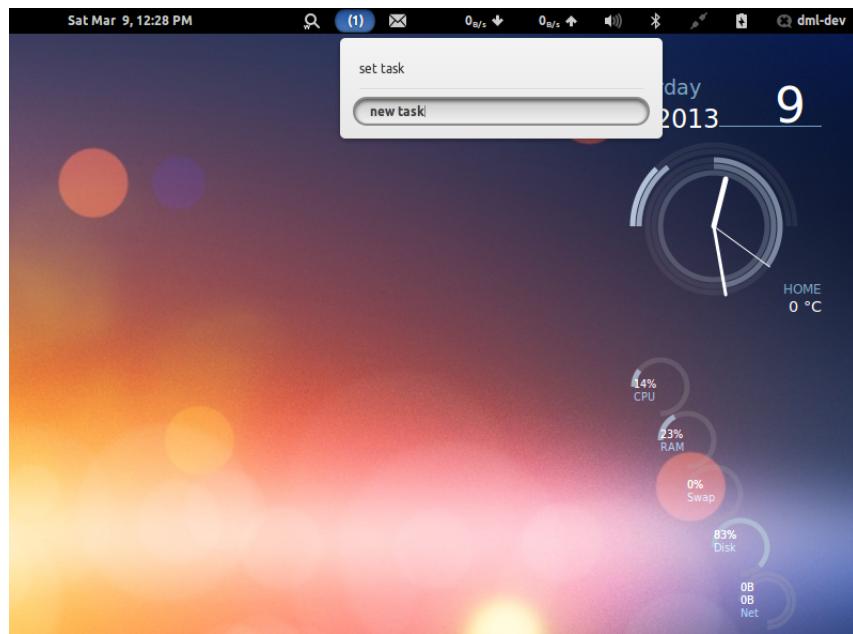


Figure 5.5: Inbuilt To-do task applet

Description: It is useful applet attached with top panel. User can make to-do list of everyday' task and whenever its completed,he/she can delete it by clicking on that task.

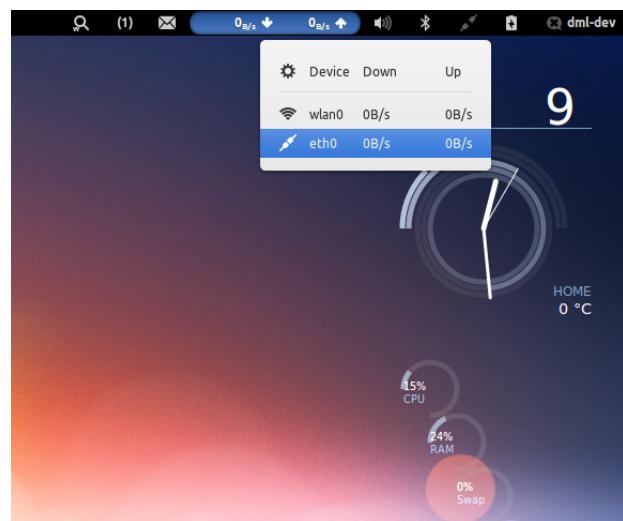


Figure 5.6: Network Meter

Description: It is a live network monitor attached with top panel. User can see the speed of network via this applet.

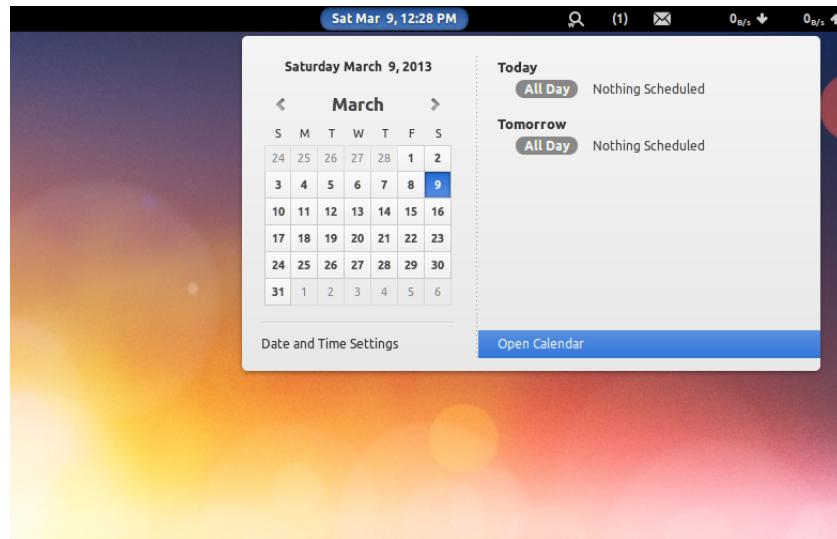


Figure 5.7: Calendar support

Description: Above feature is useful to plan a task or month using calendar on Evolution Mail client. It is handy tool with top panel for plannig big task or any important task.

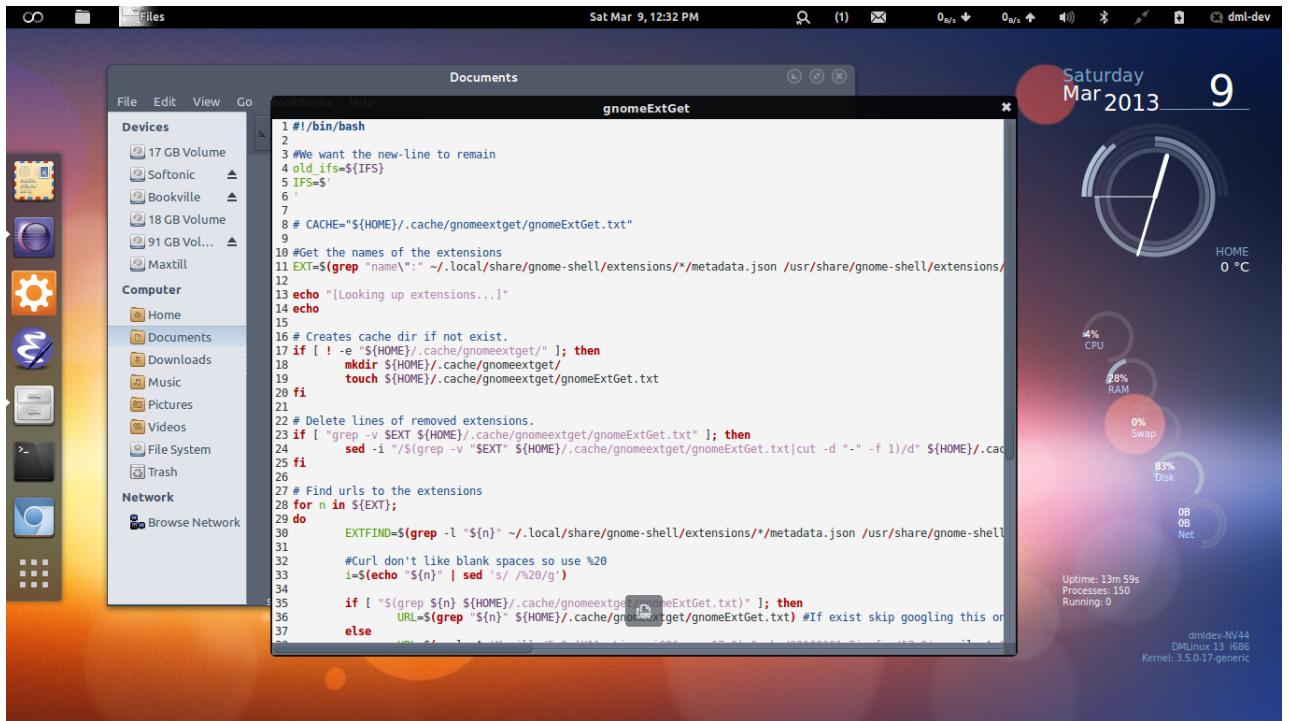


Figure 5.8: Quick Preview support

Description: User can see the preview of txt,folders,pdf,image,music and video files directly by pressing SPACE BAR on the file in file manager.It is useful feature of GNOME Shell 3.6.

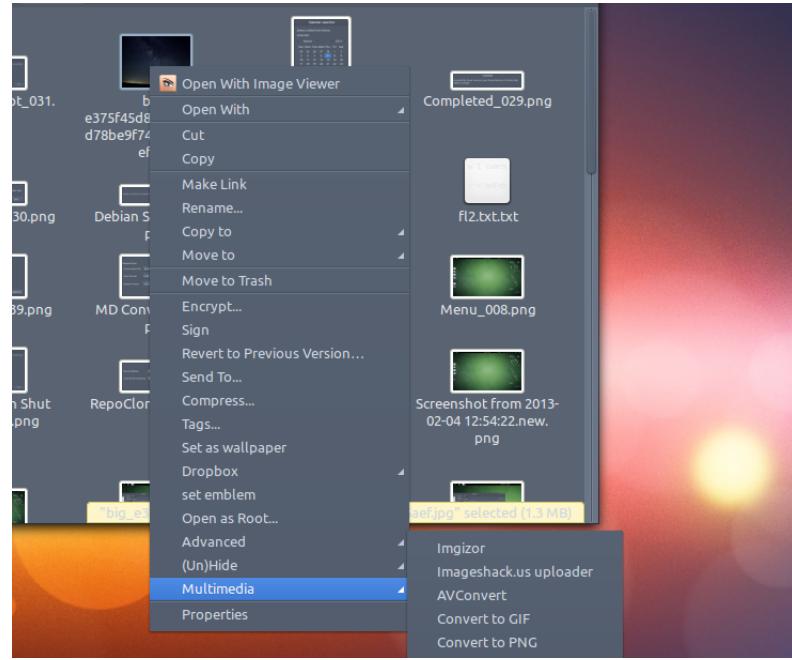


Figure 5.9: Extended right menu

Description : Extended right menu provides lots of feature that can be directly performed on file or folder via clicking right mouse button. It has handful features like image resizing, hide/unhide, checksum, dropbox sharing etc. It is nautilus extra package provided in the system.

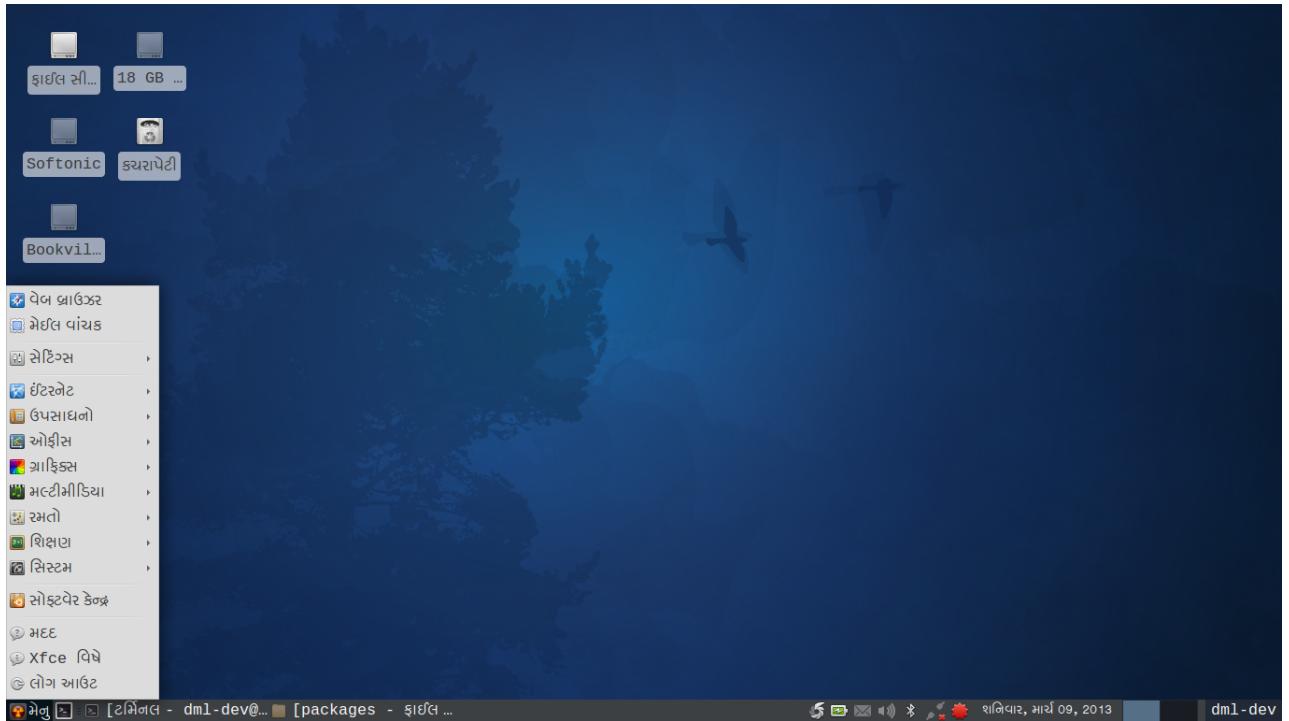


Figure 5.10: OpenGujarat Main Desktop View

Description: This is a screenshot of OpenGujarat OS Main Desktop View. It contains XFCE 4.1 Desktop Environment. It is designed as windows type mock up by us.

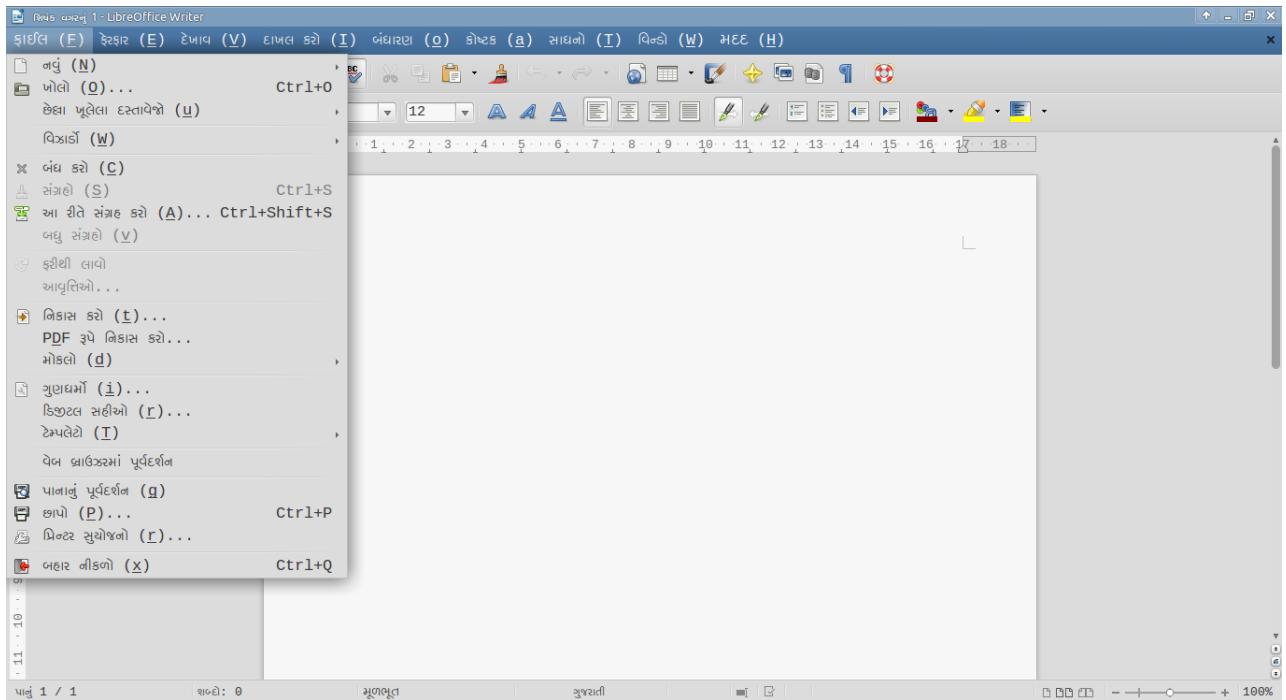


Figure 5.11: LibreOffice suite in Gujarati

Description: Above is screenshot of LibreOffice suite inbuilt in OpenGujarat OS.

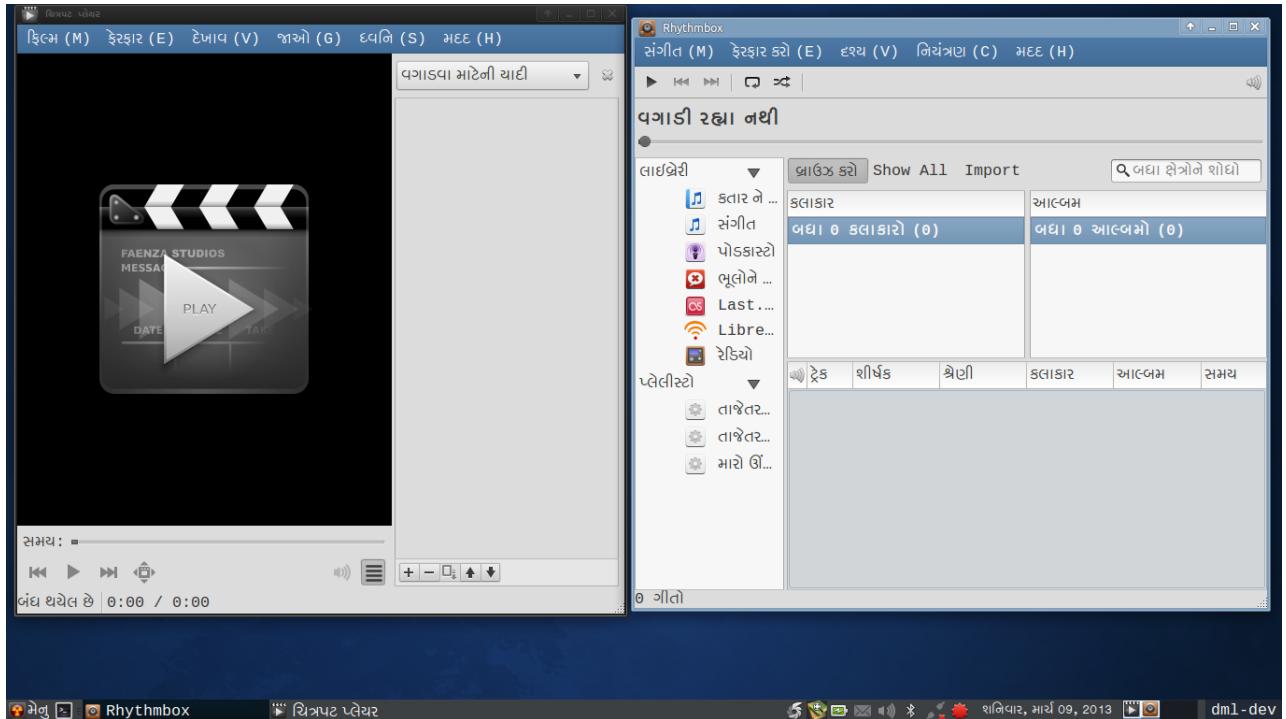


Figure 5.12: Music and Media Player in Gujarati

Description: Above is screenshot of Music and Media player inbuilt in OpenGujarat OS.

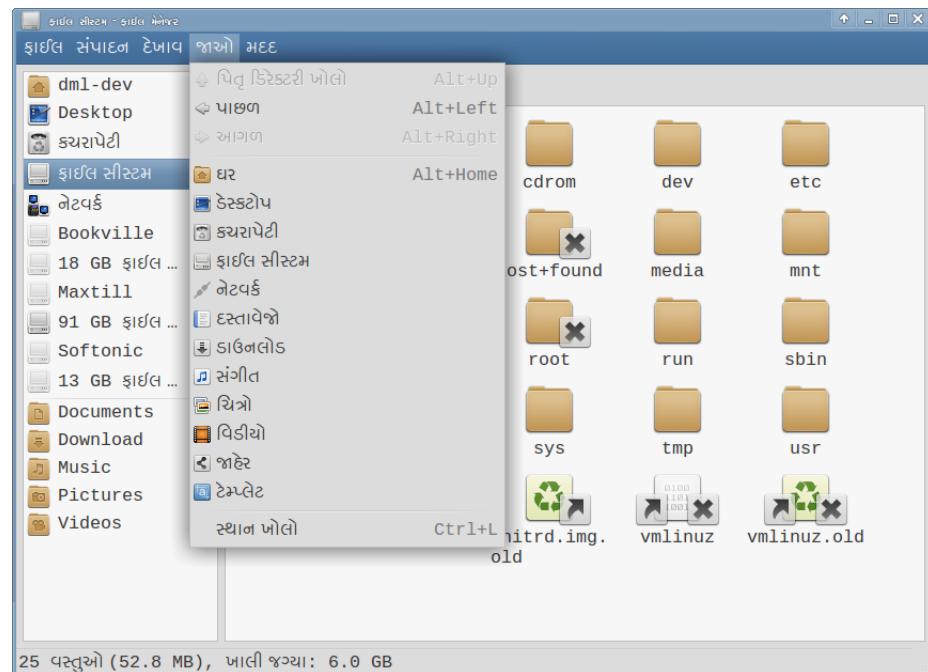


Figure 5.13: Thunar File manager

Description: It is screenshot of thunar file manager translated in gujarati provided in OpenGujarat.

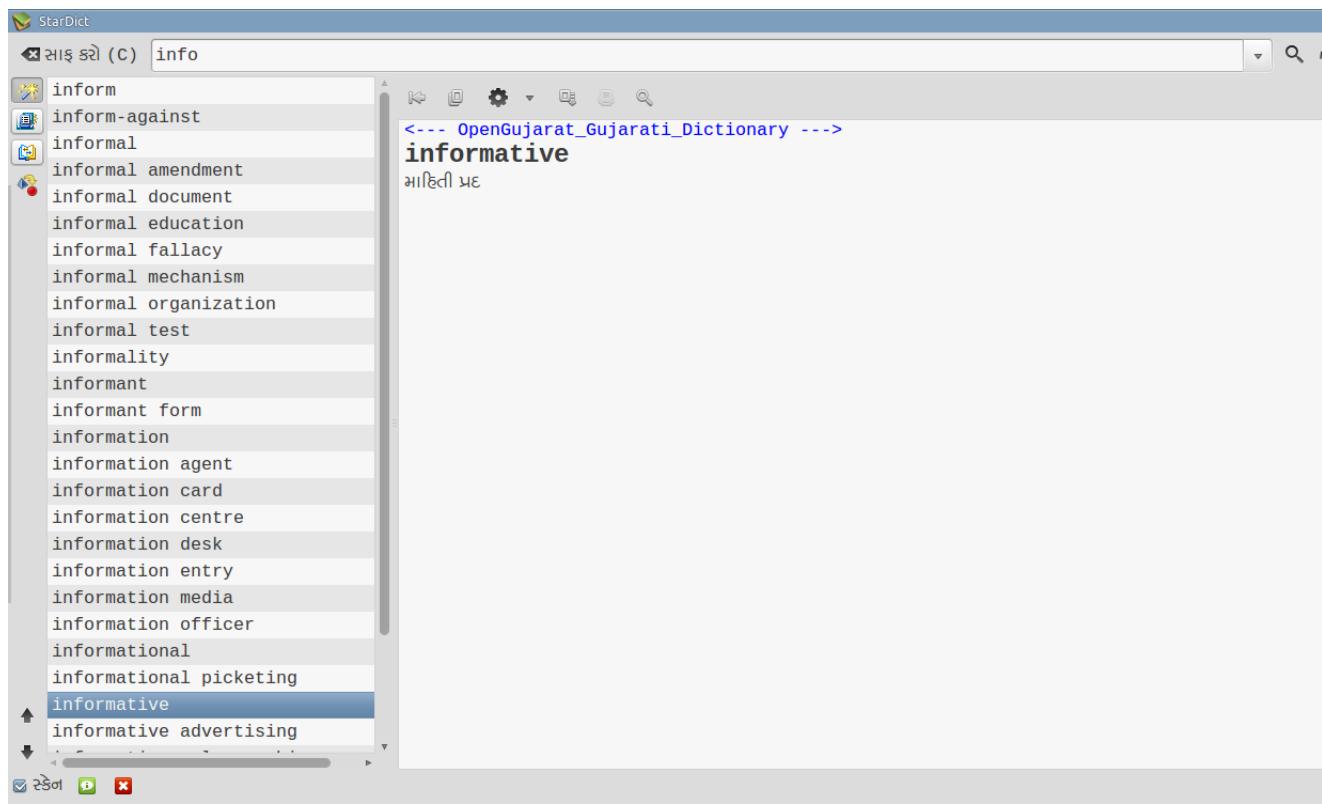


Figure 5.14: Gujarati Dictionary Main View

Description: It is main search bar of Gujarati dictionary with stardict dictionary look up program.

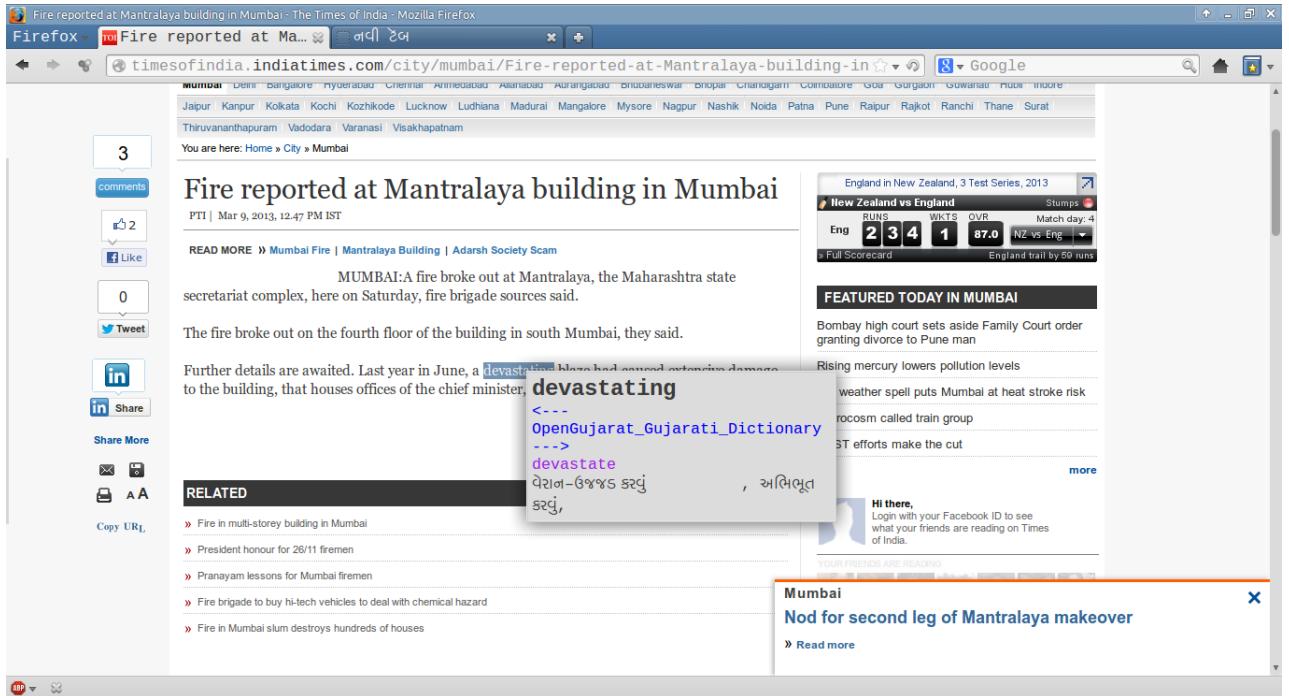


Figure 5.15: Gujarati Dictionary Live search

Description: Here is the output as dialog box clicked on the word to get the meaning of English word in Gujarati dictionary.Result is provided by Stardict application as pop up box.

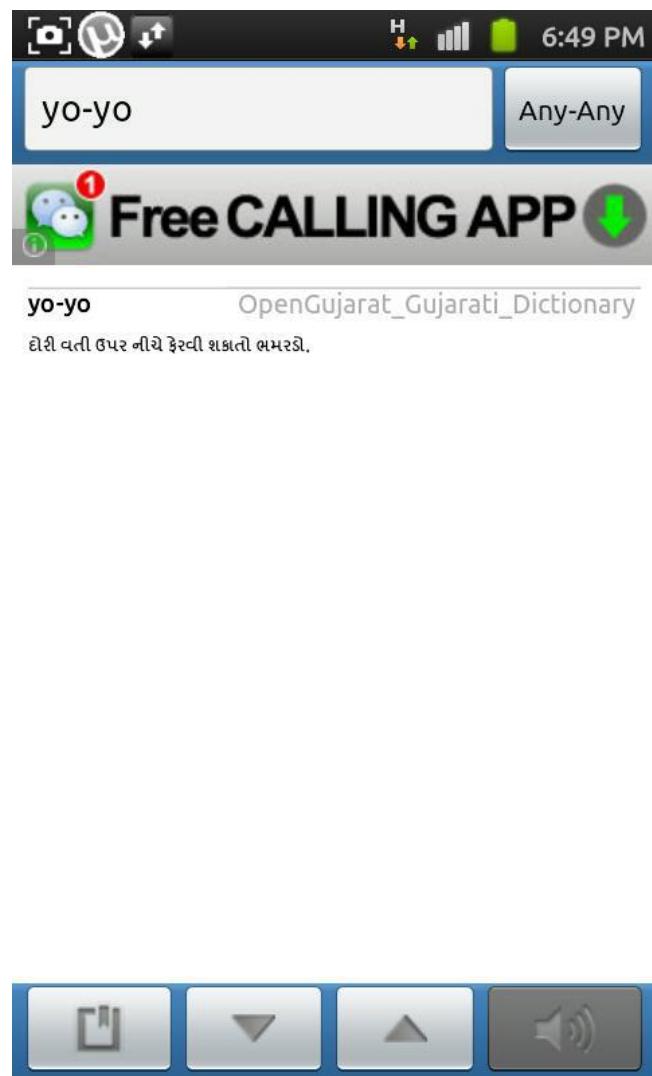


Figure 5.16: Gujarati Dictionary Android View

Description: It is a screenshot of Gujarati dictionary ported to android phone via GoldenDict Dictionary Look up program.



Figure 5.17: Auto ON Utility Start Up screen

Description: Here is the start up screen of auto on utility . Description: User have to select in which mode he/she wants to boot pc after given time.

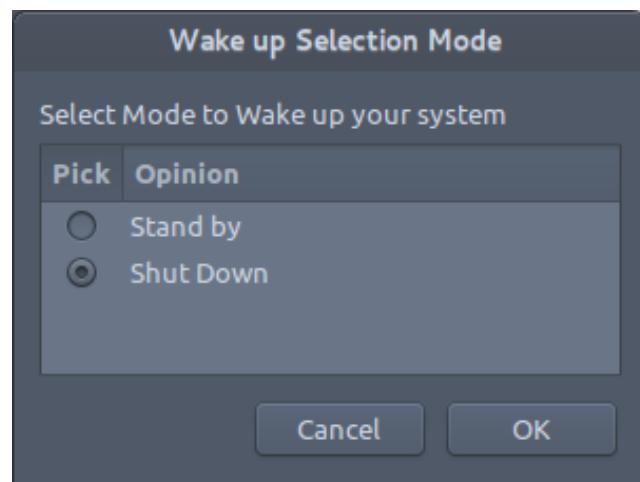


Figure 5.18: Mode selection in Auto ON Utility

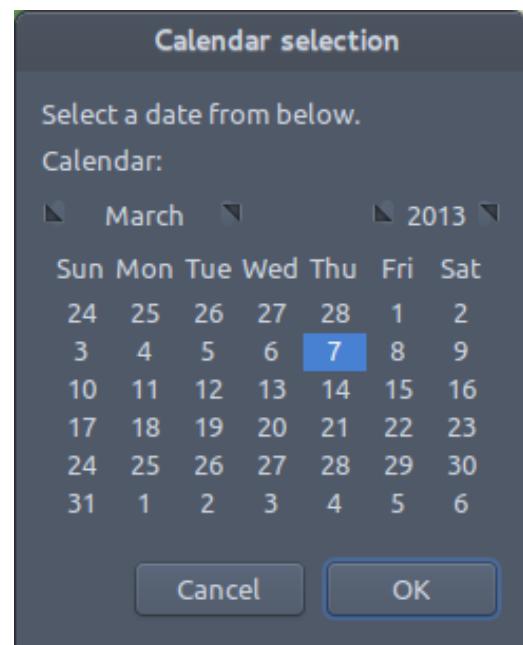


Figure 5.19: Date selection

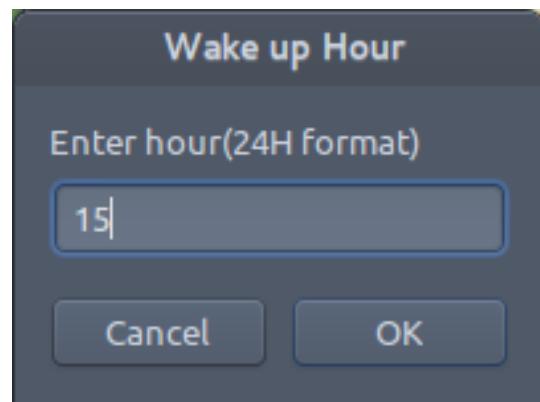


Figure 5.20: Hour Entry Box

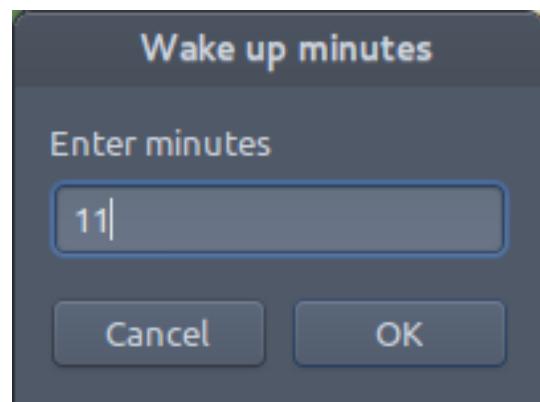


Figure 5.21: Minutes Entry Box

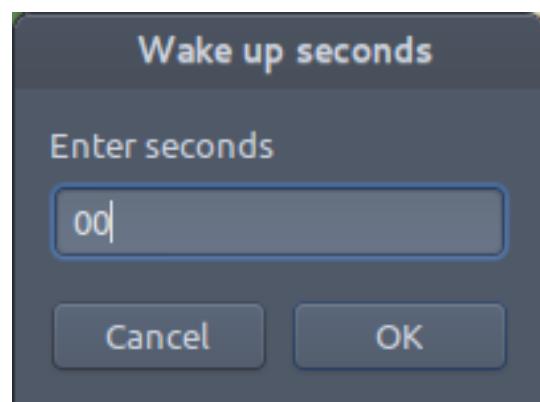


Figure 5.22: Seconds Entry Box

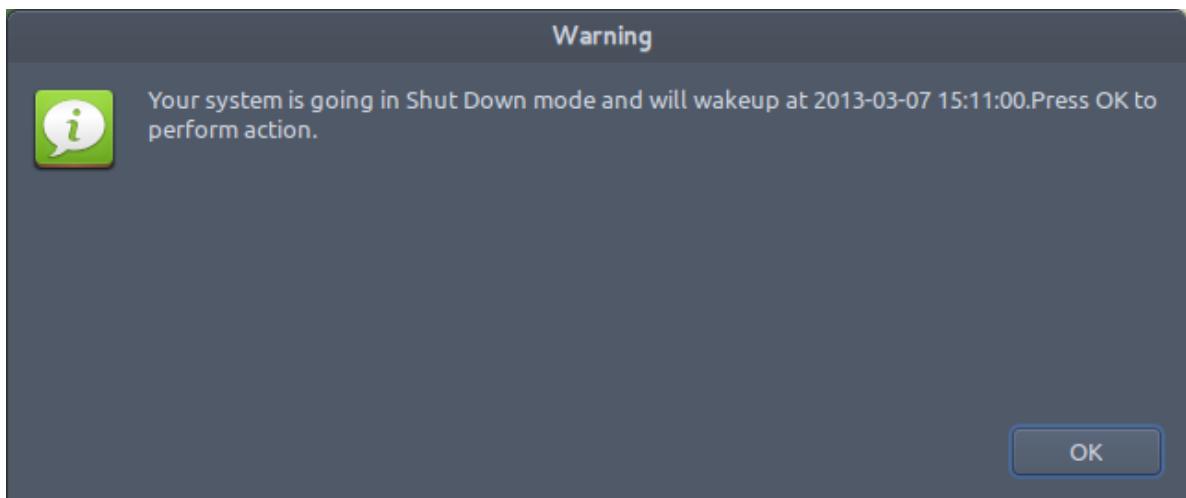


Figure 5.23: Final warning of Auto ON Utility

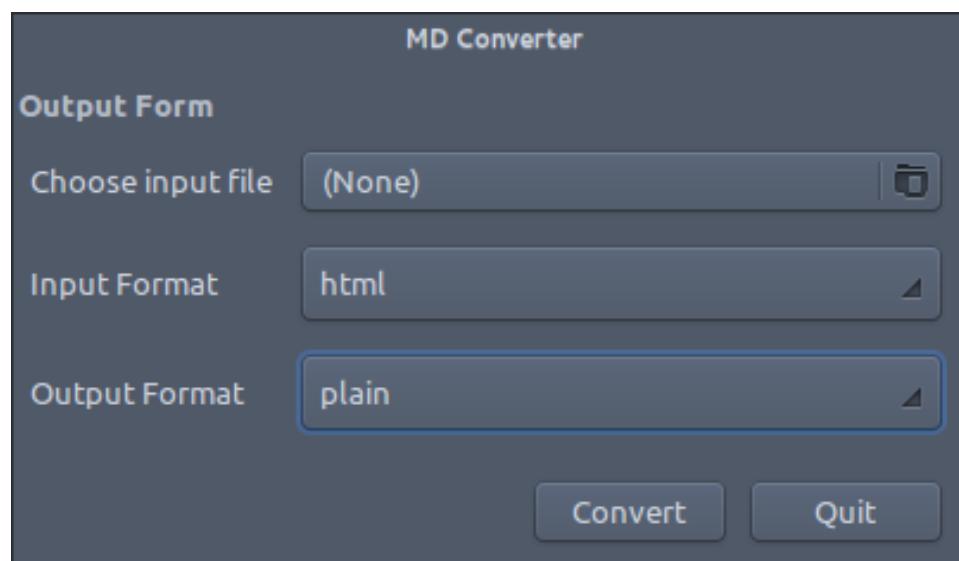


Figure 5.24: Main Screen of MDCoverter

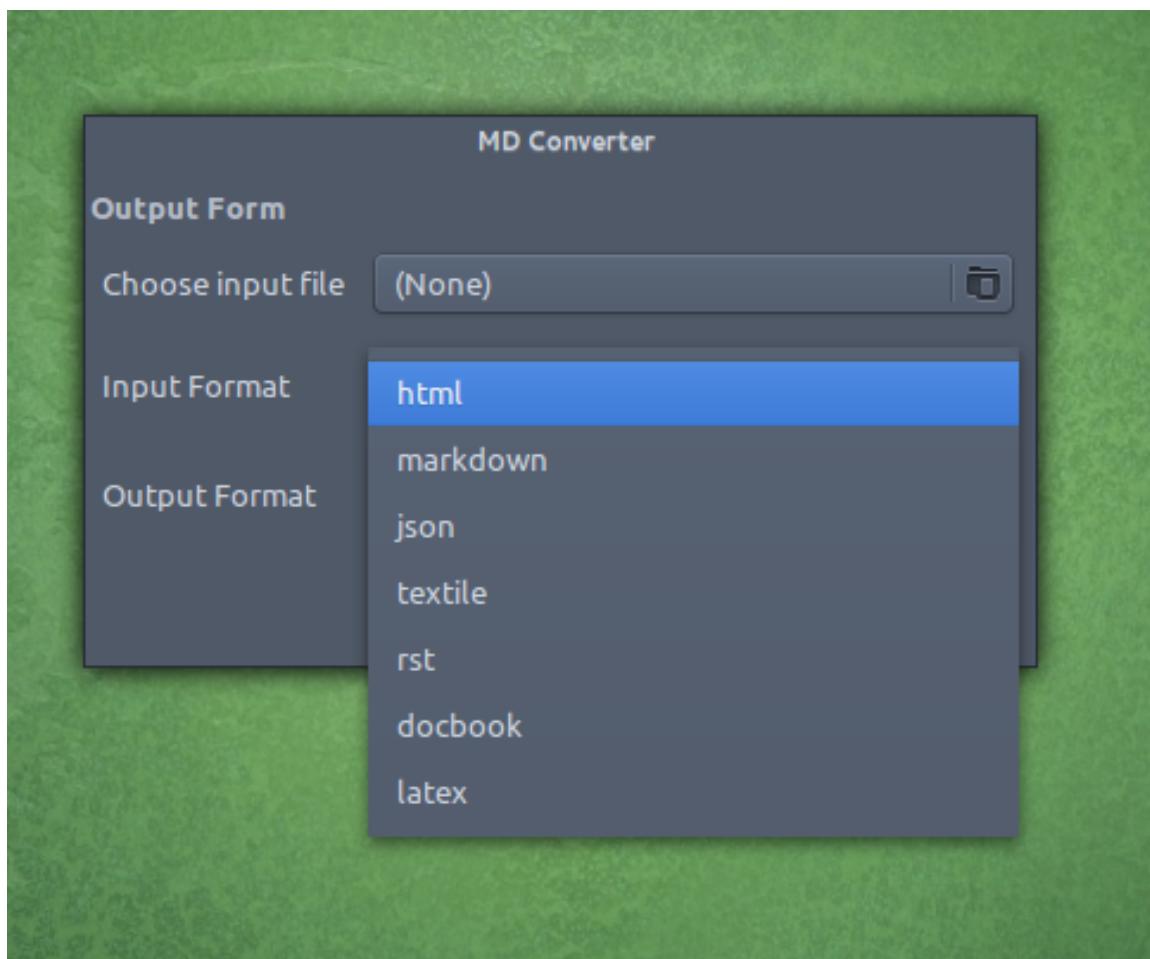


Figure 5.25: MDConverter Input Options

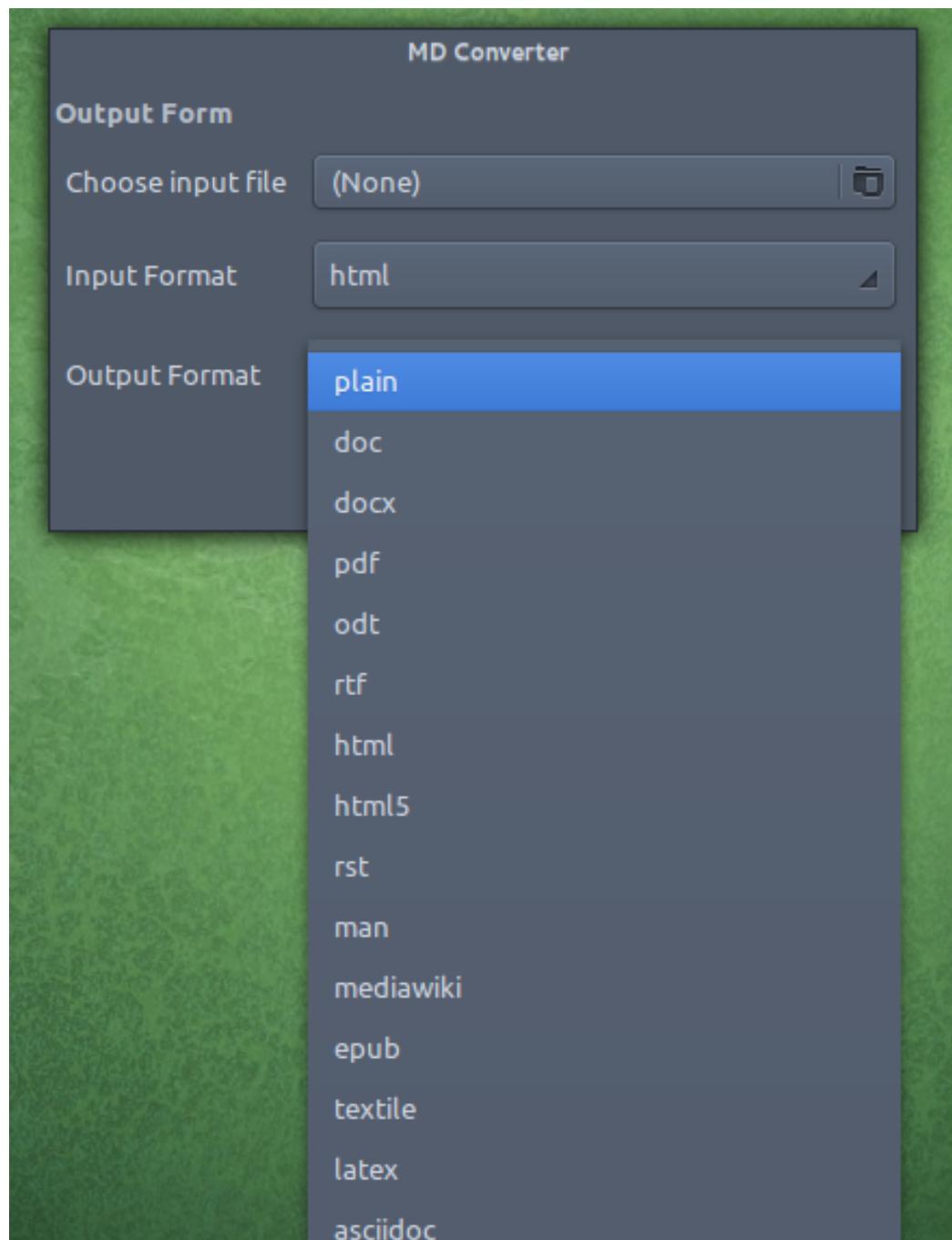


Figure 5.26: MDConverter Output Options

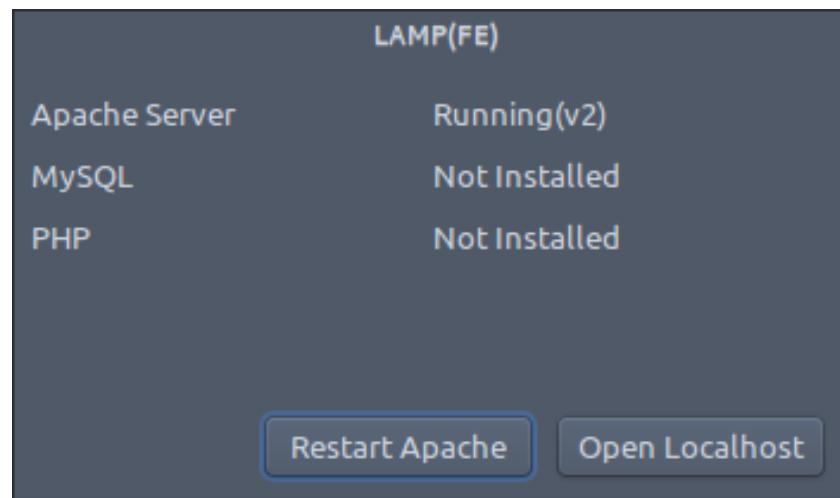


Figure 5.27: LAMP Front end Main Screen

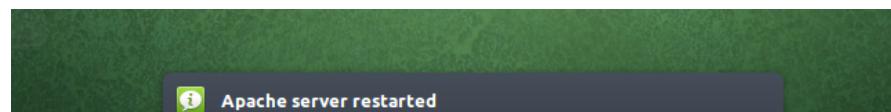


Figure 5.28: LAMP Apache Server Restart Notification

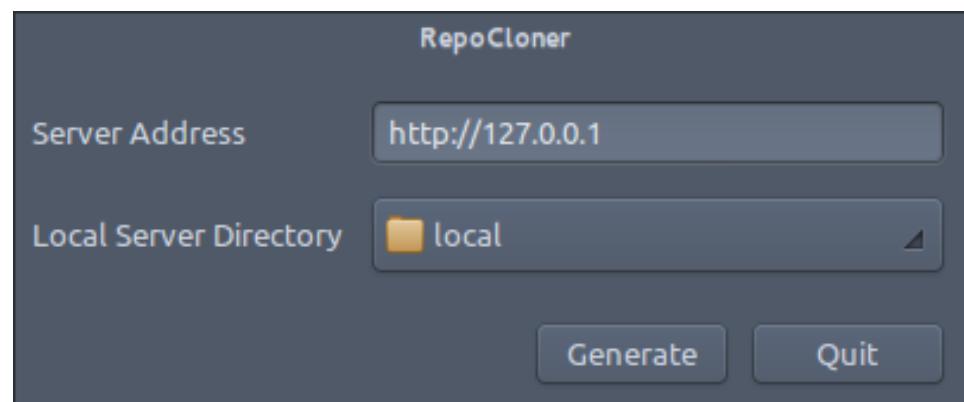


Figure 5.29: Repoclone Front End

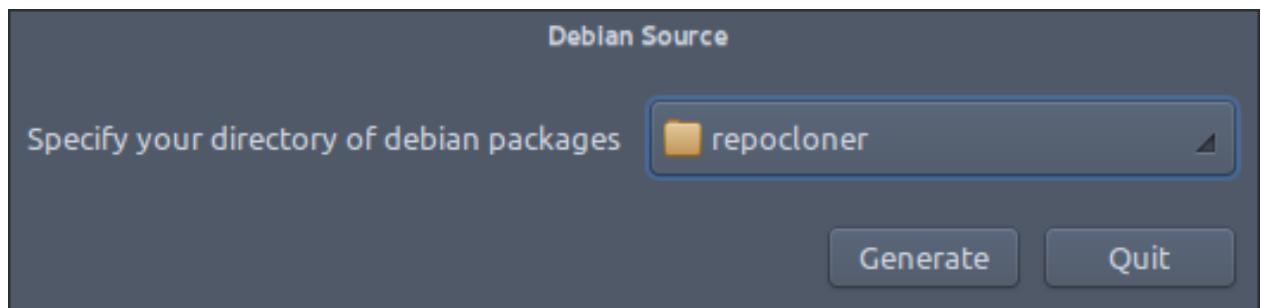


Figure 5.30: Repocloner Debian Source Dialog box

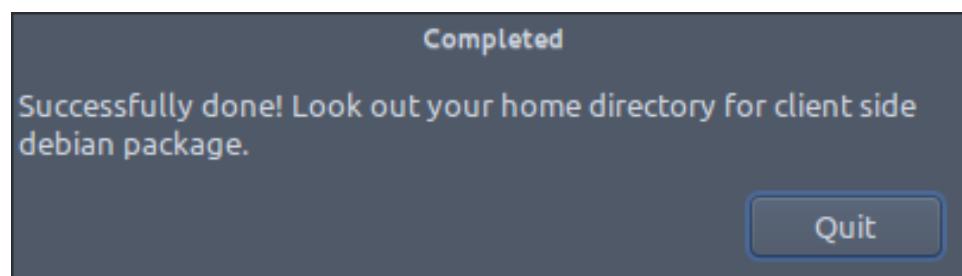


Figure 5.31: Repocloner Final Dialog

Chapter 6

Testing

Sr. No.	Development	Expected Result	Obtained Expected Results (True/False)
1	Build A basic build.	It shoud boot and work properly.	True
2	Advance build with all essential apps included	It should boot and load properly.	True
3	DMLinux final build with custom GUI	It should render properly.	True
4	OpenGujarat build with translated component	It should show proper translation with proper running.	True
5	MDConverter Application	It should convert documents as per given specification	True
6	Auto ON Utility Application	It should boot PC as per given time.	True
7	Gujarati Dicitonary	It should display proper meaning.	True

Sr. No.	Development	Expected Result	Obtained Expected Results (True/False)
8	Debian packages for translations and Gujarati dictionary	It can be installed on other systems	True
9	LAMP front end	It must do task properly as per given instructions	True

Table I: Test Cases

Chapter 7

Future Enhancement

DMLinux and OpenGujarat both are GNU/Linux Operating systems. Each operating system is build with unique purpose because there is no alternative available. For future enhancement, there are lots of chances available for the next years or for the developers also. For future enhancement purpose, We have made a public repository for all our developed applications or operating systems. Following List of links are public repository for our developments.

- DMLinux OS (<https://github.com/codejar-lab/dmlinux>)
- OpenGujarat OS (<https://github.com/codejar-lab/opengujarat>)
- Gujarati Dictionary (<https://github.com/codejar-lab/oguj-dict-pkg>)
- Translation Package(<https://github.com/codejar-lab/oguj-trans-pkg>)
- Website Source Code(<https://github.com/codejar-lab/codejar-lab.github.com>)
- Auto ON Utility (<https://github.com/arpan-chavda/autoon-util>)
- LAMP Front end (<https://github.com/arpan-chavda/lamp-fe-linux>)
- Multidoc Converter (<https://github.com/arpan-chavda/multidocconverter>)
- Repocloner (<https://github.com/arpan-chavda/reposcloner>)

Chapter 8

Appendix

8.1 Technology Used

8.1.1 Ubuntu Minimal

Introduction

Ubuntu Minimal is an precompiled version of linux kernel with some basic utilities provided with least minimal system. It is just have size of 27 MB. Current version information:

- 12.04.1: Long Term Support
- 12.10: Normal Release

We have taken 12.04.1 version as base of OpenGujarat and 12.10 version for DMLinux.

Free and Open Source

Ubuntu is well known free and open source gnu/linux operating system. Our both operating systems will be free and open source.

Open Development

By making public repository of our both operating system, We are inviting other developers to enhance or fork our operating systems. It is an open development for the people, by the people.

8.2 Tools Used

8.2.1 Build essential package

Build essential package contains following dependencies.

- dpkg-dev ($\geq 1.13.5$)
package building tools for Debian
- g++ ($\geq 4:4.1.1$)
The GNU C++ compiler
- gcc ($\geq 4:4.1.1$)
The GNU C compiler
- libc6-dev
GNU C Library: Development Libraries and Header Files
or libc-dev virtual package provided by libc6-dev
- make
The GNU version of the "make" utility.

8.2.2 chroot environment

This is the system that will eventually run from the disk. It does not need a kernel, nor a boot-loader unless you are planning on installing it back onto a hard disk (using Ubiquity). The Casper package needs to be installed into the chroot. Casper is what

allows the Live System to perform hardware autoconfiguration and run from a live environment. Installing the Casper package will update the kernels initrd to perform these tasks. The kernel that is installed into the chroot will be copied out from the chroot and put into the disk image.

8.2.3 UCK

UCK stands for Ubuntu customization toolkit. It is a toolkit to customize any ubuntu based distribution.

Zenity and YAD framework

Zenity is GUI framework which uses Glib for backend to create GUI with shell scripts and YAD is fork of zenity and YAD(YAD stands for Yet Another Dialog)provides more features then Zenity.

- Zenity Version : 3.6.0
- YAD Version : 0.19.1

Chapter 9

Summary and Conclusion

9.1 Summary

Summary of activities carried out during major project training at BISAG can be listed as below:

- Initial Learning about the technologies and the tools.
- Requirement Analysis of the project.
- Project Design including GUI related design.
- Project Development (Coding).
- Testing of the project.
- Quality Related Work
- Final Documentation.

9.2 Conclusion

In both distribution various functionalities are implemented. It includes various components that will help users to everyday's task in easy wasy. Other utilities develop-

ment has been developed to enhance user's facilities in the distribution. As we have developed many things, there are many chances to upgrade those things in future by other developers.

Bibliography

- [1] Ubuntu Minimal Disk(<https://help.ubuntu.com/community/Installation/MinimalCD>)
- [2] Ubuntu Live CD Customization(<https://help.ubuntu.com/community/LiveCDCCustomization>)
- [3] Github Version Control System (<https://github.com>)
- [4] XFCE Desktop Environment(<http://xfce.org>)
- [5] GNOME Shell Desktop Environment(<https://live.gnome.org/GnomeShell>)
- [6] GNU Gettext utility (<http://www.gnu.org/software/gettext/manual/gettext.html>)
- [7] Gettext Commands(<http://linux.die.net/man/3/gettext>)