AssetPro-Fixed Assets Management System

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Abstract

Value of organization's fixed assets represents fairly a considerable proportion of its total value. Misstatements, incorrect presentations and misappropriation of fixed assets would lead to collapses, dilution of company's good will and its presence in the market. Applications, tools and techniques used by most of the companies are outdated and will not able to sustain given the complexities of business environment. Hence its utmost important for companies to have better controls of its fixed assets portfolio using newest technologies.

This application aims to provide solutions to such issues using latest technologies and by re-engineering processes, practices relevant to Fixed Assets maintenance & reporting.

Quick Response (QR) code for each Asset is generated at the time of capitalization. Quick Response QR) code is then used as the Asset Number/ Asset tag of such assets thereafter. Certain important details of Assets can be viewed scanning the QR code via smart phone. Since it is mandatory to have Asset Owner for each asset, physical verification of assets is performed allowing such Asset Owners to confirm the existence or non-existence of Assets. Automated emails are sent to asset owners along with Asset details for confirmations. Responses from Asset Owners for such emails are recorded in the database. Since assets are categorized based on a Data dictionary, decision making with regard to Assets is made easy. Categorical view of the Assets provides summarized view of Assets.

This application been built using PHP in CodeIgnitor framework. Java Script, AJAX, Bootstrap together with My SQL been used to develop this application.

Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute. To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of Mr. D K A P Priyadarshana under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

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Supervisor Name   : Prof. K P Hewagamage

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Signature   Date

Table of Contents

Chapter 1. Introduction

The world is slowly moving into the digital era. By and large most societies expect and welcome radical changes in the way things happened in past. The words "Disruption" and "Disruptive Technologies" are being used everywhere. Communities have started to rethink and looking for newest technologies and ideas to bring in efficiency and effectiveness which ultimately save their time and cost.

The businesses have become highly volatile and complex in today's world. Customer demands too very high and sometimes Customer wants customized solutions. Most of the service industries facing risk of Customers being approached by Competitors and trying to avoid such risks.

As the Customer demands are high, companies have to operate in different locations/different regions either temporary or permanently. To set up branches in different locations companies invest considerable amount in Fixed Assets and has become a problem in tracking them.

Also these Assets whether movable or immovable are highly susceptible for misuse and misstatements. Hence there has to be a proper mechanism to track Assets and report them accordingly to take proactive management decisions at the right time.

Fixed Assets represents fair amount of company's balance sheet and hence decisions towards acquisition and disposal of Fixed Assets involve higher risk. Hence it is really important to have some form of business details like Total number of Assets, Value of Total Assets, and Categorical value of Assets (Total value of Laptops, Chairs, Scanners, Air Conditioners etc.) available to Decision makers.

1.1   Motivation

Most Organizations don't look for dedicated and extensive Asset management application but rather use Asset Management module in built to its Enterprise Resource Planning system (ERP).   Due to above reason Asset Management applications are not widely available as the demands from corporates are very low. On the other hand existing Applications meet some of the client requirements but have not been able to meet 100% Customer satisfaction.

The proposed application would look into main requirements of Asset Management solution and aim to facilitate such requirements to the client.

1.2 Objectives and Scope

This system would facilitate management with correct high level information for Fixed Assets related decision making. Taking decision in absence of relevant information is at high risk and high probability for business failures.

1.2.1 Decision making made easy

Categorical view of Assets would provide enhanced view of the total assets of the company. This will support decision makers to identify in which Asset categories they have invested heavily. If it is contradictory to the company's overall direction for capitalization spending, then decision makers could easily identify such variances and make decisions to achieve company's objective. Proposed Application would maintain Data Dictionary for Assets so that it can be applied consistently which would ultimately work as guidance in Asset Capitalization and Asset update.

Also when new assets are purchased, decision makers could review existing value of such assets and plan for divestment of such assets if it is not really fir for the organization. Such details will be readily available in the proposed system.

Further decision makers will have the ability to review and analyze past records and support historical information in making decisions.

1.2.2 Asset Tracking made easy

Since system would capable of attaching a picture or few more pictures of each asset, Users would be able to identify assets at a later stage without any concern.

Also tracking those using Quick Response (QR) code would provide better control environment which cannot be easily breakable. Quick Response code is generated at the time for Asset capitalization for the particular URL of the Asset. It is then pasted on the Asset. Users would be able to retrieve Asset Description, Asset Category, Asset Type, Sub-Type, Capitalized Date and Capitalized Value by scanning QR code via a smart phone. Also it is widely available, easy to implement at no cost.

1.2.3 Effective and Efficient mechanism for physical Asset Verification

Provision of certain details like valid e-mail address of Asset Owner is mandatory to capitalize an Asset. Application would be capable of pushing e-mails with relevant Asset details where Asset owner has to respond to the mail confirming existence or non-existence of such Asset. Such responses will be captured in the database separately and would confirm Users about physical existence

Expenditure towards carrying out annual physical verification of Assets can be zeroed out or reduce to a greater extent since physical verification is automated.

Proposed Application would maintain Data Dictionary for Assets so that it can be applied consistently which would ultimately work as guidance in Asset Capitalization and Asset update.

Maintenance of Audit trail and Transfer of Asset tracking will not be in scope of this project.

Below is the content of this document and brief introduction of each chapter.

Chapter 2: Background

Requirement gathering, review and evaluation of other systems are included.

Chapter 3: Methodology

The design and structure of the system. Class diagram, ER diagram and database table structure is explained.

Chapter 4: Evaluation

Evaluation of project objectives and to which extent they were achieved. Lesson learnt and how to use missed opportunities in future.

Chapter 5: Conclusion

Summary of work done and results of the project. Any improvements planned in future are included.

Chapter 2. Background

2.1 Analysis of requirements

Requirements of the system mostly gathered by observations and having one on one discussions with Users.

2.1.1 Benefit Vs Cost Analysis of Physical Asset Verification

One of the main requirements of Users is to have a proper physical verification of Fixed Asset tool since existing methodology doesn't assign ownership and responsibility. Also time taken to complete Physical verification is not acceptable as it would sometimes take more than 4 months to issue final report to stakeholders for due consideration and action.

It also takes another couple of weeks to analyze and update same in existing Fixed Assets module as Physical verification is carried out by independent Audit team in most instances.

The other requirement is to have some kind of identity of the fixed asset where even a new User can identify assets exactly at any point of time. This is causing lot of delays in Asset verifications, tracking, reconciling and even at the disposal of assets since there is no proper mechanism in place.

2.1.2 Poor Information for decision making

The entity has high number of individual Assets which are listed in Fixed Asset register. The information required for decision making with regard to Assets are very limited. As an example, there are more than 250 chairs included in Fixed Asset Register but no proper way to identify them as "Chairs". The only way is to look at the Asset Description. However there is no standard practice in naming Assets. Hence it is not practical for Users to identify and separate list of Chairs, list of Laptops, List of Air Conditioners etc., within a limited time. Only way is to go through the entire listing one by one and then select them individually.

The amount of time spent on these activities is considerable. If these can be readily available then Users could invest their time in a very effective manner.

2.2   Analysis of the System

Use of newest technologies like Near Field Communication (NFC), Quick Response Code (QR) and iBeacon trending upwards. But use of such technologies in Fixed Asset Management or in accounting domain is a rare occurrence.

Since these technologies can store data and display via smartphones is one of the reasons to become popular in business community. Availability and cost per unit are also key advantages.

Use of such technology would provide advantages to Users in a couple of ways;

-   Ease of access to data
-   Accuracy and Reliability of Data

Most of the Assets are not replaced regularly. Some assets can be used for more than 20-25 years. Existing employees may have not even seen most of the assets which capitalized 5-10 yrs. ago and may face difficulties in identifying and verifying them. Sometimes it is not practical finance staff to verify all these assets.

Hence newly introduced features like automated assets verification, attaching a picture of the assets would provide lot of benefits to Users of the system.

The next important requirement is to have a Data Dictionary which provides categorical view of Assets available. This will help management in making asset related decisions proactively.

Use Case diagram in Annexure (2.1 Use Case Diagram) depicts the functions of Asset Management System.

2.3 Review of similar systems.

Fixed Assets Management Systems alone are not widely available. Most Financial systems embed Fixed Asset Management module. So relevant accounting entries can be passed to the main ledger through the system itself. It is cost effective and sometimes achieves the purpose of the Users as well.

2.2.1 SAP FI [1]

SAP is the most widely used financial application. Some companies use it as their main ERP since SAP facilitates most of the functions like Invoicing, Inventory Management, Payments, Accounts Receivable, and Bank Reconciliation etc.

SAP has a separate module for Fixed Asset accounting.

Asset Capitalization, Asset retirement, update of Asset details, Asset related reports are facilitated.

Picture 2.1 Asset Capitalization

Picture 2.2 Display Asset Master Data

Picture 2.3 Asset Reporting

SAP Fixed Asset Module is a good platform for Asset accounting and it provides all details of Assets. Various Reports can also be extracted. It facilitates to record various details of Assets.

Proposed system would facilitate all relevant details and use SAP Fixed Asset module as a benchmark to refer Asset details.

However SAP doesn't facilitate innovative features like attaching a picture, Categorical view of Assets, and automated physical verification of Assets etc.

2.2.2 Asset Cloud by Wasp and Asset Tracking by redbeam [2]

Both these applications are quite similar and fulfill User requirements of Asset Tracking System. Few interesting features are as follows

- RFID based asset tracking system

- RFID based automated Fixed Assets verification

- Asset Maintenance Tracking

Passive RFID tags are used which require no internal power supply. In RFID based asset tracking, Application adds all asset data to the mobile scanner with one click on the sync button. As Users go from one location to another location, the RFID reader interrogates the tag on each asset. Update any information including location, serial #, asset custodian, status, purchasing info or IT related fields. Print detailed reports of your RFID asset tracking activities. Report on found and missing assets, asset history, asset value and depreciation, warranty and lease expiration and more.

Method of Asset tracking is quite different from the proposed system where proposed system pushes an email to all custodians with all necessary details of Assets where Custodian has to check & confirm existence of Assets.

2.4 A comparison of alternative design strategies

User Interface of the Proposed System would be developed mainly using plain HTML. Bootstrap would also be used in several User Interface designs. Bootstrap is the most popular CSS framework for developing and responsive mobile first websites. Since this is a web based application, User interface would be friendlier and designed in such a way to become popular within the stakeholders.

There are many advanced templates available which can be used for proposed application by making considerable changes. Since such templates are developed by expertise, we will have an opportunity to learn latest tools, technologies, methods, standard industry practices and gain new ideas.

Hence proposed system would also include such designs, tools and methods appropriately.

PHP would be used as the server side scripting language whereas Java Script would be used in client side. Application will be developed using CodeIgnitor (Model-Controller-View) framework. CodeIgnitor contains libraries, simple interface, email templates and logical structure to access these libraries, plug-ins, helpers and some other resources which solve the complex functions of PHP more easily maintaining a high performance.

Chapter 3. Problem Analysis & Design

3.1 Problem Analysis

The goal of problem analysis is to gain a better understanding of the problem being solved before development begins. Requirement gathering would provide a detailed analysis of what we are going to achieve by this Application.

Traditional Techniques used to gather requirements from Users of existing Applications;

> ➢ Meetings with Users/Stakeholders
> ➢ Observations

After evaluating the requirements as stated in chapter 2, below steps been followed to achieve problem definition goal.

1. Gain agreement on the problem definition.
2. Understand the root causes the problem behind the problem.
3. Identify the stakeholders and the users.
4. Define the solution system boundary.
5. Identify the constraints to be imposed on the solution.

The main concerns that Users have are;

1. Tracking and Identification of Assets
2. Physical Verification Of Assets and
3. Categorical view of the Assets for Decision Makers

Problem Statements, Fishbone Diagrams, Users and Stakeholder identification, Relationship between Input and Output been used to prioritize requirements and to analyze the problem

3.1.1 Problem Statement

Element	Description
The problem of Physical verification	Impractibility of Physical verification of each & every Asset by separate team of Members
Affects	Fixed Asset Owners, Administrator
And results in	Misstatements in Fixed Assets Register which impacts Financial Statements and ultimately shareholders
Benefits of a solution	Automated FA verification would increase efficiency and effectiveness and provide smoother functioning of FA verification

3.1.2 Fishbone Diagram of root causes
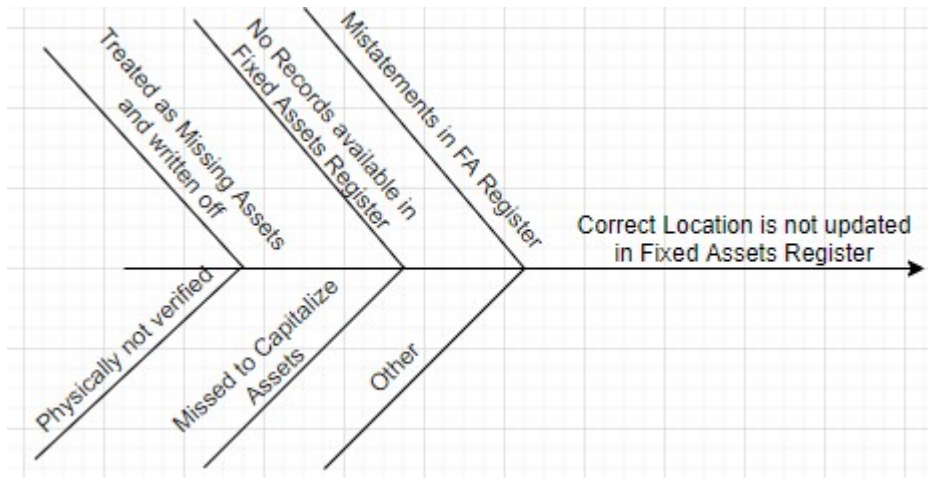
3.1.3 The inputs/system/outputs relationship
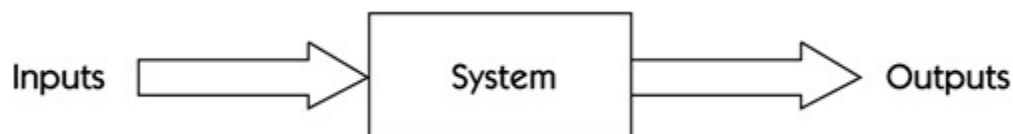
System Software Specification Requirement is then arrived after finalizing Business Requirement Specifications (Requirement Gathering).

The software requirements specification mainly broken down to 2 parts. i.e. Functional and non-functional requirements.

Use Case shown in Annexure 2.1 is used to describe Users and their functions.

3.1.1. Users and their Functions

Mainly there are only 3 Users.

1. Administrator
2. Fixed Asset Custodians
3. Department Fixed Asset Owners

User Functions

1. Administrator

- ➢ Creation of User Login
- ➢ **Retrieval of Asset details by Scanning Quick Response Codes**

- ➢ **Perform automated FA Verification-Generating E-Mail to Fixed Asset Custodians**
- ➢ **Categorical view of the Assets purchased and disposed**

2. Fixed Asset Custodians

  2.1   Asset Capitalization Process

- ➢ Login to the System
- ➢ Enter Asset details such as Asset Description, Serial No, Purchased Value, Purchased Date, E mail address of Department Fixed Asset Owners etc.
- ➢ Selecting Asset Class, Asset Type, Asset Sub type using drop down menu
- ➢ Creation of Asset Type and Sub-Type if such items are not available currently
- ➢ Asset "Capitalize "or "Cancel".
- ➢ Once Capitalize Asset details should be added to FA register and can be seen in "live Search".

2.2 Asset details Update/View Process

- Login to the System
- Live search of the asset using any detail.
- .
- Perform "Edit "and "Update".
- Once "Edit" button is clicked details can be updated
- Changes should be updated in FA Register

2.2 Asset Disposal

- Login to the System
- Live search of the asset using any detail.
- Button to "Dispose ".
- Once Capitalize Asset details should be deleted from FA register

2.4 Asset Reporting by Administrator and Asset Custodians

- Login to the System
- Total FA Reporting with Depreciation
- Asset Additions Reporting
- Asset Update Reporting
- Asset Disposal Reporting
- FA verification Report (Asset Verified/Asset Not verified)

3 Department Fixed Asset Owners

- **Receive email for FA verification generated by Fixed Asset Custodian**
- **Confirmation whether the Asset is "Physically verified" or "Not verified" on the mail itself. There will be 2 action buttons embedded to the mail.**
- If it is verified it should update in the report & notify to Fixed Asset Custodians
- If the Asset is not verified & then it should notify to Fixed Asset Custodian. Database should be updated
- **Should be able to view Asset details scanning QR code**

3.1.2. Use Case Descriptions

3.1.2.1 User Registration Screen

Purpose   : User Login Screen. Since this is internal system User registration is done by Admin itself initial PW is shared. User to change Password subsequently.

Inputs   : Users are to input their details using Keyboard.

Processing   : Input data will be check against common rules and accept as necessary. Common mechanism in place to check the validity of User Name & Password

Outputs   : Data entered will be stored in a separate database

3.1.2.2 Fixed Assets Addition

Purpose   : Separate module to capitalize Fixed Assets.

Inputs   : Fixed Assets Custodian scan capitalize Assets providing all relevant information

Processing   : All such assets must be added to Database as well as Fixed Assets register with all relevant details. Asset number should be auto generated and set as the primary key of the database.

Outputs   : Data will be stored.

3.1.2.3 Fixed Assets Disposal/Mutation/Retirement/Update

Purpose   : Separate module to perform above activities.

Inputs   : Fixed Asset Custodians can trace assets using Fixed Asset Number or any other detail and perform relevant tasks

Processing   : Whatever deletions/updates should be update in DB as well as Fixed Asset Register

Outputs   : Data will be stored.

3.1.2.4 Perform FA verification

Purpose   : To perform FA Verification

Inputs   : Fixed Asset Custodians to generate email to Departmental Asset Owners

Processing   : Departmental Asset Owners to verify Asset

Outputs   : Fixed Asset Custodians to receive feedback from Departmental Asset Owners.

3.1.2.5 Reporting

Purpose   : To capture several Reports

Inputs   : Reports to be predetermined. Details as in the User Activities

Processing   : Report from the DB

Outputs   : Relevant Reports

3.2   Functional Requirements

3.2.1 Retrieval of Asset details

Quick Response (QR) code is generated at the time of asset capitalization. Users can retrieve all critical information about asset scanning QR code using a smart phone.

3.2.2 Data Dictionary and Categorical view of Assets

Each Asset is categorized into Asset Class, Asset Type and Asset Sub-Type. This would provide categorical view of Assets to Users and decision making with regard to company assets can be taken quite easily.

3.2.3 Tracking & Identification of Assets

A picture or pictures of Asset is uploaded into the database, tracking of assets would be smooth and easy.

3.2.4 Physical verification of Assets

Verification of physical assets would be semi-automated. System will push automated email to all asset custodians to verify assets under the purview and respond to such emails accordingly. Responses will be captured appropriately. Very reliable asset verification since internal stakeholders has a responsibility towards assets.

3.3   Non Functional Requirements

Non Functional Requirements specifies the quality attribute of a software system. They judge the software system based on Responsiveness, Usability, Security, Portability and other non-functional standards that are critical to the success of the software system.

3.3.1 User Friendliness

Responsive web designs make use of flexible layouts, flexible images and cascading style sheet media queries. The goal of responsive design is to build web pages that detect the visitor's screen size and orientation and change the layout accordingly.

3.3.2 Usability

Usability can be defined as the degree to which software can be used by specified consumers to achieve quantified objectives with effectiveness, efficiency, and satisfaction in a quantified context of use. Use of SQL workbench is more appropriate since the application attach pictures of Assets to the database directly.

3.3.3 Security

Creation of different roles for different Users would provide security to this application. Also Users are registered by the Administrator only.

3.3.4 Portability

Portability is the usability of the same software in different environments. This application is capable of running on different web browsers. But Google Chrome is recommended. Also this application is capable of run on different hardware and software platforms or work with different versions.
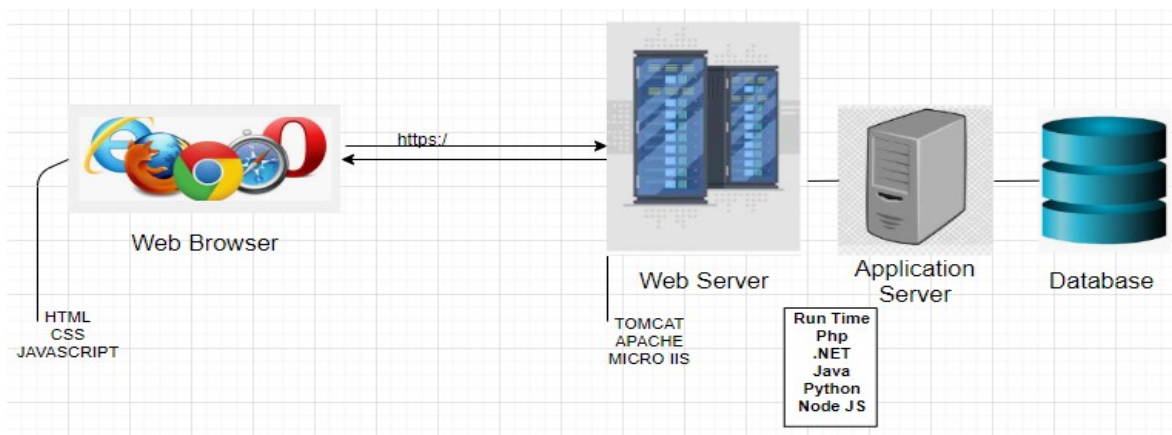
3.4   Design

Detailed Diagrams are shown in appendix section below.

3.2.1 Database Structure
3.2.2 ER Diagram
3.2.3 Flow Chart

High level software Architecture of the proposed web based application would be as follows.

User Interface design is done using HTML, CSS and JAVASCRIPT. Bootstrap is used only in few instances since it provides better styles and CSS.

PHP will be used along with CODEIGNITOR framework since such frameworks are designed to ease the process of development and it provides constructive approach. Also application error can be identified easily.

Application is developed as **web responsive** application. Hence it would fit into any screen size. Application would be able to access via a mobile device (Mobile phone).

3.2.4   Web Responsive Login Pages
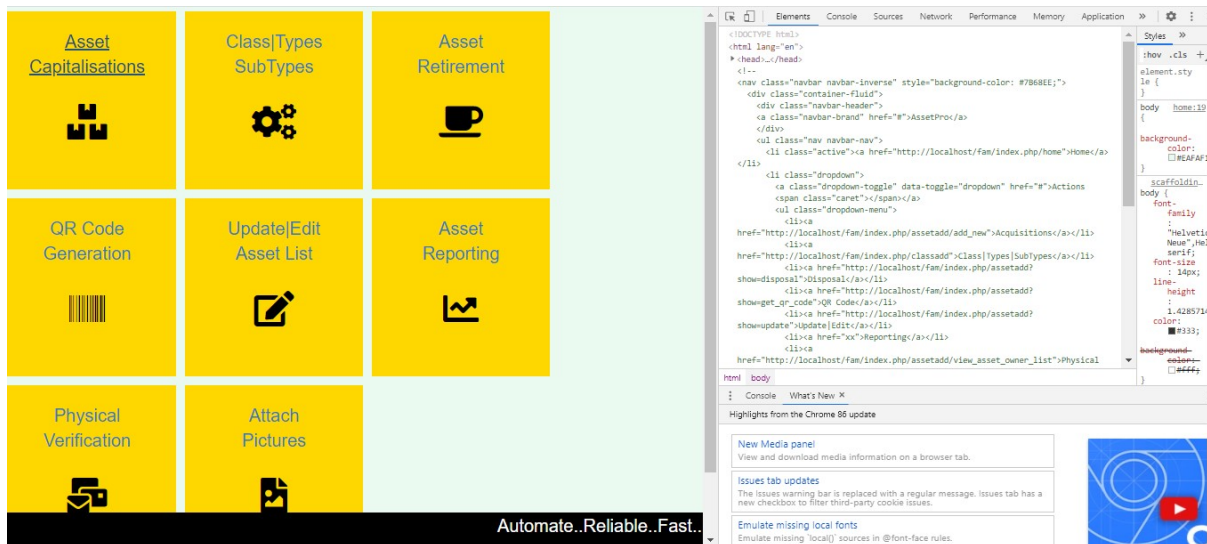
3.2.5   Web Responsive Form (Asset Addition)
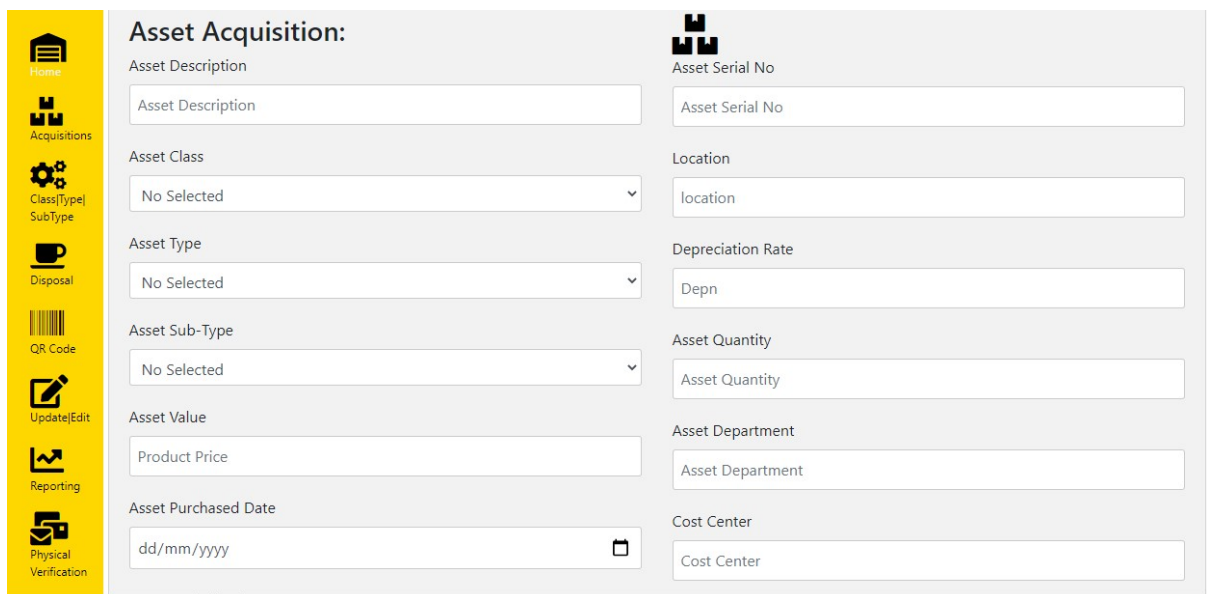
3.2.6 Web Responsive Form (Asset List)

Asset List

Add New Asset

Show 10 entries Search: [   ]

| No.	Description	Class	Type	Subtype	Value	Serial No	Location	E-Mail	Purchase Date	Capitalized Date	Depn.	Quantity
54	Damro Cupboard with 2 Lockers	Plant,Furniture & Fixtures	CupBoard	standalone Cupboard	45,000	N/A	Country Secratary	Delissia@gmail.com	2020-05-01	2020-05-01	25	1
55	Delivery route van 3500CC	Motor Vehicles	Van	Merc	4,500,000	MERC0080023	Service Center	akain@gmail.com	2020-04-01	2020-05-01	25	40
65	Hero Honda Hunk	Motor Vehicles	Motor Bicycle	Honda	385,000	FRGSKU567	OPS-Courier	amila@gmail.com	2020-07-01	2020-07-18	25	1
80	Colombo 07 5Perch Land	Land & Building	Land	Owned Land	125,000,000	Deed No 4356A	Colombo 07	virtualcfolk@gmail.com	2020-04-01	2020-04-01	5	1
81	7 Stories Building at Vauxhall Street	Land & Building	Buildings	Leasehold Building	25,000,000	Deed No 7712	Vauxhall Street	virtualcfolk@gmail.com	2020-04-01	2020-08-01	5	1
82	Printer Toshiba Auto upload	Computer Equipment	Photo Copiers	Copiers Toshiba	35,000	ER45TOSHI	Commercial Cubicle	amila.dadigama@dhl.com	2020-06-01	2020-06-01	20	2
83	Zebra Barcode Printer	Computer Equipment	Printer	Thermal Printer	25,000	ZBR00945	Finance RtR	virtualcfolk@gmail.com	2020-05-01	2020-05-01	20	2
85	Toshiba Photocopier &	Computer Equipment	Photo Copiers	Copiers Toshiba	850,000	TT9870HG	Mail Room	virtualcfolk@gmail.com	2020-08-01	2020-08-01	25	2

3.2.7 Generation of QR Code

Retrieve QR Code   ←

Asset No:
54

Asset Serial:
N/A

Purchase Date:
2020-05-01

Owner Email:
Delissia@gmail.com

QR Code:

3.5   Evaluation of alternative designs and Techniques

In a broader context, requirements of Users are not evolving. However there could be different or additional requirements from Users depending on the industry that this application is used for. i.e. In Construction industry most of their high value Assets are movable and transferred from one project to another. Use of Passive RFID or GPS is more suitable in tracking such Assets.

But in general, Quick Response (QR) code is the most suitable and widely available technology to retrieve data. As the data can instantly be read using a smartphone camera, the operating cost of the application is also affordable. Quite simply, a QR code is an encoded piece of data. The data in a QR code can be alphanumeric, numeric or binary.

Hence QR code is used to retrieve Asset data as a means of tracking them.

MySQL Workbench is used instead of using PhpMyAdmin as the database since MySQL Workbench perform efficiently and accurately when there are high volumes of data. Accuracy of the Data and computations are main priorities of Fixed Assets Management Systems. As the system requires uploading of pictures of each asset, there could be issues/vulnerabilities if PhpMyAdmin is used.

This application facilitates hierarchical view of Asset details. Each Asset has its own "Asset class", "Asset Type" and "Sub Type". The same design pattern will be used across all modules i.e. Capitalization, Disposals, Depreciation and FA Verification etc.

Traditional Waterfall method for developing this application would be quite unsuccessful as it requires specialization of tasks where each phase depends on the deliverables of the previous one. This is less iterative and less flexible approach.

The hallmarks of the agile development process include working in sprints or iterations which last from one to four weeks with the goal of releasing new functionality at the end of each iteration. Within each of these iterations there is planning, requirements analysis, design, coding, testing, and the creation of documentation.

Hence combination of iterative and incremental development methods will be used for this development.

Chapter 4. Implementation

Model- View – Controller (MVC) based CodeIgnitor framework been used to develop the application. PHP, JavaScript, AJAX, MySQL been used in implementation.

4.1   Evaluation of Codes

Dynamic select options dependent dropdown been used to identify Assets based on Class, Type & Sub-types. Below code has been used through-out the application for dynamic selection.

Java Scripting & View

```php
assetadd_view.php        ×
                            required>
71
72          <label>Asset Class</label>
73          <select class="form-control" name="class" id="class" required>
74              <option value="">No Selected</option>
75              <?php foreach($class as $row):?>
76              <option value="<?php echo $row->class_id;?>"><?php echo $row->class_name;?></option>
77              <?php endforeach;?>
78          </select>
79
80          <label>Asset Type</label>
81          <select class="form-control" id="type" name="type" required>
82          <option>No Selected</option>
83
84          </select>
85
86          <label>Asset Sub-Type</label>
87          <select class="form-control" id="subtype" name="subtype" required>
88              <option>No Selected</option>
89
90          </select>
```

```
<script type="text/javascript" src="<?php echo base_url().'assets/js/jquery-3.3.1.js'?>"></script>
<script type="text/javascript" src="<?php echo base_url().'assets/js/bootstrap.js'?>"></script>
<script type="text/javascript">
    $(document).ready(function(){

        $('#class').change(function(){
            var id=$(this).val();
            $.ajax({
                url : "<?php echo site_url('assetadd/get_type');?>",
                method : "POST",
                data : {id: id},
                async : true,
                dataType : 'json',
                success: function(data){

                    var html = '';
                    var i;
                    for(i=0; i<data.length; i++){
                        html += '<option value='+data[i].type_id+'>'+data[i].type_name+'</option>';
                    }
                    $('#type').html(html);


                }
            });
            return false;
        });

    });
</script>
```

```
<script type="text/javascript">
    $(document).ready(function(){

        $('#type').change(function(){
            var id=$(this).val();
            $.ajax({
                url : "<?php echo site_url('assetadd/get_subtype');?>",
                method : "POST",
                data : {id: id},
                async : true,
                dataType : 'json',
                success: function(data){

                    var html = '';
                    var i;
                    for(i=0; i<data.length; i++){
                        html += '<option value='+data[i].subtype_id+'>'+data[i].subtype_name+'</option>';
                    }
                    $('#subtype').html(html);


                }
            });
            return false;
        });

    });
</script>
```

4.2   Test Plan

Since the application consists of several independent modules, Unit Test will be carried out to identify any issues with each component to check whether the functions are working as expected.

> Testing of "Asset Acquisition" module to verify whether data/information is correctly captured in Asset Register, Fixed Asset Owner is properly identified and email is captured properly. Asset Number is auto generated and it is tagged to relevant Asset with QR Code.

> Testing of "Asset Disposal" module would verify whether the application is capable to update Fixed Assets Register of such disposals.

> Testing of Reports whether Details are properly captured. Depreciation is correctly calculated

> Testing of Asset verification module to check whether FA verification Email is received to the Asset Owner properly and Asset verification is performed correctly. Asset verification report should be updated with "Asset Verified" or "Not Verified".

> Testing of Hierarchical view Assets to check whether Assets details are categorized properly

> Testing of Asset retrieval via QR Code to check whether Asset details are captured properly.

Chapter 5. Evaluation

5.1 Evaluation of the Application

This Software Application is more users friendly and provides relevant details to management and Users as opposed to traditional Asset Management Systems which are in built to ERP or Accounting applications.

Being a web based application this can be accessible remotely. Entire world is now looking for new working models which do not impact to its business due to disasters like Covid-19 pandemic. This asset management solution is a great fit for company's which lookout for new technologies and make best use of its resources.

Digitalization is the hottest topic in today's businesses as it provides greater efficiency, effectiveness, accuracy by making standardization and automations. Capability to carry out physical asset verification more efficiently and a timely manner is one of the major advancement.

Since this is a standalone application which specifically designed for managing company assets, making modifications and upgrades are cost effective and can be done within few hours. System would be available to users 24x7 for all 365 days.

Moreover the project objectives are satisfactorily achieved but features can be added or modified according to client requirements.

5.2 Lessons Learnt

It is very much important to finalize technological aspects, software development methodology and project plan along with timing before you start the project. Also reviewing similar systems and technologies used will also provide more confidence to the developer. Making changes half way through is not advisable since it could lead to de-motivation and might not be able complete the project on time. Also seeking opinions and advice from experts must be done, if you are not really thorough with the domain and subject matter.

Any changes at a later stage which would impact to the initial design of the system must be carried out after extensive analysis of the whole system since such modifications could lead to malfunctioning, load issues, security compromises.

Chapter 5. Conclusion

5.1 Achievement of Objectives

The Objectives of the project have been achieved successfully.

All the assets been categorized properly into Asset Class, Asset Type and Asset Sub-Type at the time of capitalization and can be viewed properly.
Reports can be generated with these attributes. Hence decision making towards Fixed Assets made easy since details are readily available.

Generation of Quick Response code been able to track Assets effectively. Since Users can retrieve Asset details by scanning QR code via smart phone saves considerable time. Also pictures of Assets provide easy identification of Assets and reduce misstatements.

Since Physical verification can be done with the support of Department Fixed Asset Owners, motivation of such individuals has increased. Empowering and giving additional responsibilities are the main reasons.

On the other hand Fixed Asset Custodians effort in carrying out Physical Asset verification and reconciling such items has been reduced drastically. This has caused positively to the company's bottom line and has increased employee satisfaction.

5.2 Improvements to be made

5.2.1 Maintaining Audit Trail

Audit trials are very much important in finance related systems where review can be done very easily. Since we are moving towards paperless environment all capitalization of Assets, any changes made to such assets, deletions much be properly reflected in the system along with User identification.

Application will be enhanced to facilitate audit trail.

Also any changes made to assets will be kept as a log.

5.2.2 Tracking of Asset Transfers

Asset transfers between departments and locations are quite frequent. But most Asset management system doesn't support transfer of ownership via the system. This application would be upgraded to support asset transfers via the system where such transfers would follow kind of a work flow tool for transfer initiations and approvals.

References

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Appendices

2.1   Use Case Diagram

2.1 Use Case Diagram

3.2.1   Database Structure

Asset
- asset_no INT
- description VARCHAR(100)
- serial_no VARCHAR(45)
- purchase_date DATE
- purchase_value DECIMAL
- class_id INT

Indexes

Class
- class_id INT
- class_name VARCHAR(100)
- asset_no INT

Indexes

Location
- asset_no INT
- location VARCHAR(45)
- room VARCHAR(45)

Indexes

Type
- asset_no INT
- ownedland VARCHAR(45)
- leaseholdland VARCHAR(45)
- buildings VARCHAR(45)
- tables VARCHAR(45)
- chair VARCHAR(45)
- air-conditioner VARCHAR(45)
- tv VARCHAR(45)
- laptop VARCHAR(45)
- desktop VARCHAR(45)
- type_id INT
- class_id INT

Indexes

PRIMARY

class_id_idx

Depreciation
- asset_no INT
- class_id INT
- rates DECIMAL

Indexes

PRIMARY

class_id_idx

SubType
- asset_no INT
- class_id INT
- leasehold_land VARCHAR(45)
- owned_land VARCHAR(45)
- buildings VARCHAR(45)
- executive table VARCHAR(45)
- round table VARCHAR(45)
- lunchroom table VARCHAR(45)
- splittype ac VARCHAR(45)
- ac plant VARCHAR(45)
- hp 680 model VARCHAR(45)
- lenovo 520 model VARCHAR(45)
- type_id INT
- subtype_id INT

Indexes

PRIMARY

class_id_idx

3.2.2 ER Diagram

3.2.2 Flow Chart