

# **PERSONAL EXPENSE TRACKER APPLICATION**

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## **1 . INTRODUCTION :**

### **1 . 1 PROJECT OVERVIEW :**

In life cycle of human after birth the need of materials and belongings is obvious. In order to fulfill our needs and desire we buy goods. The rule of earth is that you must have money in order to buy desired good. So in this way the process of earning and spending goes on in our life.

People in order to track their expenses use traditional paper system to keep the record of their income and expenditures. This type of traditional system is burdensome and takes more time. So there must be a management system which must help us to manage our daily earnings and expenses easily, and also helps us to analyze records efficiently. So we figured out a way to eliminate the traditional system with digital, portable, easier and simple way to record these data in just few clicks with our Android application called "Personal Expense Tracker (PET)".

### **1 . 2 PURPOSE :**

The purpose of this project is to fully manage and keep tracking the daily expenditure. The following are the benefits that come with the Personal Expense Tracker (PET):

- Minimize manual effort with daily record of expenditures and incomes.
- Immediate and easy retrieval of report.
- Secured and transparent data.
- Graphical overview of transactions.
- Help in decision making with related results.
- Help in preparing wish list for pre planning your expense

## **2. LITERATURE SURVEY:**

### **2.1 EXISTING PROBLEM:**

The Expense tracker existing system does not provide the user portable device management level, existing system only used on desktop software so unable to update anywhere expenses done and unable to update the location of the expense details disruptive that the proposed system provides [6]. In existing, we need to maintain the Excel sheets, CSV files for the user daily, weekly and monthly expenses. In existing, there is no as such complete solution to keep a track of its daily expenses easily. To do so a person as to keep a log in a diary or in a computer system, also all the calculations need to be done by the user which may sometimes results in mistakes leading to losses. The existing system is not user friendly because data is not maintained perfectly. But this project will not have any reminder to remain a person in a specific date, so that is the only drawback in which the remainder is not present. This project will be an unpopulated information because it has some disadvantages by not remind a person for each and every month. But it can used to perform calculation on income and expenses to overcome this problem we propose the new project.

### **2.2 REFERENCES :**

- [1] Bekaroo, G., & Sunhaloo, S. Intelligent Online Budget Tracker.
- [2] Underwood, D. (2011). A Case Study of Tracking Expenses by Commodity at Widget Farmers' Cooperative.
- [3] Chandini, S., Poojitha, T., Ranjith, D., Akram, V. M., Vani, M. S., & Rajyalakshmi, V. (2019). Online Income and Expense Tracker.
- [4] Satpute, M. K., Kale, A., Mandal, A., & Krishnan, R. SURVEY ON CLASSIFICATION ENGINE FOR MONETARY TRANSACTIONS
- [5] Sabab, S. A., Islam, S. S., Rana, M. J., & Hossain, M. (2018, September). eExpense: A smart approach to track everyday expense. In 2018 4th International Conference Information & Communication Technology (iCEEiCT) (pp. 136-141). IEEE.

## 2.3 PROBLEM STATEMENT DEFINITION:

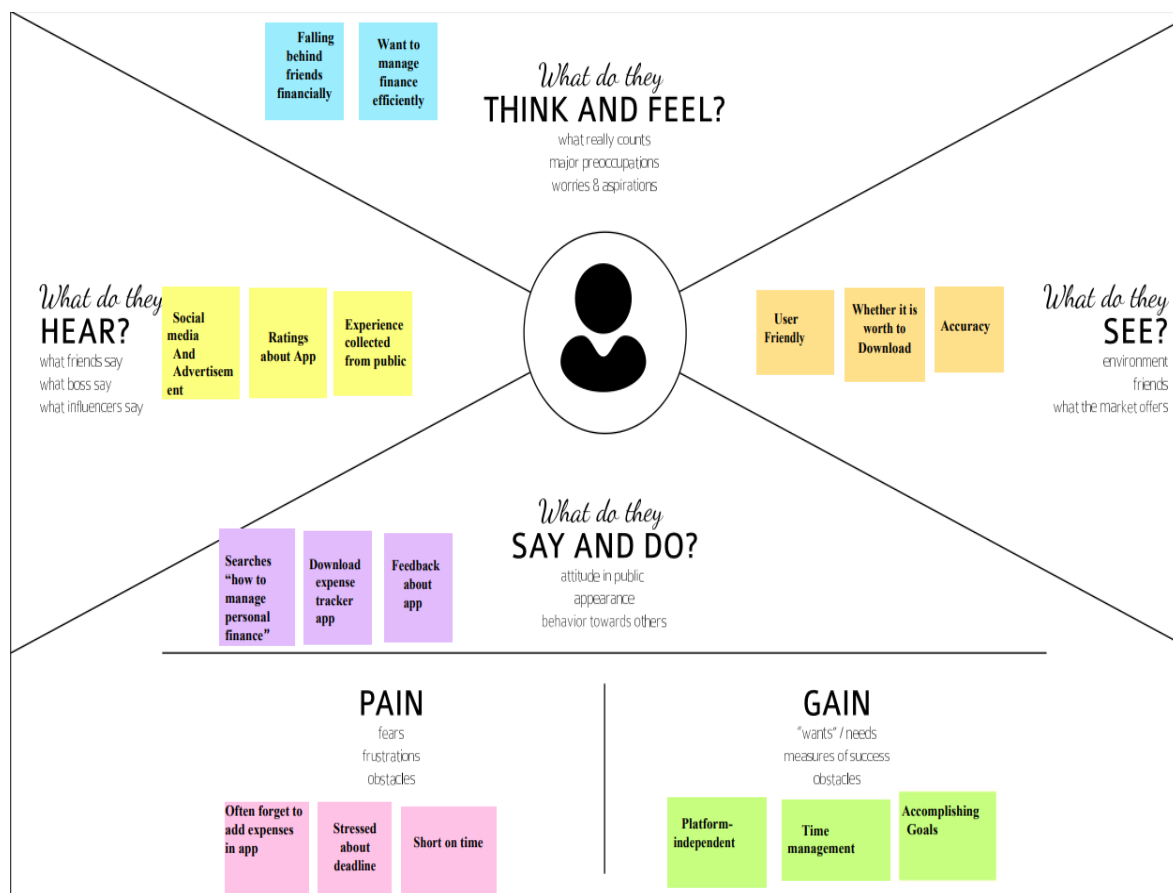
The Problem statement Comprises set of questions which the project seeks to address. It identifies the current state and future state and any gaps between the two. The Problem arising here in this project is:

1. Where does the problem affect?
2. What is the impact of the issues?
3. What would happen if we didn't solve the problem?
4. What would happen when it is fixed?
5. Why is it important that we fix the problem?

## 3 IDEATION AND PROPOSED SOLUTION:

### 3.1 EMPATHY MAP:

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers.



## 3.2 IDEATION AND PROPOSED SOLUTION:

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity.

### Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 1. Brainstorm to prepare
- 2. Share to collaborate
- 3. 10 people recommended

Download template

#### before you collaborate

a collection of preparation gives a long way with this session, here's what you need to do to get going

- 1. 15 minutes

- 1. **Team gathering**  
Define who should participate in the session and send an invite. Share relevant information as a pre-workshop.
- 2. **Set the goal**  
Think about the problem you're looking to solve in the brainstorming session.
- 3. **Open the room**  
Open the room and let the ideas flow. Encourage everyone to share their ideas and build on each other's.

Open template

#### Define your problem statement

What problem are you trying to solve? Frame your problem as a how might we statement. This will be the focus of your brainstorm.

- 1. 15 minutes

How might we bring back our daily experience and make it more enjoyable?

Any ideas of brainstorming

- 1. 15 minutes

Share an email and make a video

- 1. 15 minutes

Share a video

- 1. 15 minutes

Share a video

#### Brainstorm

Write down any ideas that come to mind, that address your problem statement.

- 1. 15 minutes

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### 3.3 Proposed Solution:

The proposed solution should relate the current situation to a desired result and describe the benefits that will accrue when the desired result is achieved. So, begin your proposed solution by briefly describing this desired result.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Personal finance applications will ask users to add their expenses and based on their expenses wallet balance will be updated which will be visible to the user. Also, users can get an analysis of their expenditure in graphical forms. They have an option to set a limit for the amount to be used for that particular month if the limit is exceeded the user will be notified with an email alert.
2.	Idea / Solution description	The solution to this problem is, the people who gets regular payments can able to track their payments and avoid unwanted expenses.
3.	Novelty / Uniqueness	This application tracks your every expenses anywhere and anytime without using the paper work. Just click and enter your expenditure. to avoid data loss, quick settlements and reduce human error. To alert the user through notification message about the expenditure of the user weekly.
4.	Social Impact / Customer Satisfaction	Using this application one can track their personal expenses and frame a monthly/annual budget. If your expense exceeded than specified limit, the application will show you an alert message.
5.	Business Model (Revenue Model)	Business people can use subscription/premium feature of this application to gain revenue.
6.	Scalability of the Solution	Unsubscribed users will be notified through alert message if the limit is exceeded. Subscribed users can have the additional facility to set the remainder for the upcoming payments to be paid on-time.

### 3.4 PROBLEM SOLUTION FIT:

Problem-Solution canvas is a tool for entrepreneurs, marketers and corporate innovators, which helps them identify solutions with higher chances for solution adoption, reduce time spent on solution testing and get a better overview of current situation.

Problem-Solution fit canvas 2.0		PERSONAL EXPENSE TRACKER APPLICATION	
Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> Who is your customer? i.e. working parents of 0-5 y.o. kids <ul style="list-style-type: none"> <li>Customers are those who spend money without keeping track of it or struggling to keep track of it.</li> <li>Provides a whole lot of different categories of expenditure types to avoid mismatch of expenditure.</li> </ul>	<b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span> What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices. <ul style="list-style-type: none"> <li>Most of the solution available in the internet hosts a lot of adds limiting its usability.</li> <li>The solution proposed has a feature to view the expense graphically and has an alert via email feature.</li> </ul>	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking <ul style="list-style-type: none"> <li>Expense tracker applications which are available in both android and iOS.</li> <li>Personal Expense tracker developed in this project.</li> </ul>
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span> Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. <ul style="list-style-type: none"> <li>The objective of this application is to enable customers to keep track of their expenses.</li> <li>The customers are provided with categories for the expenses.</li> <li>They also get an option to view the expenses as a graphical representation given the period of 1 year, 6 months etc.</li> </ul>	<b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations. <ul style="list-style-type: none"> <li>Improper expenses lead to heavy tax.</li> <li>Makes business forecasting easier.</li> <li>Saves a lot of money.</li> <li>Existence of lot of payment methods leads to problem in manual expense tracking.</li> </ul>	<b>7. BEHAVIOUR</b> <span>BE</span> What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greempence) <ul style="list-style-type: none"> <li>Start using the expense tracker app.</li> <li>Makes sure the user categorizes the expense done in order to save money.</li> <li>Set up a monthly limit on the expense done.</li> </ul>
Identify strong TR & EM	<b>3. TRIGGERS</b> <span>TR</span> What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. <ul style="list-style-type: none"> <li>Understanding the fact, the customers can save a lot of money by these expense tracking apps.</li> </ul>	<b>10. YOUR SOLUTION</b> <span>SL</span> If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour. <ul style="list-style-type: none"> <li>Design a flask based personal expense tracker application.</li> <li>Enable email-based expense alerts using SendGrid framework.</li> <li>Provide an option for graphical expense view.</li> </ul>	<b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span> <b>8.1 ONLINE</b> What kind of actions do customers take online? Extract online channels from #7 <ul style="list-style-type: none"> <li>Expense trackers online come with a lot of ads which on clicking steals data like account number if provided.</li> </ul> <b>8.2 OFFLINE</b> What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development. <ul style="list-style-type: none"> <li>Make sure they are aware of the tax rules.</li> </ul>
	<b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span> How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure -> confident, in control - use it in your communication strategy & design. <ul style="list-style-type: none"> <li>They feel a lot clear about the income and expenses made.</li> </ul>		



## 4 .REQUIREMENT ANALYSIS :

### 4 .1 FUNCTIONAL REQUIREMENTS :

Functional requirements may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements describe all the cases where the system uses the functional requirements, these are captured in use cases

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form
FR-2	User Confirmation	Confirmation via Email
FR-3	Tracking Expense	Helpful insights about money management
FR-4	Alert Message	Give alert mail if the amount exceeds the budget limit

### 4 .2 NON FUNCTIONAL REQUIREMENTS :

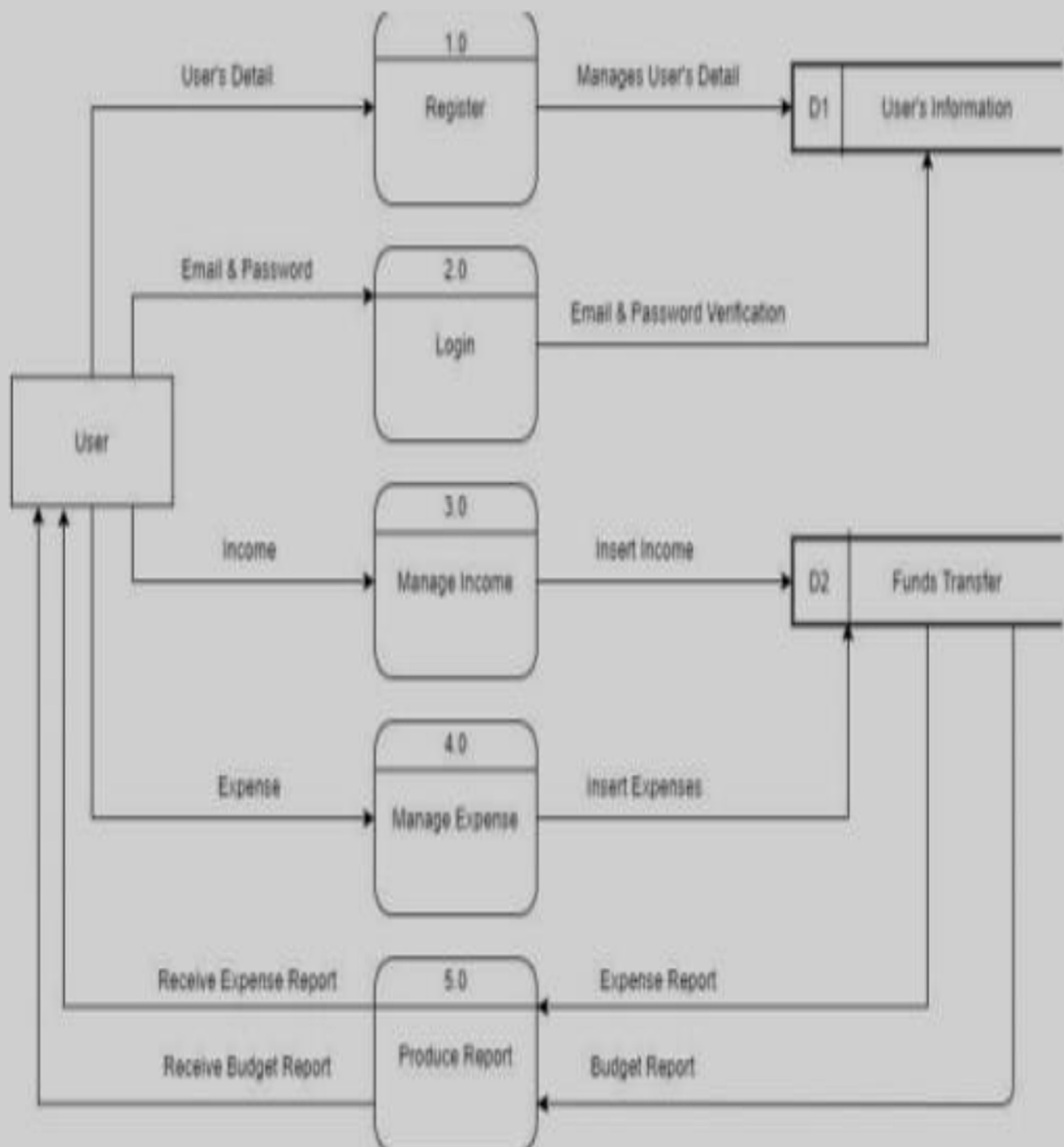
A Non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	You will be able to allocate money to different priorities and also help you to cut down on unnecessary spending
NFR-2	Security	It employs the latest security and technology measures to keep customers personal and financial information safe
NFR-3	Reliability	<ul style="list-style-type: none"><li>Used to manage his/her expense so that the user is the path of financial stability.</li><li>It is categorized by week, month, and year and also helps to see more expenses made.</li><li>Helps to define their own categories.</li></ul>
NFR-4	Performance	Help to gain control of your finance, pay down debt, grow your net worth, help to upload receipts, track mileage
NFR-5	Availability	Able to track business expense and monitor important for maintaining healthy cash flow but also qualifying for deductions that could reduce your taxable income
NFR-6	Scalability	To know where money goes and you can ensure that money is used wisely

## **5.PROJECT DESIGN:**

### **5.1 DATA FLOW DIAGRAMS :**

A data flow diagram shows the way information flows through a process or system. It includes data inputs and outputs, data stores, and the various subprocesses the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships.

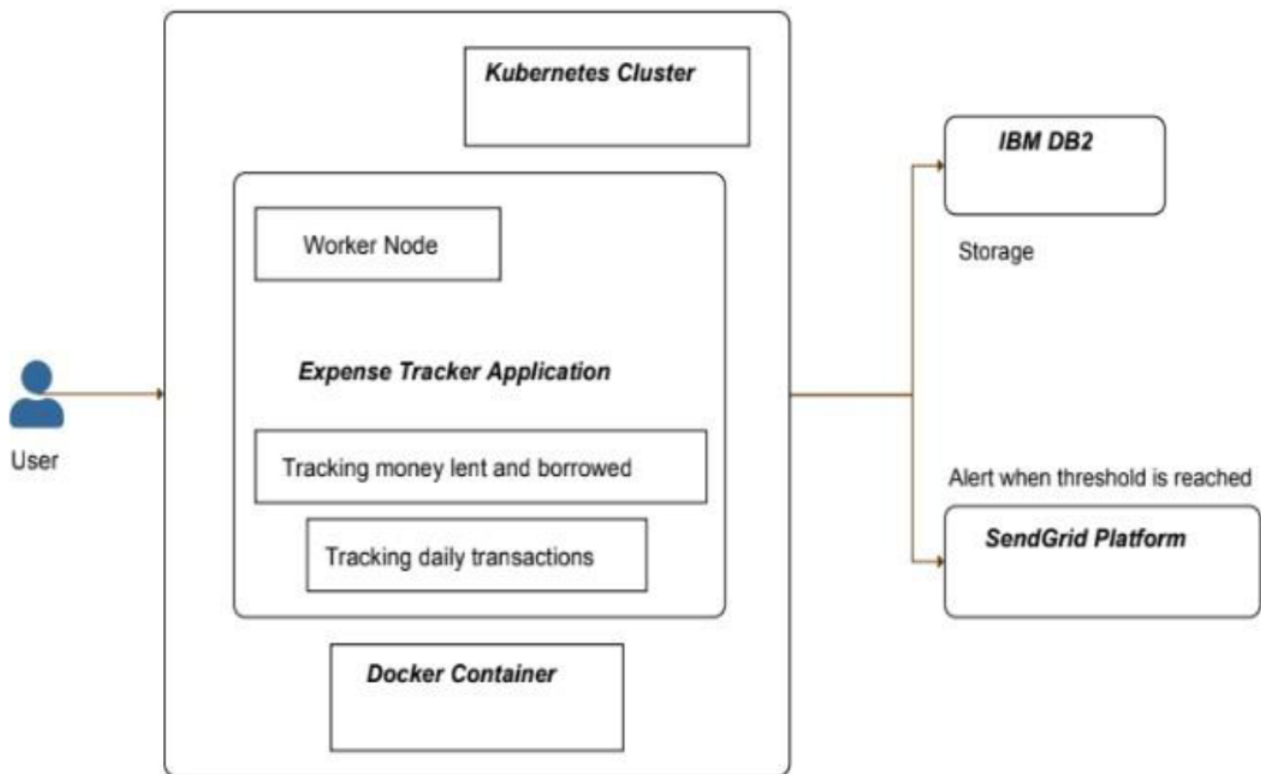




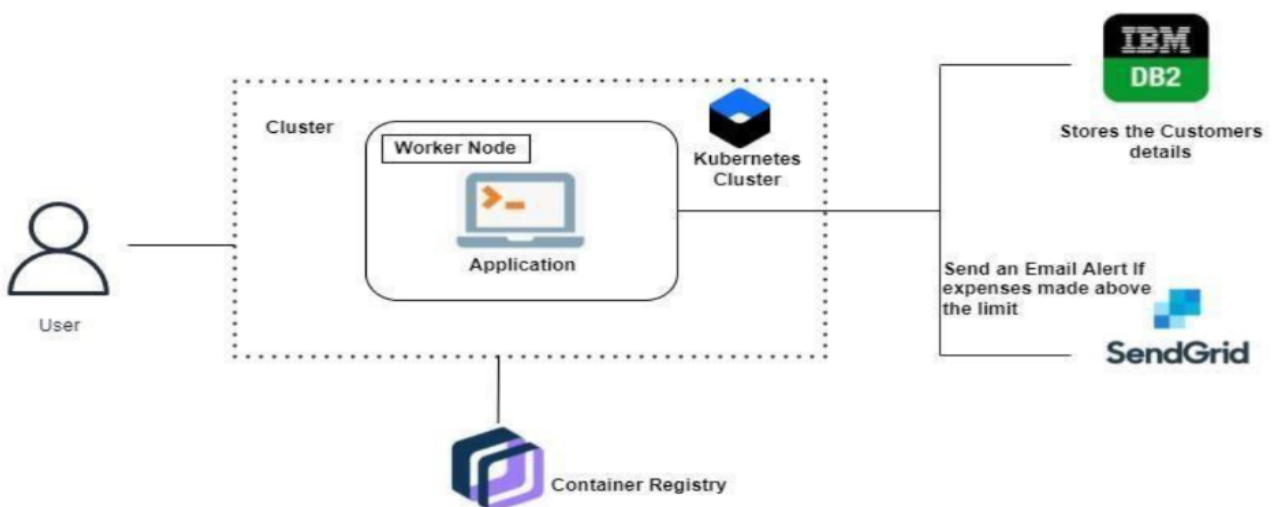
## 5.2 SOLUTION AND TECHNICAL ARCHITECTURE:

A solution architecture (SA) is an architectural description of a specific solution. SAs combine guidance from different enterprise architecture viewpoints (business, information and technical), as well as from the enterprise solution architecture (ESA).

### SOLUTION ARCHITECTURE:



### TECHNICAL ARCHITECTURE:



### 5.3 USER STORIES:

A user story is an informal, general explanation of a software feature written from the perspective of the end user or customer. The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer.

## 6. PROJECT PLANNING AND SCHEDULING:

### 6.1 SPRINT PLANNING AND ESTIMATION:

The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Bowiya S, Jayanthika J Blessing J Shanmuganathan L
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	2	High	
Sprint-2		USN-3	As a user, I can register for the application through Facebook	2	High	
Sprint-1		USN-4	As a user, I can register for the application through Gmail	1	Low	
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	2	High	Bowiya S Jayanthika J Blessing J Shanmuganathan L
Sprint-2		USN-6	After registration, as a user can Login into the application.	2	High	
Sprint-3		USN-7	As a user I can change my password through reset link from email	1	Low	
Sprint-2	Account activation	USN-8	As a user I will receive confirmation email once I have registered for the application	2	High	Blessing J
Sprint - 1	Dashboard	USN-9	As a User I can add expense and income	2	High	Bowiya S
Sprint - 2		USN-10	As a user I can add, view my past expense and income over a period of time	2	High	Jayanthika J
Sprint-2		USN-11	As a user I can add my limit expense	2	High	Bowiya S Jayanthika Blessing J Shanmuganathan L
Sprint-3		USN-12	As a user I can view my overall expense	2	High	
Sprint-4	Connecting the database to IBM DB2	USN-13	Linking database with dashboard	2	High	Bowiya S Jayanthika J Blessing J Shanmuganathan L
Sprint-3	Notifications	USN-14	As a user when my monthly limit exits I can get an email notification	2	High	Bowiya S Jayanthika J Blessing J Shanmuganathan L
Sprint-4	BOT	USN-15	As a BOT, I will provide interactive communication with the user and provide the information they need.	2	High	Shanmuganathan L

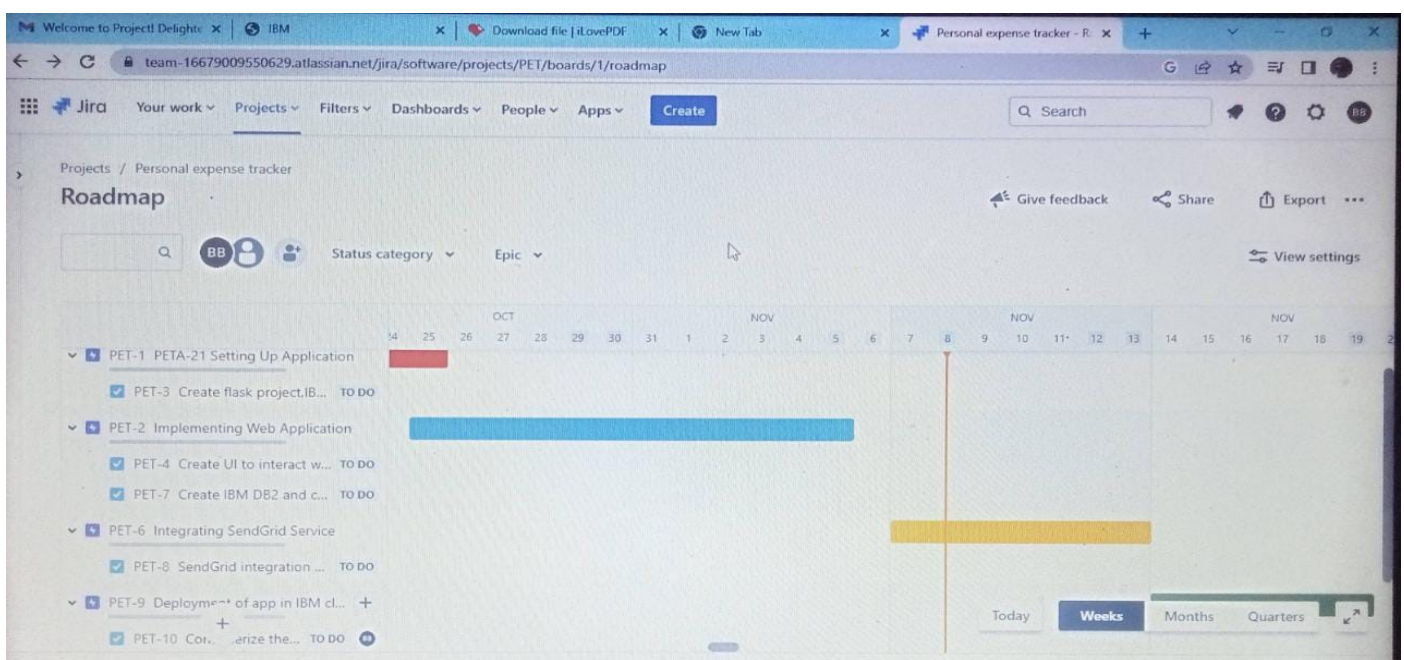
## 6.2 SPRINT DELIVERY SCHEDULE:

The Objectives of the project must have to be separated in forms of sprints and separated to all the team members accordingly.



## 6.3 REPORTS FROM JIIRA:

Jira Software is part of a family of products designed to help teams of all types manage work. Originally, Jira was designed as a bug and issue tracker. But today, Jira has evolved into a powerful work management tool for all kinds of use cases, from requirements and test case management to agile software development.



## 7. CODING AND SOLUTIONING:

### 7.1 PYTHON CODE:

```
from flask import Flask,render_template, request, url_for, flash, redirect
import db
from db import ibm_db
app = Flask(__name__)
@app.route("/")
def home():
    return render_template('home.html')
@app.route("/register")
def register():
    return render_template('register.html')

@app.route('/addrec',methods = ['POST', 'GET'])
def addrec():
    if request.method == 'POST':

        name = request.form['name']
        email = request.form['email']
        password = request.form['password']

        sql = "SELECT * FROM users WHERE name =?"
        stmt = ibm_db.prepare(db.conn, sql)
        ibm_db.bind_param(stmt,1,name)
        ibm_db.execute(stmt)
        account = ibm_db.fetch_assoc(stmt)

        if account:
            return render_template('login.html', msg="You are already a member, please login using your details")
        else:
            insert_sql = "INSERT INTO users VALUES (?,?)"
            prep_stmt = ibm_db.prepare(db.conn, insert_sql)
            ibm_db.bind_param(prepare_stmt, 1, name)
            ibm_db.bind_param(prepare_stmt, 2, email)
            ibm_db.bind_param(prepare_stmt, 3, password)

            ibm_db.execute(prepare_stmt)

            return render_template('home.html', msg="Data saved successfulty..")

@app.route("/login")
def login():
    return render_template('login.html')
```

```
@app.route("/forgot")
def forgot():
    return render_template('forgot.html')

@app.route("/dashboard")
def dashboard():
    return render_template('dashboard.html')

@app.route("/wdashboard")
def wdashboard():
    return render_template('wdashboard.html')

@app.route("/a1dashboard")
def a1dashboard():
    return render_template('a1dashboard.html')

@app.route("/a2dashboard")
def a2dashboard():
    return render_template('a2dashboard.html')

@app.route("/a3dashboard")
def a3dashboard():
    return render_template('a3dashboard.html')

@app.route("/a4dashboard")
def a4dashboard():
    return render_template('a4dashboard.html')

@app.route("/wallet")
def wallet():
    return render_template('wallet.html')

@app.route("/expenses")
def expenses():
    return render_template('expenses.html')

@app.route("/e1expenses")
def e1expenses():
    return render_template('e1expenses.html')

@app.route("/e2expenses")
def e2expenses():
    return render_template('e2expenses.html')
```

```

@app.route("/e3expenses")
def e3expenses():
    return render_template('e3expenses.html')

@app.route("/e4expenses")
def e4expenses():
    return render_template('e4expenses.html')

@app.route("/email")
def email():
    return render_template('email.html')

@app.route("/profile")
def profile():
    return render_template('profile.html')

if __name__ == "__main__":
    app.run(debug=True)

```

STEP 1: Build a flask application.

STEP 2: Initialise the flask app and load the model.

STEP 3: Configure the home page

STEP 4: Pre process the frame and run

## 7.2 HTML PAGE:

```

<!DOCTYPE html>
<html lang="en">
  <head>
    <title>Expense tracker- Register Page</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial
-scale=1">
    <!-- Fontawesome CDN Link -->
    <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/5.15.3/css/all.min.css">
    <script src="https://kit.fontawesome.com/66ef81bd09.js"
crossorigin="anonymous"></script>

    <link rel="stylesheet" type="text/css"

```



```

href="static/css/util.css">
  <link rel="stylesheet" type="text/css"
href="static/css/registerstyles.css">
</head>
<body>

<div class="limiter">
<div class="container-login100">
<div class="wrap-login100">
<div class="login100-pic js-tilt" data-tilt>

</div>
<form class="login100-form validate-form">
<span class="login100-form-title">
Register
</span>

<div class="wrap-input100 validate-input" data-validate =
"Valid Name is required">
                                <input class="input100" type="text"
name="name" placeholder="Name">
<span class="focus-input100"></span>
<span class="symbol-input100">
<i class="fas fa-user" aria-hidden="true"></i>
</span>
</div>

<div class="wrap-input100 validate-input" data-validate =
"Valid email is required: ex@abc.xyz">
<input class="input100" type="text" name="email"
placeholder="Email">
<span class="focus-input100"></span>
<span class="symbol-input100">
<i class="fa fa-envelope" aria-hidden="true"></i>
</span>
</div>

```

```

<div class="wrap-input100 validate-input" data-validate =
"Password is required">
<input class="input100" type="password" name="password"
placeholder="Password">
<span class="focus-input100"></span>
<span class="symbol-input100">
<i class="fa fa-lock" aria-hidden="true"></i>
</span>
</div>

<div class="wrap-input100 validate-input" data-validate =
"Password is required">
<input class="input100" type="password" name="re pass"
placeholder="Re-Password">
<span class="focus-input100"></span>
<span class="symbol-input100">

<i class="fa fa-lock" aria-hidden="true"></i>
</span>
</div>
<button class="login100-form-btn">
<a href="/">SUBMIT</a>
</button>
<div class="text-center p-t-136">
<a class="txt2" href="login">
<h4>Already Have an Account</h4>
<i class="fa fa-long-arrow-right m-1-5" aria-
hidden="true"></i>
</a>
</div>
</form>
</div>
</div>
</div>
<!-- Login Modal-->
<div class="modal fade" id="loginModal" tabindex="-1"
role="dialog" aria-labelledby="exampleModalLabel"
aria-hidden="true">

```

```

<div class="modal-dialog" role="document">
<div class="modal-content">
<div class="modal-header">
<h5 class="modal-title" id="exampleModalLabel">Ready to
Leave?</h5>
<button class="close" type="button" data-dismiss="modal"
aria-label="Close">
<span aria-hidden="true">x</span>
</button>
</div>
<div class="modal-body">Select "login" below if
you are ready to enter.</div>
<div class="modal-footer">
<button class="btn btn-secondary" type="button" data-
dismiss="modal">Cancel</button>
<a class="btn btn-primary" href="login.html">login</a>
</div>
</div>
</div>
</div>
</div>
<script src="static/js/registerjs.js"></script>

</body>
</html>

```

## 8. Testing

### 8.1 Test Cases:

1.Homepage	Run Successfully	Executed by Shanmuganathan
2.Register	Run Successfully	Executed by Blessing
3.Login	Run Successfully	Executed by Jayanthika
4.Dashboard	Run Successfully	Executed by Bowiya
5.Add Expense	Run successfully	Executed by Blessing

### 8.2 User Acceptance Testing:

It is important to ensure that the following stages and their test activities are covered as part of the User Acceptance Testing to ensure optimum results from UAT.

Test plan review

Test case review

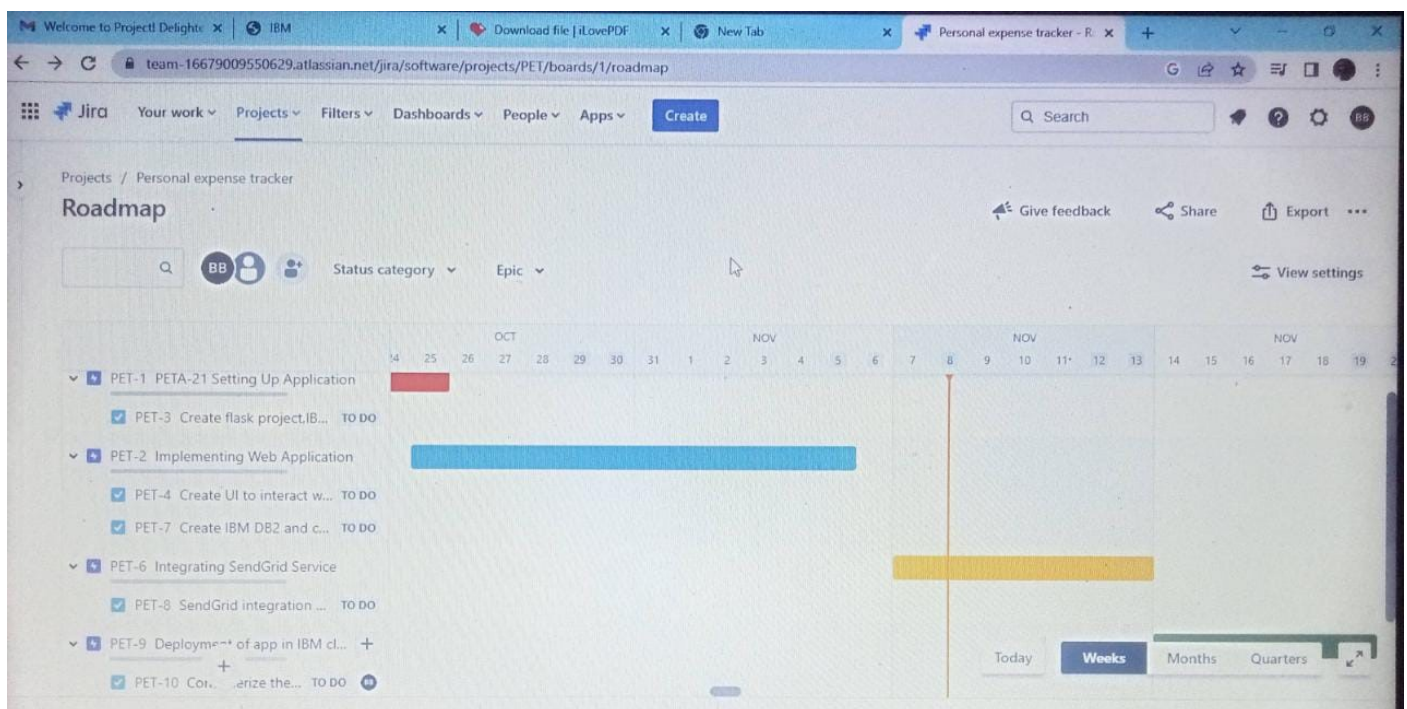
Test progress review

Post-test review

## **9. RESULT :**

### **9.1 PERFORMANCE METRICS :**

Performance metrics are defined as figures and data representative of an organization's actions, abilities, and overall quality.



## **10. ADVANTAGES AND DISADVANTAGES :**

### **ADVANTAGES:**

- **Track** your expenses anywhere, anytime.

- Seamlessly **manage your money and budget** without any financial paperwork. Just click and submit your invoices and expenditures.
- Access, submit, and approve invoices **irrespective of time and location**.
- **Avoid data loss** by scanning your tickets and bills and saving in the app.
- **Approval of bills and expenditures in real-time** and get notified instantly.
- **Quick settlement of claims and reduced human errors** with an automated and streamlined billing process.

### **DISADVANTAGES:**

- The application is unable to maintain the backup of data once it is uninstalled.
- This application does not provide higher decision capability.

### **11 . CONCLUSION :**

From this project, we are able to manage and keep tracking the daily expenses as well as income. While making this project, we gained a lot of experience of working as a team. We discovered various predicted and unpredicted problems and we enjoyed a lot solving them as a team. We adopted things like video tutorials, text tutorials, internet and learning materials to make our project complete. Furthermore, now we know much more about the Android platform, python language and the HTML.

### **12 . FUTURE SCOPE :**

1. It will have various options to keep record (for example Food, Travelling Fuel, Salary etc.).
2. Automatically it will keep on sending notifications for our daily expenditure.
3. In today's busy and expensive life, we are in a great rush to make moneys, but at the end of the month we broke off. As we are unknowingly spending money on title and unwanted things. So, we have come over with the plan to follow our profit.
4. Here user can define their own categories for expense type like

food, clothing, rent and bills where they have to enter the money that has been spend and likewise can add some data in extra data to indicate the expense.

### **13. APPENDIX:**

The Project deliverables are uploaded in Git repository and in the IBMdashboard.

**GITLINK:**<https://github.com/IBM-EPBL/IBM-Project-1767-1658412764.git>

**DEMOLINK:**[https://youtu.be/1u\\_0gEWSLPM](https://youtu.be/1u_0gEWSLPM)