



# **BILL SPLITTING AND EXPENSE MANAGING ASSISTANT**

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## **Abstract**

**Mobile application have become a part of day to day life. Many application are available in the market to manage personal and group expenses. Not many application are reliable or are able fulfil the user requirements. In this project I have design a mobile application that managers all your expenses, your personal contribution toward group expenses, maintain monthly income, recurring and adhoc payment. It provides information of "who owes who and by how much".**

**The proposed application would eliminate sticky note, spreadsheet and ledger that cause confusions, data inconsistency problems while recording and splitting of expenses. With our application user can manage these expenses more effectively. This application will not only helps users to manage their expenses but also help marketing executives by providing them the platform they need. In this application you can link your payment gateway like paytm or use our wallet to make transactions as smooth as breeze.**

## **1. Introduction:**

It is a mobile application intended to run on android devices. It is design to fulfil the needs of the user by reducing their efforts for the settlement of the bill. The application encourages corresponding users help in who owes who, and for what. Aim to provide user the best approach to help user and their companion to share expenses easily.

This application will let bunch users and their companions to have detailed view inside this application around the individual costs and to

settle them by using payment gateways linked with the application or by using the e-wallets.

This application allows its user to add remark to an expense, click on the expense name in any expense list. Bill posting will have space for comments. It will also have the notification option to notify each time somebody adds a remark to an expense user is on, or user can withdraw to posted bill. It will also have the graphical representation of the expenses weekly, monthly, quarterly or yearly.

The additional feature that we are going to add in this application is that it enables user to settle the bill without disturbing the interaction with this application, that is by providing the payment gateway like paytm, paypal or by using the e-wallet for the settlement of the bill.

## **2. Background study**

The idea of developing this application arises with the frequent problems being faced by the user in sharing among them. Splitting the expenses among group is confusing and maintaining the personal expense is a big deal.

There were different methods used before to maintain the expenses like making use of sticky note by normal people, professional people uses spreadsheet to record expenses or by using ledger to maintain huge amounts.

There are still problems in area like data consistency, there are chances were critical inputs can be missed and the manual errors my creep in. The Data recorders are not always handy and it could be hectic process to have overall view of those expenses.

I believe in a handy design in a handy mobile application to handle these problems.

This app is capable enough to record the data, show the weekly, monthly, quarterly, or yearly expenses in a graphical representation. This application is intelligent enough to show : ‘ Who owes who ?And by how much ??’ .This application will also allow the transactions by providing the facility of online payment gateways.

### 3. Related work

The applications which are available in the market are very useful to the users and reduces human efforts. Split Bill is also one of those application, with much scope in daily life. As there are many similar application available in the market I have added some features to make my application unique which makes it stand apart.

Apart from adding unique features like combining group expenses and personal expenses in to one application, I have also added the features like estimations, graphical representation and linked payment gateways like paytm to settle the shares on the spot.

Here, I have an idea of syncing the payment gateways to the application to settle the shares on the spot and also I have provided different operations that can be performed while splitting the expenses like split equally, split unequally, split by percentages, split by shares, split by adjustment. This idea serves as main objective of research project. The research also includes syncing of the applications with some social networks and emails as well.

### 4. Methodology

This section will guide our team to successfully accomplish the goals set for the research. Here, the research project methodology describes the steps and approaches to be followed to attain final product. As explained above our project is of splitting the expenses between the groups and settle it and also to efficiently manage the personal expenses as well. However, our projects will have additional features included as part of our research so that it makes our project unique in the market. These features would make the project more efficient and very useful for our users. Apart from the benefits user gets their is also an important use of user expense data that can be used with his/her

permission for data mining for several other functionalities to be applied in market by analyzing user expenses.

#### 4.1 User login/registration

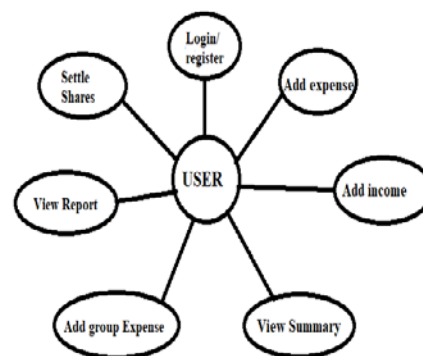
Like most of the application this will have user login screen and option for registration. The user must register in this application when he/she is using for first time. However, the user who is already registered can login to the application using his/her login credentials that are created by the user at the time of registration. User can also register themselves by using their facebook of gmail account.

#### 4.2 Creating/alter of user group

In this application user have the option to create a new group or to alter the existing group created by his/her companion and added them. The user can create, alter and delete the group as the user intends.

#### 4.3 Adding income/expenses

Every user in the group have the option to add incomes and expenses accordingly. Each record should have details like date of occurrence of item, details of items etc. This application will provide the drop down option to choose the splitting method to be applied on the total expenses.

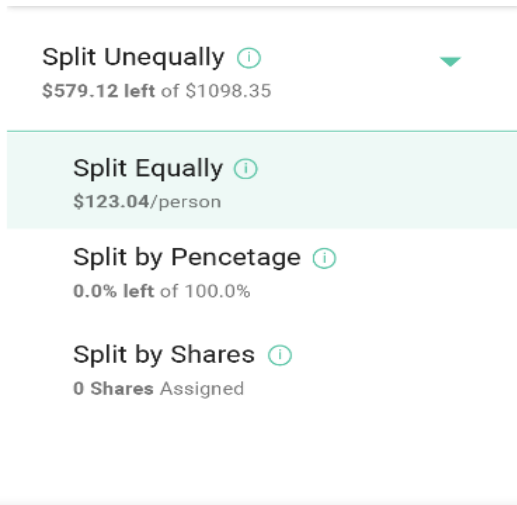


UML Diagram for our application

#### 4.4 Splitting expenses

One of the main feature of this application is to split the expenses among the group members as per the method selected from the drop down menu to obtain the accurate results.

This will be done based on the algorithm designed to split the expenses using the records made available. Bill can be split in several ways like Split Equally, Split Unequally, Split by percentage, Split by shares, Split by adjustments.



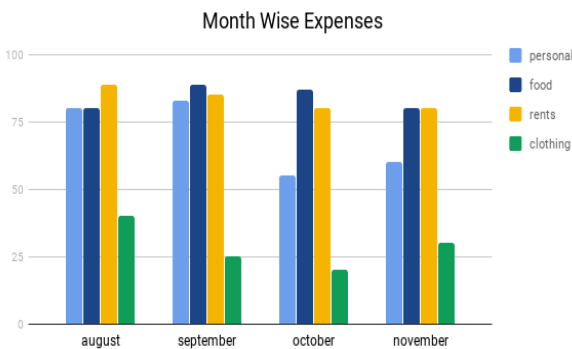
**4.5 All expense details**

This part of our application will provide user with option to view all the records of expenses and income with selection from-date and to-date. This will give comprehensive view of the expenses/income records for given selection of user.

**4.6 Graphical representation**

This is one of the main feature of our application. It is the graphical representation of the user expenses in certain period of time that can weekly, monthly, quarterly, or yearly as per the requirements. This works with the algorithm that calculates average expenses of the user for certain period by using the expenses records created using this application.

Apart from showing the expenses on whole you can view the expenses of certain categories also.



**4.7 Estimating expenses**

This feature is what we personally finds to be of great use. This section of our application tells user that how much he/she is going to spend in the next month. The results obtained from this is approximate because it uses the previous months data from the database and calculate the average category wise. This feature helps the user to reduce his/her expenses so they can avoid running out of money.

These estimations can be derived from his/her previous expenses using algorithm that uses records from expense table. During estimating expenses the algorithm should avoid using records that has huge variations because these expenses could be for long term in nature and they doesn't occur frequently. This helps users to manage their expenses efficiently.

The shown below is the estimation of the month of october here it shows the high expense because diwali festival was in this month and only personal expense is increased.



**4.8 Collecting user data**

Collection of user data is an easy task since all the user information in stored in our server but to maintain the confidentiality of data we will ask for user permissions to use user data for analysis purpose and will ensure confidentiality of every data related to data. The data samples are collected from user without disclosing any of user identity.

**4.9 Data Mining Techniques**

The data collected from user is used to evolve certain user patterns, clustering and association of the expenses. The Extraction of interesting patterns that is non-trivial, implicit, previously

unknown and potentially useful patterns or knowledge from huge amount of data. We would apply appropriate algorithms of some famous data mining techniques available today. However, this would need helping hand from a data mining expert.

#### 4.10 Settlement of shares

This is one of the main feature of our application. We will link the payment gateways like paytm to make payments to other users for the settlement of the bill. We will also provide e-wallet facility to our users so that they can add money in their wallet and make transactions.

## 5. Implementation

### 5.1 Methods

The methods adopted for the development the application to manage both personal and group expenses are proposed in earlier section of this paper. However, this section will elaborate those method used to obtain results using inputs from the users and this would also use data from database to evolve results like trends and estimations.

#### 5.1.1 Splitting of bill

User will be asked to select the method by which he/she want to split the bill. Their will be five option given to the user those are Split equally, Split Unequally, Split by percentage, Split by shares and Split by adjustment based on the selection the bill will be split.

**How was this bill split?**

Paid by you and split equally

You owe **wulan** \$40.00

**wulan** owes you \$40.00

Paid by **wulan** and split equally

More options

#### 5.1.2 Graphical representation

To generate the graph we will use the data from the database and group them weekly or monthly according to the user demand. The sum of all the expenses monthly and all sum of expenses category wise will be done separately and graph based on this data will be shown to user.

After calculating the sum, we divide total by no. of months to achieve average.

This will give the trends of expenses in total and trends for each expenses type for each month on average. Here, to make analyzing expenses trends easy to users we choose to represent those figures graphically (bar graph).

#### 5.1.3 Estimation

This section of our application tells user that how much he/she is going to spend in the next month. The results obtained from this is approximate because it uses the previous months data from the database and calculate the average category wise. We will avoid summing up the expenses that doesn't occur frequently like buying electronics, which are not recurring expense.

#### 5.1.4 Usage of collected data

The data will be collected from the user database having their prior permissions. This will depend on the type of data mining technique adopted so this method is applied at server end have no direct involvement of user. The technical consultant is always available at server end for maintenance service.

#### 5.1.5 Settlement of expenses

We will link the payment gateways like paytm to make payments to other users for the settlement of the bill. We will also provide the facility of e-wallet so that user don't need to enter there bank details again and transactions can be made easily.

## 5.2 Results of research

### 5.2.1 Graphical representation

The sum of all the expenses monthly and all sum of expenses category wise will be done separately and graph based on this data will be shown to user. The aggregate of all expenses month to month of all prior months moreover entire of expenses concentrated around expenses sort autonomously.

To make it easy for the user to understand his/her expenses we make graphical representation of his/her expenses based on the data stored in database.

### 5.2.2 Splitting of bill

The splitting expense results in hassle free calculation of shared expenses occurred in a group. Each and every individual can add the bill and can modify as per the requirements, each time changes made in a bill will notify other users in the group.

### 5.2.3 Usage of user data

Entire usage of collected data will be used only by third party for the purpose analyzing expenses and will have no direct involvement of user. The results obtained this will help market strategist to plan accordingly so that it stabilize the demand supply in the market benefiting all the stakeholders.

### 5.2.4 Settlement of Debts

Payment gateways are handled by professionals. User needs to link there account to make use of this feature or they can simply add money to there wallet and make transactions.

## 6. Performance analysis

### 6.1 Analysis of results

The results obtained were accurate on the performed operations on the application. The application delivered efficiently in calculating split expenses and recording the expenses along with date and time. The application is accurate as the sum of expenses after split is always equal to total expenses. The sharing of expenses according to the users, which is also accurate.

#### 6.1.1 Estimations

This application is showing the approximate results based on previous monthly records. These results are just average of expenses monthly for both group and personal expenses from database tables. It only consider the recurring expenses of the particular user.

#### 6.1.2 Settlement of shares

All the transaction are transparent to the user. Settling of shares is made very user friendly and as smooth as breeze.

### 6.1.3 Collection of data

This is not part of client side application and solely server side application. These are always hassle free because it is handled by professionals.

## 7 Conclusion

I have developed this application to help user to track a user personal expenses, his/her contribution towards group expenses, maintain monthly income, recurring payments, and to settle all the shares on the spot. It also provides information of “who owes who and by how much”.

This application will reduce human efforts for the settlement of the shares. It will also minimise the human interfere in the splitting process which will lead to the most accurate results. The application will eliminate sticky note, spreadsheet and ledger that cause confusions, data inconsistency problems while recording and splitting of expenses.

As part of research, I considered adding certain features to the application to make it more useful to the user. Some of the extra features are like enabling users to register to the application using existing email or social network account, it will synchronize the users profile information to the application. Apart from this application can be used to collect the user expense data with permissions and use those sample data as parameters to evaluate patterns of spending. Using data mining technique expenses can be classified and user can reduce the unwanted expenses which will increase his/her savings.

This application will not only help user to maintain expenses but will also settle the expenses on the spot which could be the hectic process.

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