EXPENSE MANAGEMENT USING OPTICAL CHARACTER RECOGNITION (OCR)

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Abstract - : We present an intelligent expense tracker to efficiently manage the monthly expenses. Our system will help everyone who are planning to know their expenses and save from it. The user will be given the facility to set a monthly limit and if the user crosses that limit our app will notify the user about the same. The user can give receipts as an input, using our Android app. will sort it into different categories. Here user can also define their own categories like food, clothing, rent and bills and the user can also set limits for a particular category. User will be provided with visual statistics of expenses by transaction date or by category. This project is not indentedfor a particular user or age group but anyone and everyone who wants to track their expense can use this app. So, the general idea of this Project is to help people view and study their overall expenditure pattern by developing a mobile application to analyse all the purchases made by the user by simply scanning the receipts.

***Key Words*:** Optical Character Recognition (OCR), Android, Text Extraction, Image Processing

1.INTRODUCTION

In order to trace their expenses, People generally use traditional paper system to stay the record of their income and expenditures. this sort of traditional system is burdensome and takes longer. So, there must be a management system which must help us to manage our daily earnings and expenses easily and helps us to find the records efficiently. So, we puzzled out the simplest way to eliminate the normal system with digital, portable, easier and easy to record these data in precisely few clicks with our Android application called "Expense Manager". The thought of this Project is to assist people view and study their overall expenditure analysis with the assistance of a mobile app to research all the purchases made by the user by simply scanning all the bills and receipts. The User should just click a picture of a receipt or choose one from the Gallery and track their payments. Using machine learning, the app is able to group items category-wise, for example- food, clothes, stationery, etc. The User can monitor his/her expenses and analyse them categorically using graphs and tables, enabling them to raise understand their expense patterns and help them spend intelligently. Using this app, the users may set monthly limits over specific categories helping them to avoid over-spend on those items. The app also will prompt users after they overspend or make repeat purchases. Our main aim is to create our users capable of achieving Personal Life goals by giving them the flexibility to monitor their expenses; analyse the buying trends; and assess their account's future transactions. And hence, the most objectives of developing this intelligent expense tracker are to supply higher a sense of expenditure to our users thereby promoting savings.

2. Literature Review

1. Jenis J. Macwan, Mukesh M. Goswami, Archana N. Vyas, "A Survey on Offline Handwritten North Indian Script Symbol Recognition", International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) – 2016, Around 90000 images of more than 40 different classes of characters of Devanagari script were segmented from handwritten documents. Used deep learning architecture for recognition and CNN for superior result to traditional shallow networks in many recognition tasks and focus the use of Idler and dataset increment approach to improve test accuracy. The base form of consonant characters can be combined with vowels to form additional characters which is not explored in that research. So, they used Deep CNNs with additional Dataset increment techniques and Dropout layer which results in very high test accuracy even for a various and challenging dataset.
2. Shruthi A , M S Patel," Offline Handwritten Word Recognition using Multiple Features with SVM Classifier for Holistic Approach" , International Journal of Innovative Research in Computer and Communication Engineering, June 2015, they describes same problem of handwriting recognition. They used holistic approach to identify the handwritten words, each word take is an individual entity so holistic approach is better and used such methods namely density features, long run features and structural features for extraction in the input handwritten document image. After that they apply classification by using Support Vector Machines (SVM). They achieved 88.13% of recognition rate.
3. AKM Ashiquzzaman and Abdul Kawsar Tushar," Handwritten Arabic Numeral Recognition using Deep Learning Neural Networks", 2011., they researched on digit recognition in Arabic with help of CNN. They proposed a novel algorithm based on deep learning neural networks using appropriate activation function and regularization layer, which shows significantly improved accuracy compared to the existing Arabic numeral recognition methods. In the Multi-Layer Perceptron (MLP) model, they implement dropout regularization to reduce over fitting in between fully

connected layers. The output layer, consisting of 10 neurons with softmax activation, predicts the probability for 10 individual digit classes (0-9).
They apply two methods in it, MLP and CNN but they achieved high accuracy in CNN.
4. Darmatasia and Mohamad Ivan Fanany," Handwriting Recognition on Form Document Using Convolutional Neural Network and Support Vector Machines", 2017 Fifth International Conference on Information and Communication Technology (ICoICT), 2017., they propose a workflow and a machine learning model for recognizing handwritten characters on form document. It is based on CNN as a powerful feature extraction and Support Vector Machines (SVM) as a high-end classifier. Based on the experiment results using data, both for training and testing, the proposed method achieves an accuracy rate better than only CNN method. The proposed method was also validated using ten folds cross-validation, and it shows that the recognition rate for this proposed method is still able to be improved.

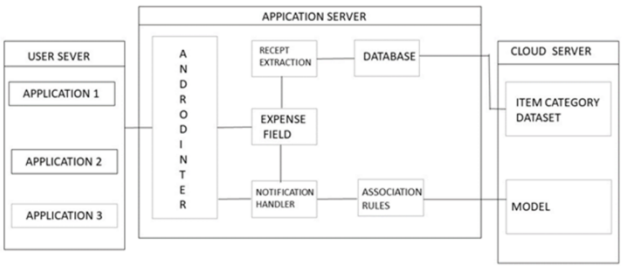
3. PROPOSED SYSTEM

The application will provide the following functionalities: -
• Upload a receipt by clicking an image or choosing from Gallery and directly convert them intoexpenses by items.
• The Application will categorize these items in specific categories (such as Groceries, Clothes, Stationery, etc.) which will help the user to manage their budget wisely ensuring an efficient budget.
• Users can set monthly limits on their expenses which will be tracked daily and help user spend their future expenses wisely.
• An Alert will be generated in case the user crosses their monthly limit helping them decide to reduce or stop further expenses as necessary. User can also monitor his/her expenses and analyze categorically using graphs and tables provided by the application.

4. IMPLEMENTATION DETAILS

The project module for an Expense Management Using Optical Character Recognition (OCR) project can be broken down into the following steps:
Requirement Gathering: This involves understanding the current expense management process, identifying pain points, and defining the requirements for the OCR solution.
OCR Solution Selection: This involves selecting an OCR solution that can scan and extract data from receipts and other expense-related documents with a high level of accuracy.
OCR Integration: This involves integrating the selected OCR solution with the company's existing expense management system or implementing a new expense management system that can work with the OCR solution.
Testing and Validation: This involves testing the OCR solution and the expense management system to ensure that they work together seamlessly and accurately capture and process expense-related data.
Deployment and Training: This involves deploying the OCR solution and expense management system to the users and training them on how to use the new system effectively.

5. SYSTEM ARCHITECTURE



The architecture as shown above has three blocks program, application server and cloud server. The interface displays the appliance with which the user can interact while the cloud server consists of various datasets and AI model. the appliance server further consists of the subsequent modules android interface, receipt extraction, expense field, notification handler, association rules and database which is required for appropriate action.
The usual process of the architecture is as follows: -
•The user sends appropriate command or request to the server through the net, using the interface of the applying.
•The application server is accountable for forwarding the command to the requested server.
•The server finds the results of requested commands (either the info processing or the database querying).
•The software or application delivers the processed information to the server.
•The server provides the user with the requested data.

5. RESULT

In this project we implemented image processing libraries Google ML kit to recognize the text in scanned receipts and bills. The input receipts were successfully processed to give necessary outputs such as date of transaction, item name and cost of the item. This extracted data was satisfactorily sorted into different categories and was displayed to the user in the form of bar graph as shown below.

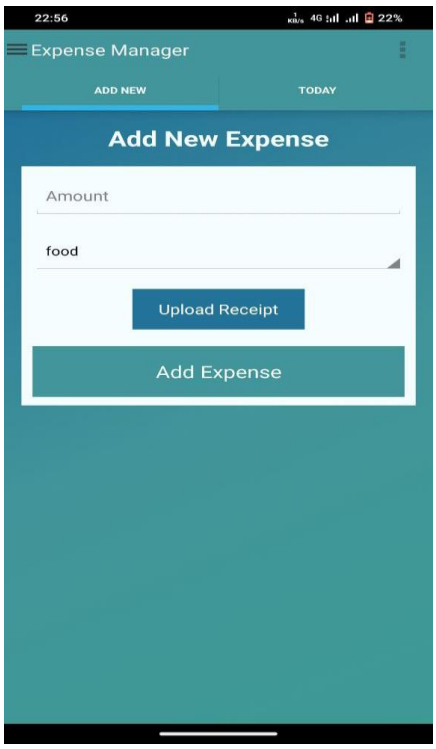


Fig.1. Add Expense

This image is the UI for adding expenses manually as well as through image in the application. It will show that two entries such end amount and category of product. It also show the option for adding expense for upload receipt . we can also generate the new expense using option 'Add expense'.

Fig.2 Bill Image is Uploaded for Extraction

By clicking on "Upload Image" option, camera is been accessed and hence we can take the photo of receipt and upload the image as shown above.

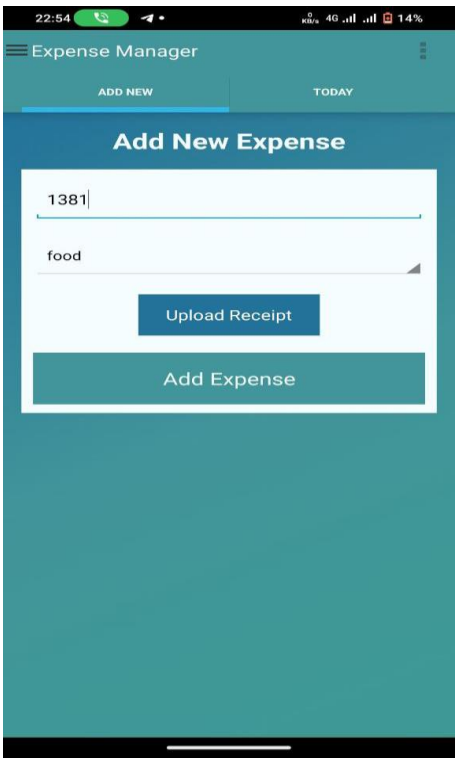


Fig.3 Data Extraction From Receipt

The end amount and category is extracted and is been entered in their respective columns as shown above.

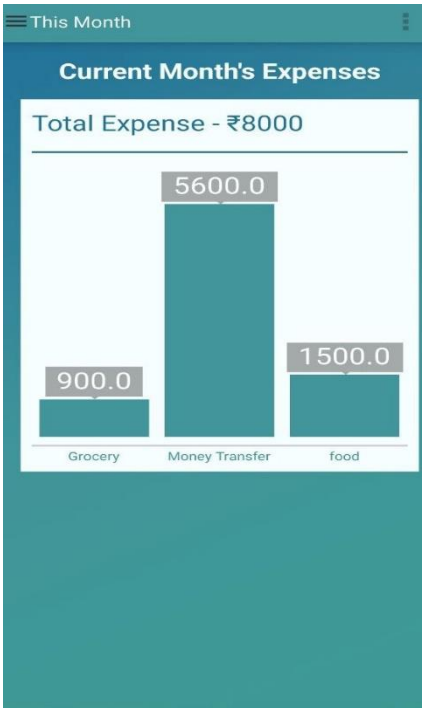


Fig..4 Graphical Representation

The above bar graph shows the monthly expenses of the user sorted into their respective categories i.e. 'Grocery', 'Money Transfer', 'Food' resp.

6. CONCLUSION AND FUTURE WORK

We have presented a working prototype of intelligent expense tracker. The development of this application has been conducted in a stepwise manner using the well-defined methodology, customized according to the requirements of the system. This application will successfully help all those people who wants to track their expenses to get a better sense of their expenditure thereby promoting savings. The development of this application has been conducted in a stepwise manner using the well-defined methodology, customized according to the requirements of the system. Most of the goals set at the beginning of the development phase have been met. Future work can be like we can integrate this app with any of our credit / debit / cash card & keep track directly from our saving account. Once when we start doing that this will help us to update details automatically rather than updating in manually.

7. REFERENCES

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