International Currency Translator using IoT for shopping

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Abstract – Now-a-days, there is a bar code or QR code reader that reads bar or QR code on the item and evaluates as a price. In the view of international passengers need, an app with integrated sensor to be built that caters needs of international customers or passengers. Especially, those passengers who would like to do shopping at air ports or intermediate cities, there this IoT based app will translate the one country’s money to another country’s money. Hence, the proposed IoT for translation of your currency into desired currency without any intermediate brokers who will charge some percentage than the defined service charge of that country. This proposed Internet of Things (IoT) app is built by keeping international customer service into consideration and the yields many advantages such as accuracy without loss or profit, minimization of brokerage service charges, and transparency among the countries tax service rules. The proposed app with integrated sensor feeds the input amount into desired country’s currency by taking service rules of the country. The performance of this IoT is demonstrated in results and its working is sketched in the novel app. In this, GPS is used to take the location of the country to which the source currency to be translated.

Keywords: translator, sensor, automation, IoT, GPS and performance

1. Introduction
In daily life, people are moving from one country to other country in the aero planes. During the journey, the passengers may stay for hours together at some intermediate airports or they have some time to roam in intermediate cities where they have to stay for some hours to catch connected flights to destination. During this idle period, the passengers would like to do shopping might be disappointed. Also this leads that customer may approach external broker for converting their native money to desired currency. This would also panic to the customer and may lose some percentage of money because intermediate broker may charge extra amount for converting the currency. This panic situation causes brainstorming deal that a sensor to be built in such a way that works like reading the price of an item, translates the customer money into their country currency by obeying servicing policies and rules of that country, and deducts that calculated money from the customer native money. The proposed IoT device automatically detects the existing country location and its currency through GPS system provided as built in service in the app that is to be designed. This introduction follows the development of proposed approach where features of the app integrated with IoT sensor to be listed, architecture of the app that integrated with IoT sensor to be discussed, and pseudo strategy to be defined that shows working of that app that is integrated with IoT device. The proposed approach follows the results along with examples which later follows the conclusion where purpose of the app that is integrated with the sensor to be discussed and outlined the accuracy achieved through the results.
2. Literature Review

There were few studies where procedures are explained and service charges are imposed. Specifically, the customer of one country to be able to transfer the amount to another's country but currency is a restriction here. The approaches used in [1],[2] are time consuming processes and also involves FCFS basis as well as queue of funds available in the parent country's currency. The approaches specified in [3],[4],[5] are just for translating the one country currency into another country currency orally. The approach used is a guide that demonstrates the currency in one form to another form. There were studies indexed in [6],[7],[8],[9],[10] are used to guide how to make payment through variety of options and by variety of methodologies. There were other studies demonstrated in other listed references where concepts like designing the website, providing IoT feature over other applications, and various security approaches in the proposed IoT applications. In these studies, oral or guidance is provided about a specific country amount into another country specific amount. But it is not to be done in real time and also these are not aim for increasing the sales of online shopping or the store sales. In studies [11],[12], first study describes about activities of a home to be done using IoT and second study demonstrates about designing e-commerce websites based on customer values, and trust. In studies [13],[14], first study is on urban climate monitoring using IoT and data analytics and second study is on working with geo-map for social media data like facebook and its consequences. In studies [15],[16], one study is about face recognition using pre-filter techniques and edge detection schemes and second study is on smoothing of time using kalman filter in GPS receivers. In [17],[18] studies, one is about inventory tracking of a kitchen using IoT, and second is on working of a model and its applications based on IoT. In [19],[20], first one is focused on evaluation of websites using opinion mining and second is reviewing the personal and merchant relation. In [21] and [22], the first is describing about website optimization using page and content rankings and second is describing about designing new privacy approach using PMD-graph mechanism. In [23] and [24], the studies represent about Hybrid context aware for pervasive smart environment and its consequences is discussed as one, other is about on smart emergency responsive environment for fire hazards using IoT and its consequences are discussed. In [25] and [26] states that one is on THAM index for agriculture decision making using IoT and other is on specific nano-tube arrays for sensing acetone room temperature and their implications. These are although different w.r.to application, the terminology of IoT and its application nature is useful in our proposed application. In all the mentioned studies, somehow related and partly are useful but not dealt expected nature of the proposed methodology. Hence, a scenario is expected to that translates the amount in one type to another type and that amount with service rules charge also imposed and calculates the final amount to be paid by the customer. In daily life, people are moving from one country to other country in the aeroplanes. During the journey, the passengers may stay for hours together at some intermediate airports or they have some time to roam in intermediate cities where they have to stay for some hours to catch connected flights to destination. During this idle period, the passengers would like to do shopping might be disappointed. Also this leads that customer may approach external broker for converting their native money to desired currency. This would also panic to the customer and may lose some percentage of money because intermediate broker may charge extra amount for converting the currency. This panic situation causes brainstorming deal that a sensor to be built in such a way that works like reading the price of an item, translates the customer money into their country currency by obeying servicing policies and rules of that country, and deducts that calculated money from the customer native money. The proposed IoT device automatically detects the existing country location and its currency through GPS system provided as built in service in the app that is to be designed. This introduction follows the development of proposed approach where features of the app integrated with IoT sensor to be listed, architecture of the app that integrated with IoT sensor to be discussed, and pseudo strategy to be defined that shows working of that app that is integrated with IoT device. The proposed approach follows the results along with examples which later follows the conclusion where purpose of the app that is integrated with the sensor to be discussed and outlined the accuracy achieved through the results.

3. Proposed Approach

In this proposed strategy, the features of the novel sensor for currency translator to be discussed, architecture of the novel sensor to be depicted, pseudo code working of the novel sensor to be defined. The features of the novel sensor for translating source money into desired country currency are defined as follows:

a) Input: It reads price of an item or product through the QR code or Bar code present. For reading the code, scanner is used for grasping the code.

b) Processing: It takes price of the item as input. It also identifies the location of the existing place which tells desired currency using GPS module. Here, GPS service gets location dynamically from the satellite. This
processing based on service rules of the country, translates that desired currency into customer source money using online built in apps available with security guaranteed. The customer came to know the amount to pay on the display of the gadget. Now, using the secured gateways that are available, the payment to be made in that located country’s currency.

c) **Output:** The Customer’s account to be updated with the balance. The device also displays bill for the product purchased at the intermediate city of the country during their journey.

The international currency translator app consists of four modules which are as follows:

a) **Code Reader:** It is the first module to be called during the operation. It scans the code of the product. The code converts the code into product and its details along with cost.

b) **Online Translator (C\text{src}, C\text{destination}):** It has built in service such as www.xe.com or www.calculatorsoup.com or www.convertmymoney.com, any of these could convert the price of the product in one currency (local currency) into customer’s currency. It displays the amount needs to pay towards the product. The customer has to check the amount and will go to next module.

c) **Online Payment with Service Rules:** This module is loaded with service rules of the country because the location of shop picks that country. Example: The Saudi Arabia currency is Saudi riyal and is 19.80 value in India currency INR. Suppose the camera cost is Saudi riyal is 849 Riyal and that price to be converted into 16,810 + 10% of service rules to be paid, total will become 16,978/-. This is to be converted into Saudi riyal and will become 857.5. From customer account, 16,978 to be deducted and that amount in Saudi riyal 857.5 is taken.

d) **Updation and Alerting:** After payment is done by either international debit card or by international payment method. The amount of the customer in source currency to be updated and will get alert message regarding the transaction from the sender bank.
The pseudo code of the whole application is as follows:

Pseudo_Procedure InternationalCurrencyTranslator(Customer_details, Source_Currency, Target_Currency):

Fig. 1: Architecture of International Currency Translator

Fig. 2: Flowchart of International Currency Translator
Step 1: Call the Code Reader(Product_code):
1.1 Reads the code on the product
1.2 Converts that code into product details

Step 2: Calls the online Translator(Source_Currency, Target_Currency):
2.1 Access the www.xe.com where Source_Currency to be converted into Target_Currency. The available target currency is more than product price in that currency, the user is allowed to purchase or the choice of the user to pay that product price amount by two or three bank accounts that accumulate the product price.

Step 3: Calling the Online payment with service rules: Automatically, service rules charge to be added to the product price according to the location of the shop, that final amount in target currency to be debited from the customer source currency. That debited operation will navigate to next module.

Step 4: Call the updating and alerting: The debit operation will update automatically from the bank site and alert message will be propagated to the customer as well as the merchant account.

The following diagram shows the flow of interaction of modules in the order to achieve the aim of the proposed approach.

Next, the input and output of each module is discussed in results chapter.

4. Results and discussion

This results chapter will discuss the screen shots of the app titled international currency translator for shopping with service rules charge. The modules involved are code reader, online currency translator, online payment with service rules, and updating the balance and alerting to both customer and merchant.

Step 1: If new User, sign up into the app. If already a member, Log in to the app that is integrated with IoT Sensor at merchant shop. It has option to scan the product through QR code or code reader scanner will read the pattern and supplies that pattern to the app.

![Sign Up of the customer](image1)

Fig.3: Sign Up of the customer

![Details to be filled by the customer during the sign up](image2)

Fig.4: Details to be filled by the customer during the sign up
Fig. 5: Entering OTP and Password by the customer

5. Step 2: The app takes code as input that is supplied by the merchant code reader

Bar code

849 Saudi Riyal

6. (or)

Fig. 8: Options could be web camera QR code Scanner or Bar code Scanner
Step 3: The online currency translator will change that currency of one form to customer currency. This will navigate to currency translator website and takes that amount to be deducted from the customer who would like to do shopping.

Fig. 9: amount in target country currency

Step 4: If the amount in customer is more than the translated amount, then customer is allowed to do shopping. If the amount is less than the translated amount, then customer will choose to pay by more than one bank using splitting option. If the option is second one, the payment is made from more than one bank one after the other.

Fig. 10: Choose Payment Approach

Step 5: Once amount is calculated with service charge, the amount will be debited by customer choice such as card or by online.
Step 6: Once the amount is debited, the customer’s account and merchant’s account are updated and are alerted.

After payment is done, the concerned bank will update the balances and alert through SMS and invoices to their mails for future reference.

5. Conclusions
In this, the proposed method is an app titled international currency translator for shopping. Firstly, the input device is used to scan the code on the product or item. Once it is done, the local price would be automatically translated to customer currency according to service rules of that country. This approach eliminates intermediate brokerage charges on the customer. Hence, user friendliness is achieved by this approach and gets the customer satisfaction. At present, bit coins are accepted internationally but getting those coins and maintaining them is time consuming and tedious process. Moreover, these bit coins are initially became more popular and are not accepted everywhere in the world. Hence, the alternative is our approach where automatic translation of customer currency into local currency according to policies of that country. It increases customer satisfaction and user friendliness during the service.

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