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Smart Payment System and Goods Billing Management

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Abstract

In this paper we Current result Billing Management for Goods use a manual system to shop input in different systems. The system is prone to numerous anomalies and frauds spread across result sensitive data. There is no way analyze the result data. We want to propose a solution for a secured and automated system to manage Goods data and billing system securely and reduce the manual efforts.

It is essential to have an automatic billing system for goods In the present scenario of supermarket and other wholesale & retail stores. Numerous billing systems like barcode scanning mechanism-based systems or tag-based systems are available in the market. It is important to replace such existing system with better and robust systems so hereby we proposed "Smart Payment System and Goods Billing Management."

However, product recognition is a tough task because the same product can be photographed from different angles, in different lighting, with varying levels of occlusion, etc. Also, different fine-grained product labels, such as ones in royal blue or turquoise, may prove difficult to distinguish visually. Fortunately, properly tuned convolutional neural networks can effectively resolve these problems.

Currently the results are processed manually there is no such system for Goods Billing by e commerce industry and upload to results for further information to online system, which leads to

Error prone operations Selection of required goods with minimal time span. No way to see overall picture for all the available goods. The above challenges lead to insecure result data ,time consuming and missing business Intelligence.

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I. INTRODUCTION

Data Collection by Existing Process

E commerce business organizations provided us with hyperlinks to more than 50,000 pictures of shoes, dresses, pants and outerwear. Some tasks were attached to every picture and some labels were matched to every task. Here are some examples:

task	labels
dress: occasion	wedding party, cocktail party, cocktail, party, formal, prom
dress: length	knee
dress: color	dark red, red

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Our goal was to match a proper label to every task for every picture from the test set. From the machine learning perspective this was a multi-label classification problem.

There were 45 tasks in total (a dozen per cloth type) and we had to predict a label for all of them for every picture. However, tasks not attached to the particular test image were skipped during the evaluation. Actually, usually only a few tasks were relevant to a picture.

II. ORIGIN OF THE PROPOSAL

Day by day, the lifestyle of today's generation is changing which enforce to have more number of shopping malls, supermarkets and retail outlets. It is very common to see huge crowd every shopping area like as at malls on festive season and weekends. The scenario is even worse when there are special offers and discount . so there fore It is essential to have efficient billing management system in those places so that people coming for purchasing can avoid long queue on billing counter, save time and shop comfortably. By the requisite of such payment methods we here by "Smart Payment System and Goods Billing Management" is proposed to achieve above said goal.

There were two main problems with data:

We visited at Driosys but we provided only few information to start our project and received some hyperlinks not only the complete picture format data to match the labels properly. Around 10% of them were expired, so our dataset was significantly smaller than the organizer had intended. Moreover, the hyperlinks were a potential source of a data leak. One could use text-classification techniques to take advantage of leaked features hidden in hyperlinks, though we opted not to do that.

Some labels with the same meaning were treated by the organizer as different, for example "gray" and "grey", "camo" and "camouflage". This introduced noise in the training data and distorted the training itself. Also, we had no choice but to guess if a particular picture from the test set was labeled by the organizer as either "camo" or "camouflage".

III. WORKING METHODOLOGY

Goods Billing Management and payment is a new kind of store with no checkout required. We created the world's most advanced shopping technology so you never have to wait in line. With our Just Walk Out Shopping experience, simply use the Goods app to enter the store, take the products you want, and go! No lines, no checkout. Our checkout-free shopping experience is made possible by the same types of technologies used in self-driving cars: computer vision, sensor fusion, and deep learning. Our Just Walk Out Technology automatically detects when products are taken from or returned to the shelves and keeps track of them in a virtual cart. When you're done shopping, you can just leave the store. A little later, we'll send you a receipt and charge your account.

The smart phone is utilized as bar-code scanner using android application and connected to the main system wirelessly for purpose of updating the information about products, bills, payment and sales record. PIC16F877A 8- bit Mi-crocontroller is used for controlling every process in this approach. Scan to Arduino application is used for turning a smart phone into wireless barcode scanner . Bluetooth module is interfaced for providing communication between MCU and bar-code scanner (Smart Phone). PLX-DAQ by Parallax is computer application which is used for maintaining the database on laptop/PC by communicating with MCU using serial port]. It keeps the track record of the product, individual product price, the total price for items purchased by customer, name of customer, date & time of products sold, Method of Payment, sales record etc. RFID reader is used for card based payment system as RFID cards are used in this prototype for payment. Alphanumeric LCD has used for display the information related to product, bill or payment. Block Diagram of proposed method is shown in Figure . This approach can be very

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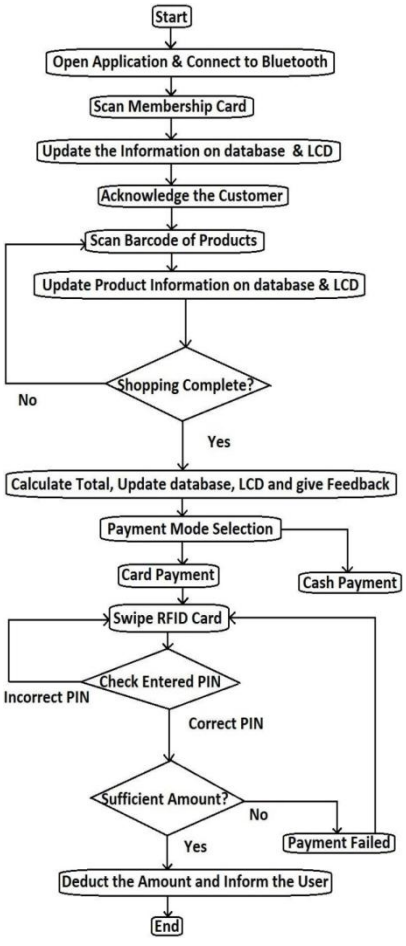
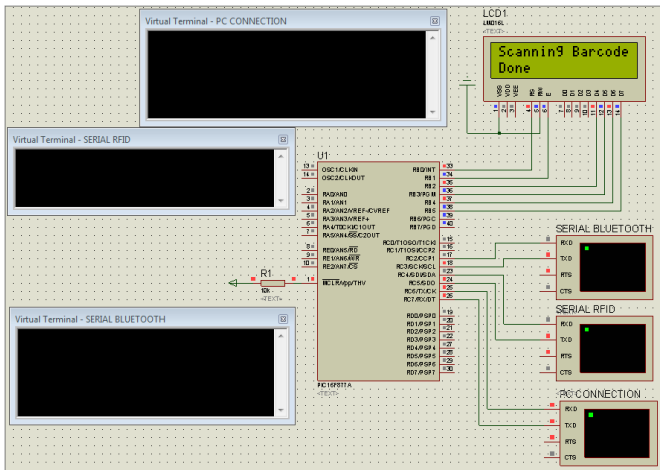
beneficial **by utilized it** in the real world by understanding and im-plemented it in following described way. Customers entered in shopping malls firstly need to open the "Scan to Arduino" Applica-tion and then connect their smart phone to the cash counter using Bluetooth . After this, customer needs to scan his/her member-ship card from the smart phone. After the customer identification, the user will receive the feedback from the MCU and welcome them for shopping. The customer can now take the trolley and manually scan the items using their barcode and place them in the trolley. There is no limit of scanning goods so the customer can buy any number of items and quantity as per requirement. Once shopping is complete then the customer will notify the system by sending some text about the completion of shopping. Now the database will up-date the total amount of shopping along with individual items and their cost. This total amount information will be sent back to us.



illustrates the central node and zone creation process for a simple case of one source and two core or central nodes with their respective zone members. In the request phase the source S broadcasts the JOIN REQUEST to all nodes in the network. The arrow flow shown in the request phase gives an idea about the propagation of the request message and does not capture every packet transmission. When a node receives a request packet it stores the hop count value in the packet. In the figure, the numeric value in each node denotes the hop



Bar Code Scanning Process

A bunch of convolutional neural networks Our solution consisted of about 20 convolution neural networks. We used the following architectures in several variants:DenseNet, ResNet, Inception, VGG.

All of them were initialized with weights pretrained on the Image Net dataset. Our models also differed in terms of the data preprocessing (cropping, normalizing, resizing, switching of color channels) and augmentation applied .All the neural networks were implemented using the PyTorch frame work. Choosing the Training loss function Which loss function to choose for the training stage was one of the major problems we faced. 576 unique pairs of task/label occurred in the training data so the outputs of our networks were 576-dimensional. On the other hand, typically only a few labels were matched to a picture's tasks. Therefore the ground truth vector

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was very sparse – only a few of its 576 coordinates were nonzero – so we struggled to choose the right training loss function.

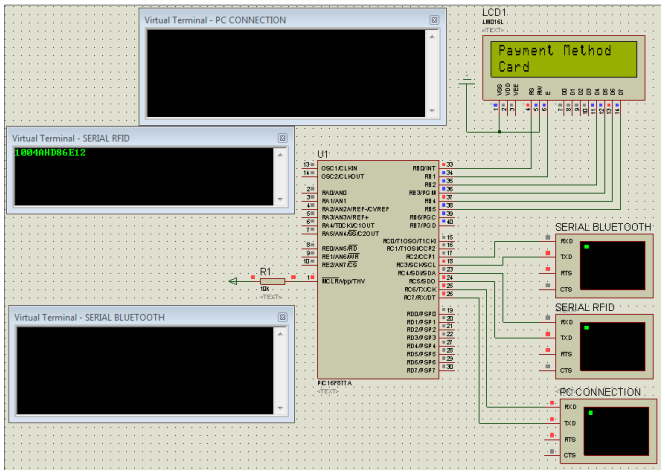
Assume that $(z_1, \ldots, z_{576}) in mathbb{R}^{576}$ is a model output and

[y_i=left{begin{array}{ll}1, & text{if task/label pair }itext{ matches the picture,}, & text{elsewhere,}end{array}right.quadtext{for } i=1,2,ldots,576.]

- As this was a multi-label classification problem, choosing the popular crossentropy loss function:
  $[sum_{i=1}^{576} - y_i log p_i, quadtextwhere p_i = frac exp(z_i) sum_{j=1}^{576} exp(z_j),]$
  wouldn't be a good idea. This loss function tries to distinguish only one class from others.
- Also, for the 'element-wise binary crossentropy' loss function:
  $[sum_{i=1}^{576} - y_i log q_i - (1-y_i) log(1-q_i), quadtextwhere q_i = frac 1 1 + exp(-z_i),]$
  the sparsity caused the models to end up constantly predicting no labels for any picture.
- In our solution, we used the 'weighted element-wise crossentropy' given by:
  $[sum_{i=1}^{576} - bigg(frac 576 sum_{j=1}^{576} y_j bigg) cdot y_i log q_i - (1-y_i) log(1-q_i), quadtextwhere$
  This loss function focused the optimization on positive cases.

IV. SIMULATION RESULTS

Simulation-based results are proposed for this approach using Pro-teus software which is quite popular for simulation of both digital and analog electronics systems. Proteus 7.10 is used in this simula-tion result for analyzing and verifies the behavior of proposed method [13]. Virtual Terminal is used in the simulation for the pur-pose of serial communication with various modules. Barcode scan-ning is the basic process used for scanning various products and membership cards as shown in After the scanning of all the products, next step is payment. The customer can pay via cash or card based payment. A RFID tag consists of a wireless transducer, an antenna, and an encapsulating material. These tags can be active or passive. While the active tags have on-chip power, passive tags use the power induced by the magnetic field of the RFID reader [4]. In card based payment, passive RFID cards are used which generate unique 12 bytes codes when swiping to RFID reader. This 12 bytes unique code is received by MCU after card swiping then received data is used to identify the card owner and PIN. RFID card scanning process



RFID Card Scanning Process

V. CONCLUSION AND FUTURE WORK

In this paper, we have demonstrated a method which makes the bill-ing of goods in efficient, easier and fast way. Existing system makes use of hardware barcode scanners on billing counters results in a long queue. Many researchers proposed methods to overcome this problem but there is a lack of efficiency and realistic in their work so we have proposed better method along with simulation and hard-ware results so as to check the behaviour in the real world. Although we have observed good results in our approach but we have used Bluetooth module in our approach which can be connected to a lim-ited number of devices and range is limited. So there is a possibilityto make use of algorithms which can bring the concurrency for all the users and reduce the waiting time. In our next work, we are working on scheduling algorithm for providing services to large number of customers simultaneously.

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