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Smart E-Loco

By

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Declaration

I declare that this or any other University has not previously submitted this work for the awarding of the course marks. To the best of my knowledge and belief, this wok contains no material previously published or written by another person except where due reference is made.

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Approval

The project of Reinhardt Ilelwa Bonke was reviewed and approved by the following:

Supervisor Name: David Kirop

Signature: …………………

Dedication

I dedicate this research to my parents Mr &Mrs Khalisia for pushing me this far to make this a success. I would also like to thank the entire computer science fraternity for their endless support this far.

Acknowledgment

ABSTRACT

The main purpose of this project is to develop an e-commerce platform that will accommodate local businesses for example Small and Medium Enterprises (SME's) such as the Juakali industry and connect them to the local market within their locality. Majority of the SME's don't use e-commerce platforms because of the upfront amount of money that has to be spent in developing the system to their liking, hosting and domain charges which is very expensive. Developing the system with only a limited amount of products doesn't also attract the traffic they expected hence most don't of them don't give it a priority. I'm looking forward to develop a system that will bring several businesses together under one platform and connect them to their local market who many at times don't know they exist.

The system will be developed in Django for the back-end and use bootstrap, Cascading Style Sheet(CSS), Hyper Text Markup Language(TML and JavaScript for the front-end. Django is a light weight language hence quick response rate. The system will be integrated with Google Geo-location API so that it can only show businesses within a given area to the client within that area. The system will provide stores to the SMEs with an admin panel to control their stores within the system. The SMEs using the system will be able to add products including description, product photos and pricing, remove them and update their products in their stores. The shoppers will be able to access the goods in various stores within their locality, add the goods to cart, remove the goods from cart and also check out and make payments for the goods.

The e-commerce platform will use a multi-tenant architecture where the stores in the back-end will be same for all stores. The front end will enlist all products within the area. The customer has an option of logging and shopping or shopping as an anonymous user and login at checkout customer will be able to add goods to cart, update the cart in terms of quantity, and also clear the cart. After adding to cart the customer will be able to checkout from the checkout page where he/she will select the mode of payment and pay for the goods and order will be placed after successful payment. All placed orders will be displayed to the seller in the admin panel.

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KEYWORDS

- The system
- Django
- Html
- CSS
- JavaScript
- SMEs
- Stores
- Cart
- Amazon cloud
- Cloud servers

Tables

Abbreviations

Smart E-loco – Smart E-commerce platform that connect local sellers to local buyers

S.M.E – Small and Medium scale Enterprises

HTML - Hyper Text Markup Language

CSS- Cascading Style Sheets

KES – Kenyan Shillings

Figures

CHAPTER 1: INTRODUCTION

1.1 Introduction

Alexander (2020) The impact of COVID-19 on small business outcomes and expectations: shows that there has been a massive shut down of businesses that relied on physical contact with clients some choosing transitioning to online operations since the fall of the pandemic Covid-19.In many countries, mandatory lock down and curfews were put in place to control the spread of the disease. This immensely affected a lot of businesses and some are still affected by the pandemic. This has seen a rise in the e-commerce industry as most opted to reach their clients from home, but for others setting up the e-commerce platform to sell one or two products is expensive hence running out of options to survive the pandemic and the changing dynamics of the economy.

Smart E-loco means connecting local buyers via e-commerce platform to businesses operating within the locality. My project seeks to create stores under one platform for small and medium scale businesses within a local area for the shoppers within the area. According to an article by Outer Box(2020) it costs about KES.500,000 to build an individual e-commerce platform. E-loco will involve building a shared e-commerce platform will make it much cheaper and by integrating the Geo-location API it will bring growth to the local industry as goods within a given locality are consumed by the locals. The project will provide an admin panel for the sellers to add items, descriptions images and price of the product to the system, They will also be in a position to adjust and remove items from their stores. The customers on the other hand will be in able to view goods within their area, select the products and add to cart, remove items from cart, adjust quantity of the product they need then finally checkout and make payment. Once the payments have been successfully made the order is placed and acted upon by the seller.

The project gives the customer various payments options such as PayPal, cards and once the payments are made records of the same are made.

1.2 Problem statement

Due to the pandemic people are moving to online shopping shifting from the traditional shopping so as to avoid infections. People also prefer online shopping because it unveils a variety of

products. The big challenge is delivery period because most e-commerce platforms deal with goods confined to Nairobi and outside Kenya hence the shopper has to wait for quite some time for them to be delivered. This may take days, weeks sometimes even months. In most cases the items that the shopper is buying online are located within the area he/she resides just that the shopper doesn't know where exactly to get them hence has to wait for weeks to get his/her order while it could have taken hours to have the product delivered.

1.3 Objectives

1.3.0 Assessment Objectives
This project is going to address the following problems:
- Expensive individual e-commerce setup – business have to spend a lot hiring developers to build and maintain the system.

The objectives are as follows:

1.3.1 Specific Objectives
- Designing and building stores to accommodate vendors' products
- Each user should be able to see products in their cart.
- Assess to see if customers should be able to view and add products to cart even without logging in.

- Assess to see if customers can edit products added to cart: they should be able to increment, decrement and even remove the product from the cart all together.

- Assess system for integrity use and performance

- Avail local products to customers within the area. This will be done by encompassing Geo-location API to group the stores according to geographical location.

1.4 Justification
The purpose of this project is to avail an e-commerce platform to local business who can afford to setup individual platforms. It also aims to avail products available to the customer within the shortest time possible by enabling them to shop at virtual stalls within their location.

The purpose of this project is to setup an e-commerce platform that has an eye catching user interface for the front-end to attract customers use a Geo-location API to enable accessibility within the geographical location. It should allow businesses add products to their stores For the back-end.

1.5 Assumptions
- User knows how to shop online
- User has a access to online platform

1.6 Scope

This project will cover Django back-end and bootstrap for front-end .Geo-location API will be used to enable the system to display products being sold within a given geographical area.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

E-loco aims at making the consumers' lives easier and interesting by availing an e-commerce platform to them, thus easier access of goods and comfort ability in shopping. Many customers always have a hard time when it comes to shopping. Problems like the shops' locations and exact prices of the commodities they want and even during the pandemic, fear of getting infected.

2.2 Usability

The project will enable customers to access products they want from the comfort of their devices. By integrating the system with Geo-location API, it will be easy to link customers to the local sellers within the area. The customers are then able to shop and add the products to cart and checkout with payment confirmation. The orders will then be delivered to them much more faster and on time.

2.3 Languages

According to Vik(2017) Several languages can be used to setup e-commerce platforms depending on the strengths and weaknesses I.e Java ,JavaScript,Python and Ruby on rails. For this project we used Python Django for the back-end the system as it took less time to develop hence easy to deploy and also its load time faster displaying items per store in a blink. For the front end the project uses React to make it more user friendly and easy to use. This makes it simpler for even the computer illiterate so that they can use it too. Rather than have a user login every time they want to access a given store, they will just login once and navigate to any store they want.

2.4 Cloud Computing

Akinyende (2018) introduced cloud computing with the aim of solving problems affecting e-commerce systems. He examined, analyzed and discussed the current e- commerce system and

came up with cloud computing concepts that will cope with the e-commerce problems. He referred cloud computing as the most reliable, safe, speedy and cost effective platform to carry out transactions. Cloud computing involves using a network of remote servers hosted on the internet, to store, manage and process data, rather than a local server or a personal computer. With the increased rise in global trade and the entire community, Raphael felt that the cost of transacting data via a local server was more costly, to the environment, thus the need for cloud computing. His main idea was solving a global problem by ensuring that, a variety of clients get access to the web based services. On this project,E-loco will be hosted by the Amazon cloud server for a particular number of reasons:

- Accessibility-Since the platform is supposed to help people across the world based on their location hosting it on cloud makes it easily accessible any time.
- Security – The cloud is much secured than hosting it locally in cases of vandalism or natural disasters.

2.5 Culture

Rahman (2017) outlines that, an e-commerce website should be designed in accordance with the culture of the targeted customers. He says that, most websites creates designs in form of pictures, videos, audios, color, images shapes and even graphics. These designs should be created in a manner that attract the target audience and respectful at the same time. For example, a color red is used in most Chinese websites, since most of them prefer the color to any other. This will attract a large number of customers to visit the website and order anything they need, thus increasing the sales even five times higher. A key feature we will add in the system is the ability of the user to change theme colors based on their liking. Since the system operation is based on locality customers will be able to get the best products in a comfortable culture they are used to. For example, in a Muslim based locality, the female clothing sector in the website will be filled

by several shawls and not short skirts. This will bring more traffic to the system as we will be able to maintain the same culture the customers are used to on our platform.

2.6 Social media

According to Ghaeli(2019) e-commerce can be integrated with social media and Google accounts. Many e-commerce websites support the use of social media apps such as Instagram, Twitter and Facebook and Google account when logging into the website. They argue that, through these social media sites, users can post what they purchased from an e-commerce website, and tag it on the post as well. Sellers can also post on social media platforms, what they are selling, in a much clear manner. This increases the awareness of existence of the system and attracts a large number of customers to visit it. In our project, this will also be an important factor, since, not everyone will have a chance to visit the website, or rather, know about its existence. Through social media, one will thus be able to know about the website's existence in their community and they will gladly consider looking through the website as well, and search for what they want. Sellers will also get a double platform where they can be advertising their goods to all the customers, since, both the ones on social media and those who using the website will be covered.

2.7 E-commerce Security and privacy

Maziriri and Cuchu(2017), talk about risk when it comes to online shopping. Many customers end up making the choice of risk taking, since they have no any other choice apart from putting their trust in the seller. Since the risks associated with the online commodity cannot be foreseen, obstacles end up occurring, thus creating complications to online shopping. There are also numerous reasons varying from place to place, preventing customers from adopting online shopping, such as insufficient funds, payment methods and fear of taking risks. According to John(2018), the main reasons compelling consumers from practicing e-commerce are national culture and social conduct as seen in the people of Thailand. Our e-commerce platform will

incorporate the already existing modes of payments such as PayPal and use of cards which are acceptable by most users

Goldsmith et.al study in A Literature Review of the Trend of Electronic Commerce in Bangladesh Perspective(2017) reveals that, some customers prefer online shipping in order to avoid face to face interaction with the owner of the goods, and also avoid contact with people in the market place. They prefer this since they can shop at the comfort of their homes, and bargain freely without being manipulate with the owner of the products. This is true, since some customers are introverts and don't like being fooled around the market place, and end up causing chaos. Monsuwe et.al(2017) also reviewed that, most customers find it embarrassing when buying some confidential products in a market place. They instead prefer buying them anonymously thus, end up shifting to online shopping whenever they need the confidential product this makes us confident that E-loco will be easily accepted by the individuals that fall in that category.

Richard Dobbs et.al(2017) outlines, most online shops market themselves by the use of low prices. A good example is Amazon which sales books online, at a cheaper price, thus shifting customers from the traditional bookstores. With the low prices, customers end up getting attracted to shopping online, in order to save more money, because they find it cost effective. Making E-loco stores cheaper to use will make the sellers save on expenses such as rent for big stores to sell their products. This in return will result in lowering the prices of commodities.

CHAPTER 3: METHODOLOGY/ANALYSIS AND DESIGN

3.1. System Design

| Back-End | → | API | → | Front-End |

Figure 3.1 System design representation

Figure 3.1 shows the conceptual framework showing how the system parts are integrated as explained below.

3.1.1 Back-End
Back-end in figure 3.1 the vendors account store and products of the Smart E-loco will be found

3.1.2 API
In figure 3.1 API is where we will link the back-end and the front end via the APIs.

3.1.3 Front-End
In figure 3.1 Front-end is where the user/customer will interact with the platform and shop
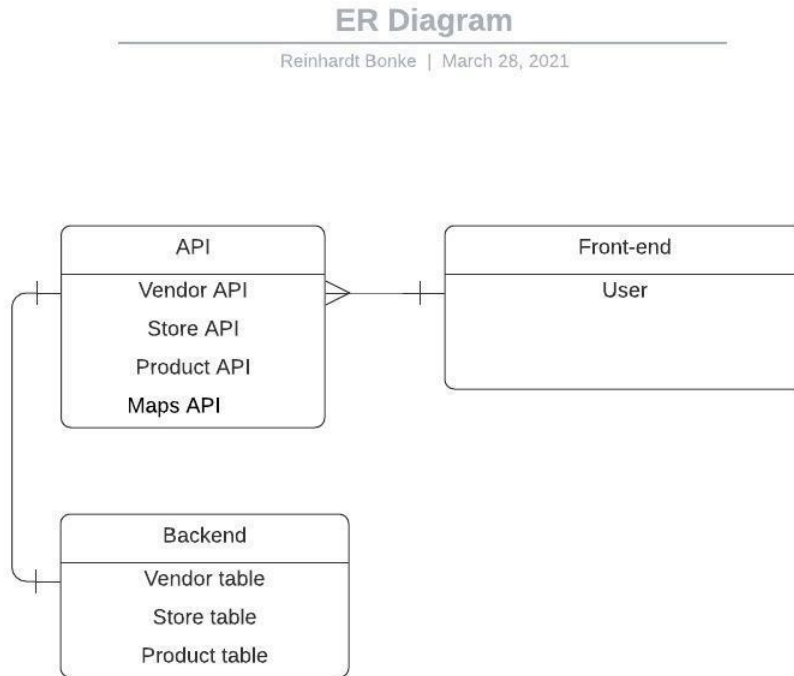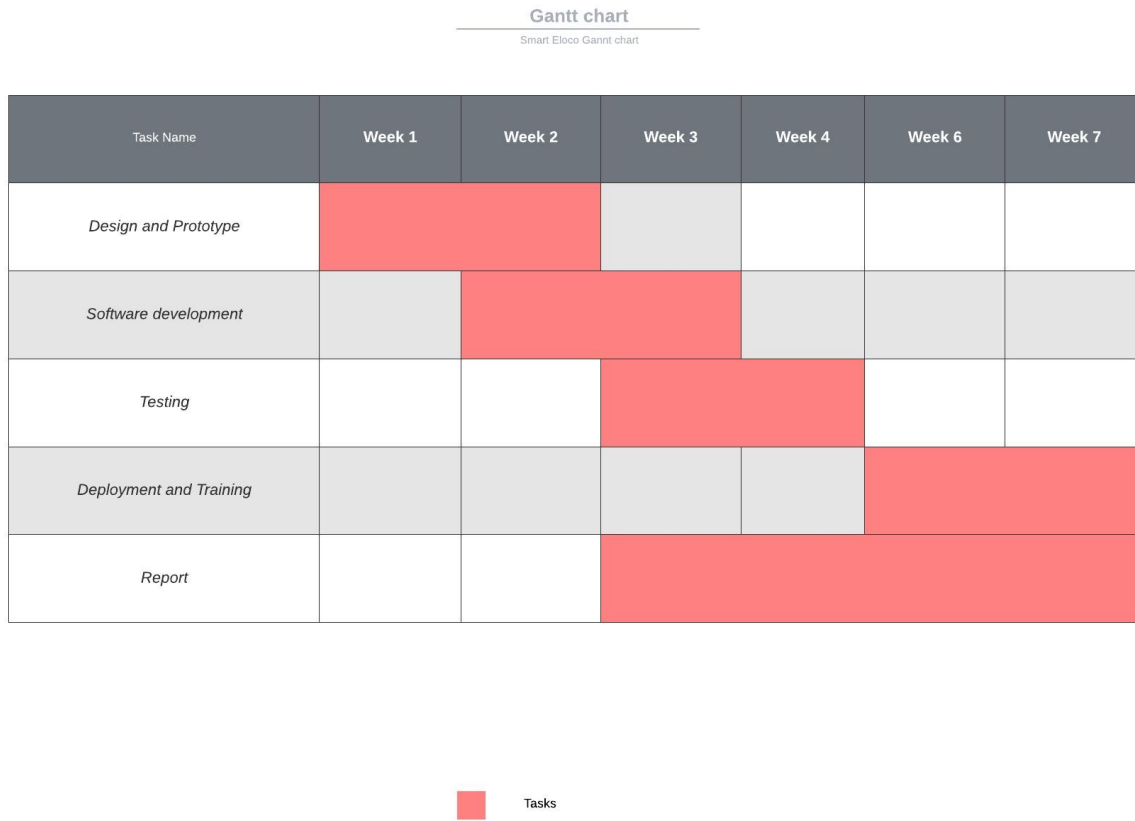
3.2. ER Diagram

Figure 3.2 ER diagram
The figure 3.2 shows the ER diagram for smart E-Loco.

3.3. Gantt Chart

Table 3.3 Gantt chart

Gantt chart
Smart Eloco Gannt chart

Task Name	Week 1	Week 2	Week 3	Week 4	Week 6	Week 7
Design and Prototype	██	██				
Software development		██	██			
Testing			██	██		
Deployment and Training					██	██
Report			██	██	██	██

■ Tasks

The table 3.3 shows the Gannt chart for smart Eloco.

3.4. Budget

Table 3.4 shows the budget for the project.

table 3.4 Budget

Smart E-loco Project Budget		
March 28,2021		
Item	Description	Amount
Computing environment	Hp core i7	50,000
Internet	5mbps	2,500
Travel		3,000
Total Cost		55,000

CHATER FOUR: IMPLEMENTATION, TESTING AND RESULT

4.1 Implementation
The project used Python Django to build the system and MySQL to store the data. Python Django approach was choosen over Java because it's easy to code and integrate with APIs such as Geo-location API.
Geo-location API obtains the users current position hence this is important when locating and connecting local traders to local buyers.

4.1.1 Hardware and Software
The project used my computer as the only hardware to build and run the system
And python Django to build the system as it easier to build and implement AI features in future. It gives room for expansion as many libraries are in build in python.
- JavaScript
- Cascading Style Sheet
- Hyper Text Markup Language

4.2 How the system works

E-loco platform is an e-commerce platform meant to connect local traders to local buyers enabling users to shop locally from home. Here are the key features that enable users and sellers to use the platform more efficiently.

4.2.1 Store
The E-loco platform has the store feature as shown in *Figure 4.2.1* that showcases the goods being sold in the client location. When a seller adds goods to his/her account the goods are displayed in the store within that given location.
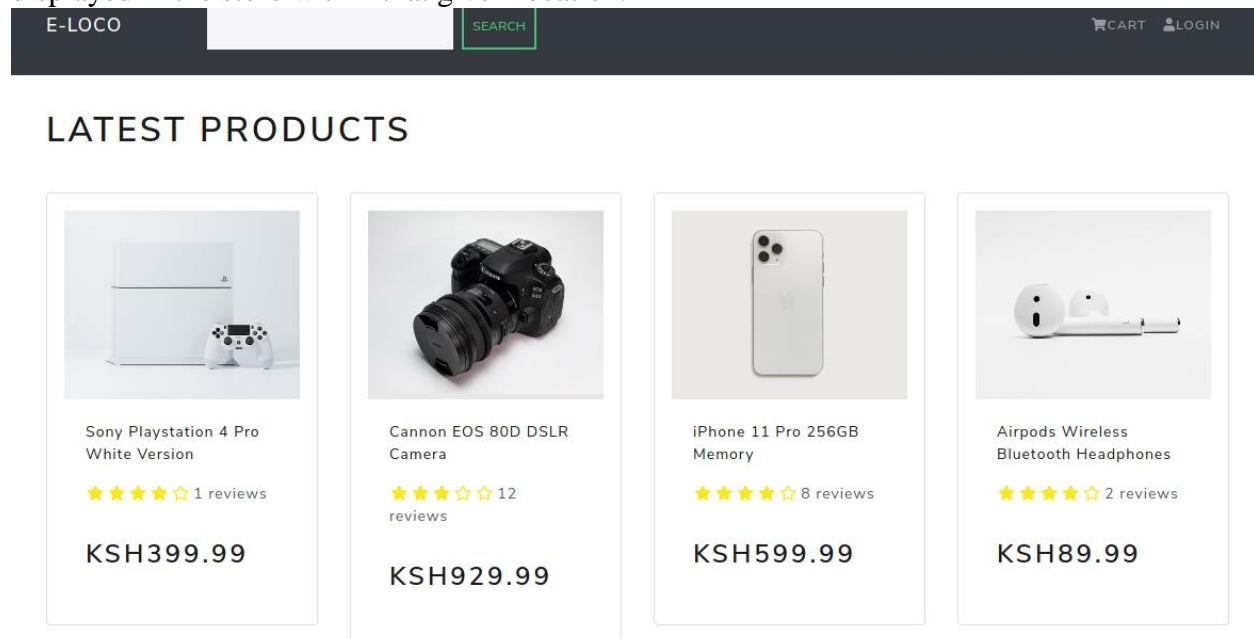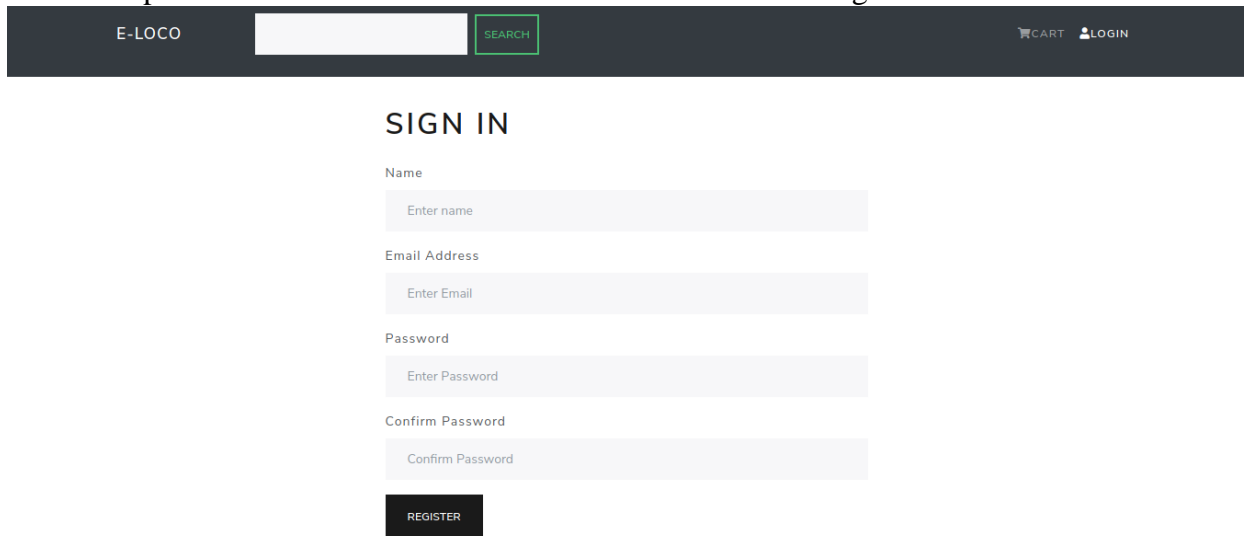

Figure 4.2.1Store

4.2.2 Users/Guest user feature

E-loco platform enables user to add to cart even without having to login. The login feature is used when the customer wants to checkout and pay for the item. This feature allows people to access the platform and use it with much more ease as shown in figure 4.2.2

Figure 4.2.2 Sign in

4.2.4 Geo-location feature

The geo-location feature is the key feature for E-loco as this allows the connection between the user and the local products within the area. It does this by collecting its data from the GPS on the users device and the cellular networks linked to the user.

4.2.5 Checkout feature

This function pops up when the user wants to proceed to order the products added to cart as shown in figure 4.2.5 . This gives the user the options to pay for the goods either using a bank card or using PayPal.

Figure 4.2.5 Checkout

4.2.6 Vendor account feature

This feature in figure 4.2.6 allows admin to create account for vendors create their account. They can add goods to their store, remove it, edit description and also pricing.
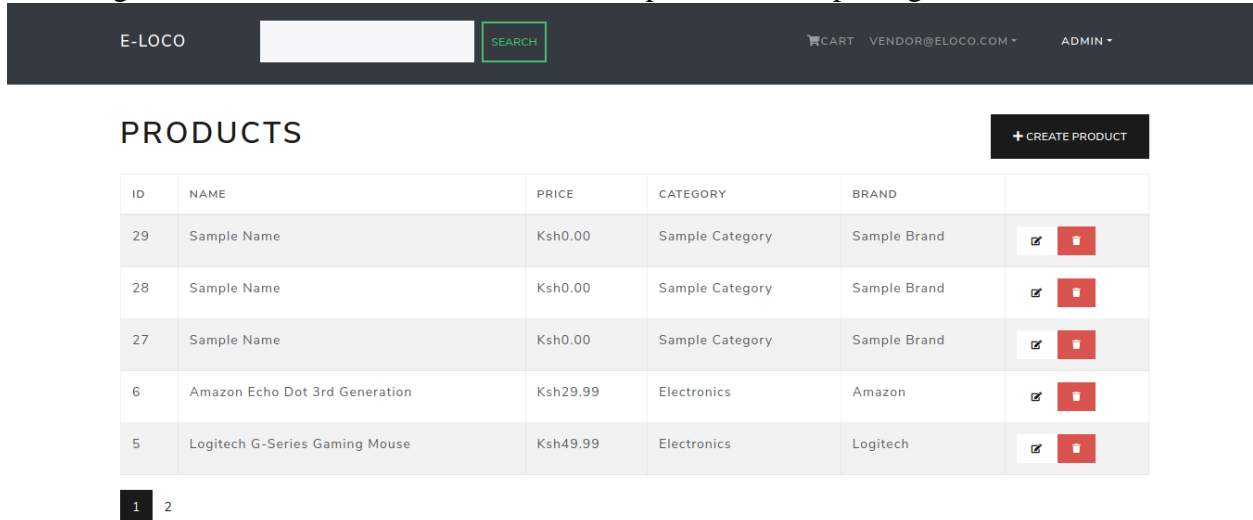

Figure 4.2.6 Vendor

4.3. Testing:

This was done to check if the built system was able to accomplish what was expected to have it produce, ensuring no defect.

The project used the following testing methods to test my system.

4.3.1 Functionality Testing

Testing was done to check whether the system was able to perform the listed functionalities.

E-loco's main functionality was to connect local user to local buyer. This is to be achieved using the geo-location API that enables users within a given location to link up to products being sold in that area. It also is to enable the consumer to create an account and shop while new vendors who want to be part of E-loco can create account and access their store adding their products there.

4.3.2 Interface testing

Through interface testing the project was able test if the system can pass data and communicate from back-end to the front end and also that it saves the data in the database. The project was also able to test if the system does operate locally via the Geo-location API locating the client and vendor location.

4.3.3 Performance Testing

In this testing the main testing processes were as follows. Load handling and performance bottlenecks. Load handling test was conducted and there was a success rate of 90% for the orders that were placed from different locations. Its load rate was at 3 seconds for the system to load and open successfully. The system was tested on its ability enable user to randomly create products, create orders, create customer accounts and making changes in the admin interface. Top Bottlenecks that were tested was involving the security of the system and client data. User login credentials are encrypted.

4.4. Analysis

During analysis it was realized that the system was able to map locally available products to the local buyers with a success rate of 90%.The system allows users to update and delete from cart hence they can adjust their items to their liking.

Validation and integrity of records – Once a user makes an order they cant modify it or delete it from the records. The records are also read only hence user can delete them.

Different roles/ access rights/ authorization for customers – The system allows users to access only the goods within their given area and shop. The customer cannot add or delete from the system as shown in figure 4.2.2

The vendor – The vendor's accessibility is limited to his/her store. They can only add,delete and modify goods from their store hence cant interfere with other records as shown in figure 4.2.6

The Admin – the admin has privileges over the entire systematize can suspend,delete and adjust the system as required.

Authentication login – The system only allows users with valid emails to create accounts and also it has the minimum character requirements for user to create a password. Should the user fail to enter the right password three times it invokes a reset link to the user's email as shown in figure 4.2.2

CHAPTER FIVE: CONCLUSION, EVALUATION AND FURTHER WORK.

5.0 Conclusion

In conclusion the system attained the following objectives and also faced the following objectives and also faced the following challenges.

5.1 Objectives Attained

- E-loco was able to create an ecommerce platform for juakali sellers and buyers.
- E-loco was able to avail the local products to customers within through connecting them with the sellers.
- The customers were able to navigate through the E-loco system easily; they could order, add products to their carts and be able to remove them.
- E-loco was able to operate from cloud and with the help of Search Engine Optimization suggest available product to clients on social sites.
- With Geolocation API E-loco was able to connect local buyers to local sellers.

5.2 Further Work

For E-loco System to be improved;
- E-loco system can be incorporated with Artificial Intelligence to help in identifying the users.
- E-loco system can involve Internet of Things so that customers' devices can be able to sense and notice what product is needed.

5.3 Challenges faced during development.

During the creation of the system, it was challenging to compile the programs. Integrating the with the Geolocation API so that it operates per user per location was hard.

5.3 Recommendations.

There is more to be done in the e-loco commerce to make it cheaper and easier to access. This includes setting it up to use SSID to cover users and vendors who don't have access to smart phones.

There is immense change in how businesses are running around the globe. As much as there is need to reach the global market we shouldn't neglect the local businesses that boost the economy.

The project achieved the following objectives:

- It availed products to customers within the area.

- Provided vendors with virtual stores to add and sell their goods.

- Each user should was able to see products in their cart.

- Customers should were able to view and add products to cart even without logging in.

- Customers were able to edit products added to cart increment and decrement all together.

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