

An Interactive E-Commerce Website for the Beauty Industry in Sri Lanka

GVDIK Perera#, W Gunatilake and WAAM Wanniarachchi

*Faculty of Computing, General Sir John Kotelawala Defence University, Ratmalana,
Sri Lanka*

#35-se-0029@kdu.ac.lk

Abstract— The beauty industry has been gaining popularity for past few years, due to increasing social media trends in "self-care" with the use of beauty products. As a result, sales generated by the beauty industry spiked creating competition among vendors and sellers in the industry. With the COVID-19 pandemic, the traditional way of shopping for beauty products halted, creating a requirement to introduce customers with new methodologies to sell beauty products, which are similar in experience to traditional shopping. One such solution can be considered as e-commerce websites. E-commerce websites currently operating in Sri Lanka and are part of the beauty industry are dedicated to a singular brand or product line, not a marketplace with multiple brands. Also, considering the products sold, current e-commerce applications do not provide sufficient information regarding standards or ingredients used in the development of the product. This paper investigates an e-commerce solution to the beauty industry that allows customers to shop for safe beauty products that are suggested according to their personal preference by a variety of sellers.

Keywords: *e-commerce in beauty industry, e-commerce website, beauty industry*

I. INTRODUCTION

E-commerce, according to (Andrew Bloomenthal, n.d.), is a business model that allows firms and individuals perform business transactions (buying and selling) over the Internet. In the modern society, possessing or being a part of an e-commerce website is considered a benefit to the business. ("The impact of E-commerce on Business Strategy: A Literature Review Approach" n.d.) says that, e-commerce has become the key means of modern "enterprise

competition" and is regarded as "complimentary tool" that supports the overall strategy and business performance.

As an ever-growing industry, e-commerce industry is growing 23% year-over-year (BigCommerce, 2021) with 12-24 Million existing sites around the globe ("68 Useful eCommerce Statistics You Must Know in 2021," 2019). In the year 2019, retail e-commerce sales globally added up to 3.53 Trillion USD, making online shopping one of the most popular activity online ("Global retail e-commerce market size 2014-2023," n.d.). The main reason for this is because of the advantages offered by e-commerce. E-commerce surpasses physical limitations the brick-and-mortar system offers, expanding the coverage and market base. It allows customers to find products, compare products, obtain more information on a certain product, ask follow-up questions and shop anytime convenient for them. Also, as sellers, owning a physical store is much costlier than owning an e-commerce site. Savings of hosting an e-commerce site over a physical store can be rewarded to customers as discounts, attracting more and more customers (Business and Khurana, n.d.).

In the year 2020, due to the COVID-19 crisis, people were driven towards limiting activities that involves physical interaction, which then later lead them to accomplishing their day-to-day tasks such as shopping, through online means. The report ("E-commerce in the time of COVID-19," n.d.), the demand in shift from brick-and-mortar retail to e-commerce has caused an accelerating expansion of e-commerce towards new businesses, products and customers. E-commerce transactions in most countries

deviated from luxury products to everyday necessities such as groceries and health care.

Considering the beauty industry, which includes health care products such as skincare, sun care, haircare, deodorants and fragrance. Products such as make-up and colour cosmetics, is also considered one of the popular niche markets on e-commerce under the beauty industry. According to (“E-commerce to dominate future of health and beauty sector | WARC,” n.d.), the online sales of the health and beauty sector is expected to rise from 16.5% to 23.3% globally. This projection implies that the demand for e-commerce is growing. Hence creating a need for better e-commerce application for the beauty industry.

The beauty industry in Sri Lanka is still at a nascent stage. With the influence of international personal care trends, people gain more awareness about their skin types and tends to be more oriented towards their outward appearance. According to an article by (Rohan, n.d.), personal care penetration is increasing rapidly within the country causing the “shelf heat” to triple every year. However, with the COVID-19 pandemic, the demand for colour cosmetics plummeted and the need for personal care items increased (“Beauty and Personal Care in Sri Lanka | Market Research Report | Euromonitor,” n.d.).

Beauty industry in Sri Lanka is unable to contribute to its maximum capacity to the country’s current need for beauty products, one of the reasons being, lack of online applications to market beauty products. During lockdown period in Sri Lanka, beauty products were sold through online supermarket applications and pharmacies which did not prioritize in providing product details such as ingredients used, purposes, etc. Also, it was identified that harmful products are being sold through existing online applications as well as in-stores. Existing applications do not have mechanisms to filter products that contain harmful ingredients added in beauty products.

The aim of this paper is to explore a possible solution, is a web-based e-commerce application dedicated to the sellers, manufacturers and buyers solely interested in beauty products. This e-commerce website will allow sellers to sell products such as Baby and Child-specific

Products, Bath and shower, Color cosmetics, Deodorants, Depilatories, Fragrances, Hair care, Men's grooming, Oral care, Sets/kits and Skin care. Each buyer user of the system will have a unique “feed” filled with product suggestions unique to their preferences. The order procedure will be straight-forward and easy for both users, buyer and seller. The website owner user will be able to manage the website with ease using the tools provided by the proposed system.

The rest of the paper is organized as follows; through the section 2 of the paper, an insight will be provided about popular e-commerce platforms related to the beauty industry both locally and globally. Further section 3 of the paper will elaborate the proposed solution and methodology used to overcome the defined problem in existing systems. Section 4 elaborates on how the proposed system impacts on the society. Finally, section 5 concludes the paper with a note on further improvements.

II. LITERATURE REVIEW

In the past, beauty industry was only limited to physical stores, but with the development of e-commerce websites, social platforms and various other reasons, beauty and personal care market has experienced an immense growth. (“INSIGHT,” n.d.) lists out these reasons as:

Rapid technological advancement: technology has played a vital role in closing the gap between online and physical of marketing products. As an example, L’Oréal’s “Makeup Genius” application in the year 2014, not only opened doors for new sales, but it also gained popularity. This was because of its main feature, which is transforming mobile phone camera into a virtual mirror, allowing users to try-on shades of lipsticks and eyeshadow on users’ face.

E-commerce: making its way from online content to online shop, e-commerce now provides its users an experience that is close to “real life”. E-commerce not only allows users to shop for their favourite products any time of the day, but it also allows them to shop at the comfort of their homes and get products delivered to their doorstep.

(“INSIGHT,” n.d.) also elaborates that, though brand-based sites are popular, majority of online shoppers choose to shop through retailers such as amazon, etc. As an example, in the year 2015, L’Oréal reports that $\frac{1}{4}$ of their online sales are

generated from their brand website, however, remain $\frac{3}{4}$ is generated through online retailer sites such as amazon. Therefore, it can be acknowledged that online shoppers do use brand-base sites to purchase beauty items, however, much preferred choice is e-commerce websites which collaborates with multiple brands and sellers.

A. Global

According to ("Top Beauty And Cosmetics Websites in The World," n.d.), following are the top beauty and personal care e-commerce websites globally:

Hot Pepper Beauty: Beauty hot pepper is an e-commerce site for beauty operated or based in Japan but rated as no. 1 according to ("Beauty.hotpepper.jp Traffic, Ranking & Marketing Analytics," n.d.). This popular beauty e-commerce site can be considered to be the "marketplace" for booking local salons specialized in beauty, therapy and spa treatments through the website.

The website initially lured its customers through AdWords brand campaigns and offline advertising however, in order to reduce CPA (Cost Per Action), the website implemented DSA (Dynamic Search Ads) along with page feed as a solution. This helped the website gained immense popularity among the locals. ("hot-pepper-beauty-reduces-workload-by-90-percent-with-google-page-feeds.pdf," n.d.). Hot Pepper Beauty differs from other online booking websites because it has two main unique features. Since many customers stick to one salon they are used to, this application will be useless, to overcome this issue, search method has been changed from salon to searching by hairstyle. This allows users to explore different salons which offer unique and distinct hairstyles. Similarly, the website has expanded this feature for nail parlours, eye beauty, relaxations, etc. Second main feature is the "salonboard". This is a cloud-based management system which facilitates salons that allows 24-hour reservation and all-in-one management for reservations made through phone, online or via website. This feature aids salons in organizing their customers, giving promotion services, register functions and various tools for aggregation and analysis. These features ultimately resulted in site's unbeatable popularity among locals, saving labour and making online marketing more efficient. ("One of Recruit's leading services supporting dining and beauty in Japan," n.d.)

Sephora: Raking 2nd in the beauty and cosmetics e-commerce category, Sephora is based in Paris. Website acquaints nearly 3000 brands along with beauty products under their private label including cosmetics, skincare, body, fragrance, etc. ("Sephora.com Traffic, Ranking & Marketing Analytics," n.d.)

Few features that aided Sephora gain popularity can be considered as, the beauty insider community, beauty quizzes and Sephora's virtual artist ("About Us," n.d.). The Beauty Inside Community is a membership program given to members who spends a specific price limit on Sephora. Second special feature, which is beauty Quizzes, helps customers to find what they are looking for in an efficient manner.

According to (Stanovick, 2018), these Quizzes aids in finding perfect Foundation colour, skin-care regiment, but mostly popular for its quiz to find the best fragrance or the required make-up brush. Sephora's Makeup Artist is one of the prominent features loved by many customers, this is because, this application allows users to virtually try-on cosmetic products offered at Sephora. In addition, the customer can "mix and match" and apply many layers of eyeshadow and access the overall result before purchasing the product.

Ulta Beauty: Ulta Beauty us an American-based beauty chain which sells beauty products such as cosmetics, skincare, fragrances, nail products, etc. from various beauty brands ("Ulta.com Traffic, Ranking & Marketing Analytics," n.d.).

Few of Ulta Beauty's main features that draw customer attention include valuable content, harnessing data analytics for more effective marketing and direct personalized emails to customers (Chua, 2019). Ulta Beauty owns an online beauty magazine "Ulta Beauty Mix" to lure customers in offering beauty tips and article. Further the customer will be able to easily purchase the item by clicking the image of the product on the article. Ulta Beauty harnesses the data collected by the loyalty program to make smarter marketing decisions depending on the buying decisions made by their customers. Ulta Beauty's personalized emails contains 21 ad tiles in it with content based on recipient preferences and behavior.

B. Local

Due to the technological advancement and recent evolvement of internet-based businesses in small and largescale; it is quite visible that the beauty industry has initialized its path via online platform in Sri Lanka. With regard to online beauty cosmetics sites, most would state that it would mainly concern about women and would be a quite gender-based target market. However, the most liked and talked online site in Sri Lanka is raula.lk (“raula,” n.d.), which is based on men. This company introduced a beard oil brand to local male population through their website, which gave them this popularity among other competitors. Therefore, it is evident that the need of an online based beauty cosmetic site is not only for women but for all genders because simply who doesn’t like to be pretty.

Furthermore, (“Ramani Fernando Salons,” n.d.) are seen to be promoting their beauty related industries via the online platform in order to attract customers to their saloons. This has now become a trend within Sri Lanka to advertise the customers about the bridal and beauty related services through online platform; doing so they often promote their products and brands.

“(Cosmetics.lk | Premium Beauty Cosmetics in Sri Lanka,” n.d.) by CosmeticsBeautyMantra could be identified as one of the best online platforms to purchase beauty related gift packs in Sri Lanka. This introduced the path for other sellers to introduce gift packs and healthcare packages through online beauty cosmetic sites.

However, it is still visible that each online based beauty cosmetic industry has its own unique features to provide services to e-based customers.

In conclusion, it is evident that e-commerce marketplaces are much popular than brand based websites. Also, it is noticed that e-commerce websites that provide unique features such as personalised suggestions, virtual artist, interactive virtual magazines, etc. Have a tendency of being preferred over other websites. Sri Lanka currently lacks e-commerce applications to be in par with the moving beauty care trend as well as providing the basic need to shop for non-harmful, personally-suggested beauty products, all in one platform. Therefore, there is a need for such application based in Sri Lanka.

III. METHODOLOGY

A web-based e-commerce application dedicated to the sellers, manufacturers and buyers interested in solely in beauty products can be

considered a suitable solution. This e-commerce website will allow sellers to sell products such as Baby and Child-specific Products, Bath and shower, Colour cosmetics, Deodorants, Depilatories, Fragrances, Hair care, Men's grooming, Oral care, Sets/kits and Skin care (“Beauty and Personal Care in Sri Lanka | Market Research Report | Euromonitor,” n.d.). The system will comprise of three main users, namely, buyer user, seller user and website owner user.

The basic overall architecture of the system is depicted in the Figure 1.

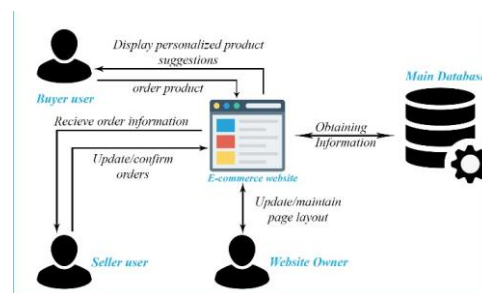


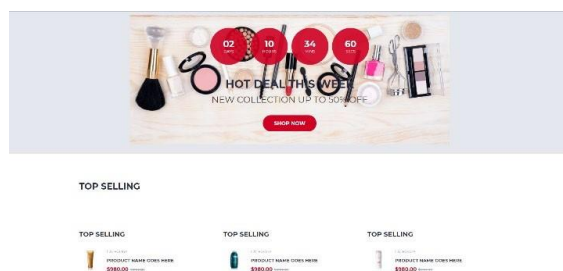
Figure 1 – Overall basic architecture of the system

Source: Author

Technologies used in the construction of this application are HTML, CSS and JavaScript to obtain the basic layout of the e-commerce application and its interactivity.

OpenCV and python are used in the implementation of the Image Processing module to obtain user face colour information. And, MySQL is used as the database connector.

Figure 2 depicts a prototype of the Buyer user interface of the system



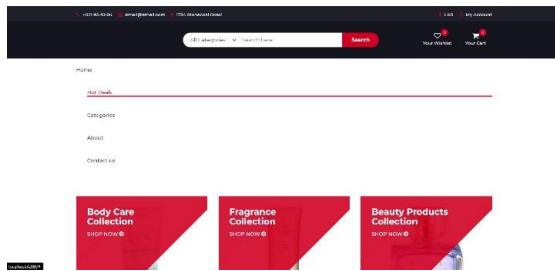


Figure 2 – Prototype of the proposed system

Source: Author

Functionalities of the system are as follows:

Seller user perspective:

A. The process of ordering a product

The buyer user of the system has the ability to browse various stores available in the e-commerce application and purchase products. The product purchasing procedure is simple and straightforward. The seller user, whose product is been purchased will receive a notification of the order.

B. The process of managing orders

After receiving the notification of the order, it will be stored as a “pending” order. The seller can either “accept” the pending order or “decline” the pending order. The notification regarding the acceptance/declination of the order will be sent the relevant buyer user.

In the case where the order is accepted, the status will the order will be updated to “to be shipped”. The website owner user will further update the status of the order to “shipped” when the order is handed over to the courier; “delivered” when the buyer user confirms that the order was received; And “return” if the buyer user fails to collect order or if the user is dissatisfied with the product. The statuses of the order will be notified to both buyer and seller user. *The process of managing products*

The seller user can add products to the e-commerce application and manage a “virtual shop”. The seller user is required to add specified product details and clear images to the system. The added product will be checked and approved by the website owner user. Once the product is approved, the seller user has the ability to update details of products such as stock,

images, discounts, etc. Also, the seller has the ability to remove a product from the shop.

Website-owner user perspective:

A. The process of filtering products with harmful ingredients

The website owner user acts as the administrator of the system. It is within the website owner’s authority to manage the appearance of the e-commerce application and approve/disapprove products sold on the application. The website owner user will update the system with keywords of harmful ingredients to flag the products with harmful ingredients in them. Through this input as well as other factors such as sufficient details regarding products, clear images, etc. may also influence website owner user’s decision to approve/disapprove products.

B. The process of updating order status

The website owner user has the authority to oversee the process of delivery. All accepted orders by seller users will be forwarded to the website owner user. When the order is handed to the warehouse, the website owner user will manually update the system that the specific order was “shipped”. It is solely within buyer user’s authority to enter manually to the system whether the order was received. After the buyer user confirms, the system will be updated to “delivered”. If the order does not reach the buyer user within the given timespan, the order status will be manually updated by the website owner user to “return” and the products will be redirected to the specific seller. Also, if the buyer user initiates a “return request”, the system will be updated by the buyer user to “return”.

Buyer user perspective:

A. The process of providing personalized product suggestions

The buyer user has the ability to undertake quizzes to view personalized product suggestions mainly on four categories, namely:

Skin care preferences: the user can include information regarding their skin type, allergies, etc. and gain product suggestions that fit the specified criteria.

Hair product preferences: the user can include information regarding their hair product preferences such as dry hair, dandruff, etc. and gain product suggestions that fit the specified criteria.

Cosmetics preferences: the user can upload an image of themselves such that the system will suggest products such as make-up foundation, lipstick and eyeshadow colours that matches with user skin tone and colour.

Fragrance preferences: the user can select preferred fragrance notes (such as floral, fruity, etc.) and receive product suggestions that match the specified criteria.

B. The process of face Colour Identification using ImageProcessing

This module will be considered as a part of the quiz undertaken by the buyer user to analyse user cosmetic preference. The process of colour identification shown in Figure 3.



Figure 3 – Face colour Identification using ImageProcessing

Source: Author

Image Acquisition: The buyer user uploads an image to the system in jpg format to extract the mean skin colour of user face.

Image Pre-processing: Through the pre-processing stage, the image will be enhanced to differentiate prominent feature prior segmentation. Following actions will be performed:

- Removal of noise: Linear filter will be used to remove excessive blurriness and noise of the uploaded.
- Image convolution: The sharpness of the image will be increased to made the boundaries prominent.

Image segmentation: In this module, the pre-processed image will be segmented into background and different parts of user face. The

mean colour of the user face (specifically the cheek areas) will be extracted from the segmented image.

Colour Categorization: Extracted mean colour of the image will be further categorized into the closest predefined beige colour category and will be further used in suggesting cosmetic products that match the specific colour category. Python and OpenCV will be used to implement this module.

III. DISCUSSION

With the use of the proposed solution, beauty industry in Sri Lanka will obtain an e-commerce application that is not only limited to one seller or a specific group of sellers, but a collection of sellers with products of various genres. Since this system follow a joint model of both B2C business model where the Business directly sells products to Consumers and C2C model where a sole Consumer sell products to another Consumer; both small businesses and large-scale businesses related to the beauty industry can sell products, providing job opportunities.

Since the world is moving towards the trend of using non-harmful and organic products, this application is projected towards popularity. As this application ensure that harmful products are not sold, customers will be satisfied.

Providing personalized product suggestions yields around 10-15% conversion rates and around 20% customer satisfaction rates according to ("21 Ecommerce Personalization Examples That Won't Break at Scale," n.d.). This is because this feature is important is keeping the customer in the loop of returning to the site again and again. With the usage of quizzes in this application, the buyer user will receive suggestions that is relevant to him/her only, motivating them to purchase products in a hassle-free manner.

Therefore, it is evident that the proposed solution will increase the sales generated by the beauty industry in Sri Lanka by providing a safe consumable product which will ultimately aid in the improvement of the country's economy.

IV. CONCLUSION & FURTHER WORK

This paper elaborates on a solution that can improve the sales of the beauty industry in Sri Lanka, namely, an interactive e-commerce application solely dedicated to the beauty industry. This application comprises of three users namely, buyer user, seller user and website owner user. The system allows buyer users to purchase products sold on the e-commerce site by the seller user. The website owner user act as the administrator of the system, hence in charge of controlling quality of products sold on the site, filtering harmful products. The application provides personalized product suggestions to each buyer user depending on their preferences in skin, hair, fragrance and cosmetics. Personalization for cosmetics is obtained using an image processing module which will extract user face color information from an uploaded photograph and suggest products accordingly

As for further improvements, the system can be expanded such that all manual inputs such as website owner user updating product status, etc. is automated. In addition, this system can be presented to intended users, namely, seller, buyer and website-owner; and obtain feedback. Based on the feedback obtained, the system can be further developed to make it more effective for each pertaining user. Further, mechanisms such as virtual mirrors and other AR applications can be added to the system to provide customers an in-house shopping experience. Also, as blockchain technology in e-commerce is a trending topic, blockchain can be implemented in this system will allow users to securely store digital assets such as order information, users' personal information such as skin allergies, etc. Also, blockchain will aid in reducing managing costs, ensure fast transactions, secure the application from cyber threats and many more.

ACKNOWLEDGMENT

We would like to thank the staff of Faculty of Computing, Department of Computer Science and Information systems at General Sir John Kotelawala Defence University for their valuable time and interest in the research topic.

REFERENCES

- 08_30069jas120516_68_79.pdf, n.d.
- 21 Ecommerce Personalization Examples That Won't Break at Scale [WWW Document], n.d. . Shopify Plus. URL <https://www.shopify.com/enterprise/ecommerce-personalization-examples> (accessed 3.7.21).
- 68 Useful eCommerce Statistics You Must Know in 2021 [WWW Document], 2019. . WPForms. URL <https://wpforms.com/ecommerce-statistics/> (accessed 3.8.21).
- About Us [WWW Document], n.d. . Sephora. URL <https://www.sephora.com/beauty/about-us> (accessed 4.6.21).
- Andrew Bloomenthal, n.d. Electronic Commerce (e-commerce) [WWW Document]. Investopedia. URL <https://www.investopedia.com/terms/e/ecommerce.asp> (accessed 3.8.21).
- Beauty and Personal Care in Sri Lanka | Market Research Report
- | Euromonitor [WWW Document], n.d. URL <https://www.euromonitor.com/beauty-and-personal-care-in-sri-lanka/report> (accessed 3.9.21).
- Beauty.hotpepper.jp Traffic, Ranking & Marketing Analytics [WWW Document], n.d. . SimilarWeb. URL <http://similarweb.com/website/beauty.hotpepper.jp/> (accessed 4.6.21).
- BigCommerce, 2021. Top 14 Ecommerce Trends in 2021 (+Industry Experts' Insight) [WWW Document].
- BigCommerce. URL <https://www.bigcommerce.com/articles/ecommerce/ec-ommerce-trends/> (accessed 3.8.21).
- Business, F.B.F.L.F.T.A.K. is a former writer for T.B.S., Khurana, has more than two decades of e-commerce experience R.T.B. editorial policies A., n.d. Why E-commerce Is Taking the Retail World by Storm [WWW Document]. Balance Small Bus. URL <https://www.thebalancesmb.com/advantages-of-ecommerce-1141610> (accessed 3.8.21).
- Chua, R., 2019. How Ulta did Beauty Marketing Right for Attractive Results [WWW Document]. Credits Perform. Des. URL <https://credits.com/blog/how-ulta-did-beauty-marketing-attractive-results/> (accessed 4.6.21).
- Cosmetics.lk | Premium Beauty Cosmetics in Sri Lanka [WWW Document], n.d. . Cosmetics.lk. URL <https://cosmetics.lk/> (accessed 6.17.21).
- E-commerce in the time of COVID-19 [WWW Document],

n.d. . OECD. URL
<http://www.oecd.org/coronavirus/policy-responses/e-commerce-in-the-time-of-covid-19-3a2b78e8/> (accessed 3.8.21).

E-commerce to dominate future of health and beauty sector | WARC [WWW Document], n.d. URL
<http://origin.warc.com/newsandopinion/news/e-commerce-to-dominate-future-of-health-and-beauty-sector/44002> (accessed 3.9.21).

Global retail e-commerce market size 2014-2023 [WWW Document], n.d. . Statista. URL
<https://www.statista.com/statistics/379046/world-wide-retail-e-commerce-sales/> (accessed 3.8.21).

hot-pepper-beauty-reduces-workload-by-90-percent-with-google-page-feeds.pdf, n.d.

<https://raula.lk/> [WWW Document], n.d. URL
<https://raula.lk/>(accessed 6.17.21).

INSIGHT: Beauty Market is Conquering E-Commerce [WWW Document], n.d. URL
<https://blog.styla.com/en/insight-beauty-market-is-conquering-e-commerce> (accessed 4.3.21).

One of Recruit's leading services supporting dining and beauty in Japan [WWW Document], n.d. . Recruit Hold. URL
https://recruit-holdings.com/who/value/post_35.html (accessed 4.6.21).

Ramani Fernando Salons, n.d. URL
<https://ramanifernando.com/>(accessed 6.17.21).

Rohan, n.d. PERSONAL CARE. LMD. URL
<https://lmd.lk/personal-care/> (accessed 3.9.21).

Sephora.com Traffic, Ranking & Marketing Analytics [WWW Document], n.d. . SimilarWeb. URL
<http://similarweb.com/website/sephora.com/> (accessed 4.6.21).

Stanovick, K., 2018. The 7 Features You're Not Using Enough of at Sephora. StyleCaster. URL
<https://stylecaster.com/beauty/sephora-features-use-frequently/> (accessed 4.6.21).

Top Beauty And Cosmetics Websites in The World [WWW Document], n.d. . SimilarWeb. URL
<http://similarweb.com/top-websites/category/lifestyle/beauty-and-cosmetics/>(accessed 4.3.21).

Ulta.com Traffic, Ranking & Marketing Analytics [WWW Document], n.d. . SimilarWeb. URL
<http://similarweb.com/website/ulta.com/> (accessed 4.6.21).

AUTHOR BIOGRAPHIES



GVDIK Perera is currently a BSc. Undergraduate in Software Engineering at faculty of computing, General Sir John Kotelawala Defence University. Current research is about developing an interactive e-commerce platform for the beauty industry in Sri Lanka.



W Gunathilake is a lecturer under Faculty of Computing, General Sir John Kotelawala Defence University. She graduated B.Sc., University of Colombo, Sri Lanka and has other qualifications such as M.Sc in (IT), University of Colombo School of Computing (UCSC), Sri Lanka M.Sc in Operations Research, University of Moratuwa, Sri Lanka and Ph.D in Computer Science, Keele University, UK. Her research interests lie in E-learning and software engineering.



Mr. WAAM Wanniarachchi is a lecturer under the Faculty of Computing, General Sir John Kotelawala Defence University. His Academic qualifications include Bsc (Hons) in Information Technology General Sir John Kotelawala Defence University; Associate Business Analyst at Bellvantage Pvt Ltd and Certificate of Teaching in Higher Education, General Sir John Kotelawala Defence University. His research interest is Machine Learning.