

New Augmented Reality Application in E-Commerce and M-Commerce

Mustafa Atalar
Technology Director
Biritek LLC
Ankara, Turkey
matarar@gmail.com

Mahmut Özcan
Sales Director
Biritek LLC
California, USA
mozcan@gmail.com

Abstract—Nowadays, Virtual Reality (VR) and Augmented Reality (AR) offer new and extend existing customer experience in web and mobile environment. VR has been practiced a good start with game applications. By increasing interaction with user or equipment motion, applications have been strongly continuing to produce and reach more user experience target. In this paper, we would like to announce and introduce you our new AR application platform, called as Lify. Lify's exceptional features will also be introduced for a novel electronic or mobile commerce experience in our paper.

Keywords—*Augmented Reality; Virtual Reality; Electronic Commerce; Mobile Commerce; Artificial Intelligence*

I. INTRODUCTION

Popular area of recent years Augmented Reality technology, though some applications have attracted a significant number of users, has not yet been seen as an example of how this technology can be adapted to our daily life routines. Although Pokemon had a very fast rise in the game world, the excitement that has emerged has not continued for a long time [1]. As a breaking from the web to mobile application has occurred, content-providing technologies of user interaction with finger movements and phone-sensitive content shares the same abruptness. Interaction with the user, the user experiencing the product with his/her own senses, the identification of the product with the user altogether attracts more attention from the users. For this reason, we anticipate that the next break in the mobile applications will bring the user closer to the content and ensure the user content consistency. This is possible with AR and VR, but the need to use glasses in VR applications is affecting adversely VR in everyday use. For this reason, we developed an application platform named Lify [2] to use AR to cause a user to become closer with three-dimensional and moving products / contents and visualize them in real size in the real environment. With our Lify platform, we offer a wide range of user experience ranging from games to movies, from event organization to group activities, from educational conferences to health safety, advertising to shopping, e-commerce and mobile commerce. In this work we show that Lify is a very strong, most secure and the fastest candidate to make the best use of AR technology in electronics / mobile commerce, with the vision presented above.

II. A BRAND NEW WORLD - LIFY PLATFORM

Lify is a brand-new world, an AR content platform with its own living beings, objects and communication / transfer standards. Rather than being referred to or presented with a specific AR experience, Lify AR offers the opportunity to make its own original design for those who wish to offer content in the technology. Lify can use social media experience while serving content.

The Lify platform is designed with an infrastructure that can contribute significantly to future standards and norms for delivering content to the web and mobile applications. It may support the standardization work named ARML under Open GeoSpatial Consortium [3]. In addition to the standards created for basic media content such as today's picture, audio/video, future standards for content delivery in the AR environment will also be established, and AR content will be available through technologies such as web / mobile applications in accordance with these standards. As an example, we might think that the <ar> element in Html.X will be supported. The designer will prepare an AR content as if it were preparing a JPEG file and use this element to present anyone on the web / mobile. Lify forms the basis for the establishment of these standards and has the knowledge to contribute at a high level. Because the existing Lify uses a standard model specific to its content when storing the content and provides it to other users. According to the needs of the current usage and the following information in this model, the data structure was created.

- AR type (image recognition / geo based / relative to users' position)
- GPS coordinates
- Relative location information (North, East and altitude delta)
- Content type (image / video / text / 3D model)
- Content URL address
- Target image for IR
- Content-producing user
- Publishing policy (public, followers only, private)

The data model summarized above, used in Lify, will make a significant contribution to the formation of general standards. These standards which will be prepared according to the needs of different industries, will be able to be parsed and presented by any software / plugin on any device according to the determined data model. This way, AR will be preferred by developers as it will provide cross-platform technology.

Lify aims to reduce the development and operating costs of AR which is higher than other current media technologies. The high costs that AR technology needs to deal with today are as follows;

- Development costs are high because the number of developers is low and standards do not exist¹.
- Inferences from image comparison are increasing the bandwidth cost. When the alternative to keep database on the device is selected, there is an increase in storage cost.

Development costs are lower because Lify provides AR support through an end-user platform. The ability to share customized content using a social media experience on a mobile device can be done without any development required.

Developers who want to offer customized content in the AR environment do not need to know the AR encoding algorithms, etc. when using Lify. Any web programmer can use the capabilities of the Lify platform to develop its content in the desired design. Thanks to this feature, it is suitable to be used as a direct selling platform in e-commerce.

When thinking that the habit of buying a new domain and publishing a website under this private domain is now being transformed to using Facebook to reach larger masses with less cost, we can point out that Lify has the same effect at submission of AR content. With/Help of Lify AR platform;

- The need for a separate mobile application development and publishing ceased.
- Content can be presented through social media experience.
- It has the ability to reach the Lify user volume which grows every day
- It also does not require similar cost and operational effort such as hosting, storage/domain management, and the platform is cloud based.
- As with the experience of video streaming from YouTube, AR content can be broadcasted from Lify.
- Integrating with other social media and instant messaging tools (Facebook, Twitter, WhatsApp etc.), the Lify app can present both its own social media experience and other popular social media experiences.

¹ In the search made on April 28, 2017 on Upwork.com, when "iOS developer" words were searched in Mobile and Web developers working as freelancers in America, 145 results were found. When the same search was made with the words "augmented reality", 5 results were found. This screening shows

III. LIFY TECHNOLOGY

On the Lify platform, Wikitude's commercial "Wikitude Augmented Reality SDK [4]" is used for augmentation support. The current version of the Lify platform utilizes mainly Image Recognition and Geo based augmentation features. At present, studies on features such as instant tracking (SLAM) [5], cloud based image recognition and 3D Object Recognition [6] are ongoing. With Instant tracking, it is aimed to make AR with image recognition as adaptive according to the previously unknown user environment and the landscape.

Amazon Web Services (AWS) cloud service technology is used for data processing and hosting. In the AWS environment, Lambda [7], S3 [8], RDS MySQL [9], Cognito [10] and EC2 [11] products have been integrated. Lify is designed as a cloud-based AR service and works in a live environment.

IV. LIFY IN ELECTRONIC / MOBILE COMMERCE

With the anticipation that AR / VR technology can take up a great deal of space in the electronic / mobile commerce, which is becoming widespread day by day, supporting the shopping experience on the Lify platform has been developed. According to the research done by UPS in 2016, the rate of increase in online shopping and the effect of social media on online shopping are remarkable [12]. ComScore evaluates the results of this research, Consumers who predominantly prefer to shop on their smartphones desire a flawless virtual store experience and want to be able to experience the perfect feel of the physical store experience [13].

A study of Gautier et al. in four European countries [14] shows that AR has more interest in functionalities and entertainment, as well as interest in the use of e-commerce by users. It is possible to say that, the data in this research is based on the work done in 2012 and with the addition of the UPS 2016 report, this trend has changed and that the widespread AR / VR technology will be accepted more and more. We have also explained in the paragraph above on the trend of online and especially mobile shopping; when evaluated with ComScore's interpretation of "seamless experience between virtual and physical stores", using AR as an in-store presentation tool, rather than being a direct sales channel, overlaps with Gautier's perception of AR experience and can give more successful results.

In addition, when the crime complaints in e-commerce frauds in America are examined, we can say that "misrepresentation" has an important rank with a high figure such as USD 17,974,014 according to the internet crimes complaint center in USA in 2015 [15]. "Advertising bias" is described in the form of complaints arising from the product being advertised and the delivered ones being different [16]. In Turkey, the consumer complains about the dispatch of different products from the advertised or purchased product ranked as fifth complaint [17]. Generally, consumers are misled by

that the number of AR developers is quite low compared to other areas.

introducing different products or services on the internet pages [18]. It is once again important to realize that the products presented in virtual stores are truly represented in the presented size, color, quality or appearance, or that the customers have the feeling of being in the physical store without being tricked by the malicious shops [19] and providing the perfect virtual store experience.

The fact that Lify is a social platform makes it a candidate for the mobile shopper user experience that the above research confirms / anticipates. That's why Lify is designed with the ability to be offered by brands as a functional, fulfilled in-store application. For example, part of the store may be completely empty, and the markers on the walls will allow to develop a custom store concept by augmenting the models of the specific products and developing them with Lify designed specially for each user.

Mobile trade experiences that can be done with Lify can be multiplied. For example, a pizzeria in Rome can display three-dimensional models of exquisite pizzas in front of the Colosseum, allowing tourists to see them in the real environment. It can take orders online via sharing, as well as navigate customers in the AR environment with navigation.

AR is also used for product trials in e-commerce. Lify is taking the AR applications, which are used in the corporate area and different industries, one step forward. Especially in the furniture sector, there are many applications for the control of products at the customer's home. Although some companies in the furniture sector do not have a mobile application for sales or promotion, they only publish applications for product placement with AR. Therefore, its use and awareness remain low and difficult to manage. However, Lify empowers these companies to directly effect sales by increasing the number of product trials by providing the same experience to their customers with AR through Facebook accounts. Lify can offer this experience at a much lower cost than traditional methods.

In the textile sector, clothes are being tried for entertainment purposes. Ladies standing in front of the screen, in the mirror view, can see the dress they want to try with AR on them. The best known is Disney's application. Lify is designed to ease in making a buying decision, at low cost, by carrying this experience to homes and offices from within the store. A virtual boutique selling over Ebay will be able to create virtual trial rooms with Lify. By taking a selfie, she can look at the outfit she wants to try, look at how she thinks about her hair coloring and makeup on her own. When the number of product returns is reduced on this count, support and operational costs will fall. With Lify, it will be very easy to move the store shelves to the place where the user is located. By visualizing the virtual shelves where the virtual clothes, shoes and accessories are located, the user can take the product that she wants at the rack and try on the selfie.

Not only pre-sales, but also after-sales Lify produces added value. Support costs (technical support, installation support, etc.) can be reduced at one side. The time, speed, efficiency and corporate reputation to be earned cannot be underestimated when we imagine the technical support staff on the phone will continue to tell the customer about the light on the product at the other side. Think about the flow starts with Lify directly

explaining the operations to be done on the product in three dimensions and animations.

Lify is designed to be capable of responding to service quality and performance expectations of areas such as education, military, health and safety in electronic/mobile commerce with its flexible, expandable, fast, (android / iOS compatible) platform independent and social media integrated cloud technology.

V. OTHER USES OF LIFY WORLD

In addition to e-commerce, Lify will find itself in other areas of use in AR literature. For a sports club fan, after the team winning the championship, she can broadcast team's flag, improving the experience of sharing the flag as a photo floating in the sky over the city. In this way, friends in the same city can see the flickering flag when they look at the sky with their mobile phones.

Lify will be a revolution for applications that present content on maps. These applications do not say exactly what the user is going through in reality, they present the points of interest (POI) just on the two-dimensional map. Lify, on the other hand, shows the POI she is looking at the world in front of her eyes. Are you looking for a restaurant? It will suffice to move your mobile phone to the eye position with your hands while scanning left and right with your eyes. Lify's eyes will point to the restaurant you're looking for. You do not need to look at the windows when you are walking in a street and looking for a rental house, you will have a glimpse at the top of the street with Lify and you will find out the location of the rental apartments in Lify. Lify can be a virtual guide for tourists as well as being able to reveal the original state of the city with virtual reconstruction on its remains. And many more location based services like these ones can be brought out by Lify. The easier it is to find the POI that is searched on the site makes, the advertising material is more interesting and because of this the important number of sales increase is sustained.

Gamification has an important role in marketing studies. Lify has the potential to be an important instrument for marketers. Because, with Lify, the space in which the user is located can be included in game editing, so that more impressive and functional games can be created. For example, to find a certain number of objects hidden in different places in the city and to take them for ranking the first place, or to carry a hidden message on the face of the shirt which can be seen only with Lify. And, Lify is able to do all of this on the brand's Facebook or Twitter account, taking it to the next level.

We foresee that Lify will open a whole new perspective in the advertising world. AdMob, MobFox, and similar ad serving channels serve content on the web and mobile. Lify, while opening a new world window to the users, is capable of displaying the ad content it receives from the distribution channels in the AR environment. With the support of ad distributors over time, Lify will be able to offer more vivid and impressive ads with AR-friendly content. At the moment, the work on Lify has gained momentum so that ads in video format received via MobFox can be placed in a random place on the world of AR, or on a plate, plate image, in real world. Lify's

content database will be available over time in the video provided by Youtube and similar video distribution channels.

Lify provides an environment for educators and writers to create their own content. By reducing the cost of preparing training material on this side, it will contribute to the increase of AR education contents.

Lify is also ready to be used in psychiatry and neurology. Methods for altering the perception may be applied in the treatment of patients who have lost their sense of reality or in increasing their quality of life. Remember the mirror method that Ramachandran developed for ghost limbs [20]. Ramachandran introduced this device as a "virtual reality box". These and other methods are based on the perception of objects that are not in the real world, as if they existed in our visual senses. In another example, Ramachandran suggests the creation of a reality that will create real horror for the user as he approaches the attack against the panic attack [21]. In this sense, the user will be able to control his anxiety by experiencing a sense of fear in the knowledge that it is a true source of fear, rather than anxiety that develops independently from the outside world. Although watching horror movies appeals to the visual senses, it is far from real world perception. The success of this method can be improved by creating a more realistic perception with AR. The most important value for Lify for such applications is that, just as Ramachandran suggests, mobile devices already carried in the pocket of the user can be used at a very reasonable cost.

GPS and image processing are widely used in security technologies. Geo based AR technology that blends these two technologies will surely find its place. Especially, visualization of location based services and placement of monitored POIs in real environment image by AR will help the security forces to provide healthier information with less effort. The cloud-based service developed by Lify is laying the groundwork for such customized applications.

VI. CONCLUSION AND FUTURE WORKS

AR technology is solving more different problems than entertainment use and has the potential to be used in several sectors. The biggest challenges in applications to realize this potential are development difficulties, reaching more users and high costs. With Lify, we aim to overcome these obstacles. Lify could be a technology that engineers and developers can easily use in their system designs.

Lify, a brand new world, will show its real impact as it is highly recognized by the industry and ecosystem. Starting at the moment as a mobile application platform, Lify can be said to be integrated with the device's camera in the future, with the windshield of the vehicles, windows of buildings, glasses and lenses. Enhanced hardwares will allow modeling of three-dimensional objects through mobile devices. When this stage is reached, the scanned 3D models will be shared via Lify as the target object, which is a base for both content and augmentation.

We do not see AR just as an interesting new application or a platform. We believe that AR is a new type of digital media that uses other media in itself. Over time, we anticipate that Lify will lead the way in which presentation styles will be standardized for mobile and web technologies. When we think

that Kuruüzümcü defines virtual reality as a "new art form" [22], Lify will be a new space for artists to express themselves, as well as an opportunity to share their messages with the users in the same environment for brands.

Using AR with three-dimensional and moving product content in real size in order to zoom in and visualize them to the users in the same environment, at the Lify world where we have discovered, we offer a wide range of user experience ranging from games to movies, from event organization to group activities, from educational conferences to health safety, advertising to shopping, e-commerce and m-commerce. Lify offers an important user experience, such as electronic/mobile commerce, to go beyond entertainment for you to promote itself. It is a platform specialized in giving the most convenient, safest, fastest and most realistic experience for your shopping needs. Future UI/UX developers, playwrights, campaign editors will be Lify's most valuable solution partners. In today's applications, AR technology requires different applications from the commonly used applications for content presentation. Lify breaks this habit and presents AR technology within social media tools. Thanks to this flexibility of Lify, AR is becoming more accessible to designers and campaign writers. We invite you to explore the brand new world of Lify.

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