

# A SOFTWARE APPLICATION BASED ON AUGMENTED REALITY TO IMPROVE PERSONAL SPORT HABITS

<sup>1</sup>MUSTAFA ULAS, <sup>2</sup>AYTUG BOYACI

<sup>1</sup>Firat University, Dept. of Software Engineering, Turkey  
<sup>2</sup>Firat University, Dept. of Digital Forensics Engineering, Turkey  
E-mail: <sup>1</sup>mustafaulas@gmail.com, <sup>2</sup>aytugboyaci@gmail.com

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**Abstract**— Augmented reality applications place the virtual images and 3d models onto real footage and enabled the users to interact with the virtual contents by physically. This innovative technology has applications in many areas such as education, health, and defense industry. One of the major problems is the lack of modern human beings do sport for a healthy life. Augmented reality technology can be presented as a solution to these shortcomings. The time spent with sports as fun and efficient evaluation issue is the primary objective of this study. An application model which is based on augmented reality has been formed to achieve this objective. The application will be placed on pre-defined scenarios on the image which is provided by the camera and this process will enable the user to efficiently spend the sport by creating a comparative performance data. This study has also demonstrated a supportive application in personal health with the software to be performed and a model has been introduced.

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**Keywords**— Augmented Reality, Embedded System, Personal Healthcare, Expert System, Wearable Technology.

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## I. INTRODUCTION

Augmented reality (AR) is an innovative technology which has a lot of application area and the use of augmented reality is increasing rapidly [1]. This rapid increment can be described with application platform compatibilities of it. AR can work with many platforms, such as mobile devices, wearable technologies, embedded and desktop systems [1]. The spread of VR goggles will increase the usage of AR. There are various examples of suitable applications. The project aims to create mobile health monitoring infrastructure. The generated data will be the source of the next Health Monitoring study.

Today, the most important thing is to produce data which includes knowledge about the world and users. It is observed, many of the people who might have trouble making regular sports activities has an idea that the sports activity period is inefficient or boring. The main objective; the amount of time users spent doing sport more enjoyable, useful and is to be interactive.

In this study, a sample of model of the application which is based on augmented reality has been proposed. This proposed sample is a study like a compilation of the results of important research in the literature. As a result of this review, the study was carried out an application.

## II. AUGMENTED REALITY AND RESEARCH AREA

Augmented reality can be described that it helps the application to merge the real and virtual world. Augmented reality works with the embedded camera of the system and replace a virtual image on a real image which is sourced by the camera. The aim of augmented reality is mounting the 2D or 3D object on real world image. It works in two different ways. One

of them is finding markers on the images which are sourced by the camera and the other is the working with technic. Augmented reality application is also working with GPS and web browser technologies [1] [2].

Augmented Reality has application examples in many areas such as, education, security, health, and social media etc. Augmented reality helps to enhancing the quality in education [3-5]. Supporting materials must be used to improve the quality of learning in education [1][6].

## III. LACK OF TIME TO DO SPORTS ACTIVITIES OF THE MODERN PEOPLE

The environment for the realization of the sport activities are required to have certain characteristics. These conditions can be named as users' needs. Relaxed performing the sporting activity in places where users are related with equipment, the properties of the action and number of the users.

The basic objectives of the study is increasing the efficiency by making fun time when the users are doing the sport activities [7].

For a healthy lifestyle, regular feeding of people, away from the stress of life and do sport on a regular basis is recommended. A lack of doing sports is particularly important for many people living in metropolitan cities shortcomings. This lack trigger serious health problems, coupled with the challenges of city life and stress can become a factor. The research, physical activity, psychological disorders and protect against metabolic disorders has been revealed the idea to have a significance [8] [9]. In another research, it was stated that particularly in children, the reasons of safety issues habit of regular exercise, lectures, the status of the daylight, the lack of facilities, fields and equipment, lack of adult role models, injury worries have blocked physical activity

[9] [10]. Recent researches revealed that children need particularly to play games which include physical activities comfortable spaces [10].

In the field of health, augmented reality has been designed as a place-based virtual reality elements on the current image. By processing real images, the software performed in the study will have the scenario that will enable people doing the sports activities more productive [11]. These scenarios regardless of the platform will be designed to be compatible with all other technologies, embedded systems and mobile systems. The main objective; the idea of a healthy life should be supported [12] [13].

### 3.1 Advantages of Augmented Reality in the Model

The working principle of software for augmented reality is to place objects on the real images of people engaged in sports will allow them to use indoor or outdoor area. Applications will be available for human who do not sport activities with enough quality in city life. Actually, these scenarios will be based on the improvement of the efficiency of the time when the people doing the sports activities. Figure 1 is the model of the application. The application uses camera to get the image from the real world. Scenarios are planned to improve the sports activities and the application will include a lot of scenarios. The image which is got by camera from the real world merges with the 2D or 3D interactive objects. Scenarios use the sensor of the embedded system such as accelerometer and GPS to improve the effect of the sports activities. The application creates the interaction between users and 2D or 3D objects with embedded system's sensors.

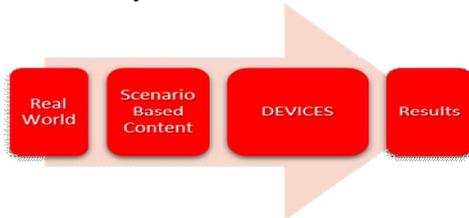


Fig 1. The model of the application

Many devices can be used as embedded systems which are planned to be the important part of the application. The device is planned as the place to run the program.

There are several device options which could be used as an embedded system. Figure 2 represents the device options. It is observed in the figure that mobile device VR glasses and wearable technology device could be used in this application.

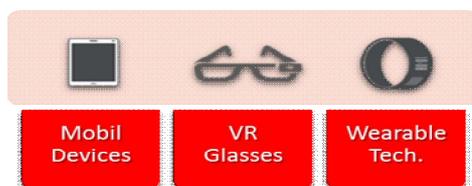


Fig 2. The sample of devices which can be applicable with the model

## IV. PERFORMED APPLICATION WITH THE STUDY

Application was performed on Unity. This application is designed to run on android based devices. Users can change the mode of the system developed with the Unity scenes are provided. In these scenes, the user can choose the scenario modes. Depending on the application running platform, screen is divided into two separate parts with goocards library. Figure 3 is one of the scenes, which appears to make itself useful for this sample scenario.



Fig 3. The User Interface of Application

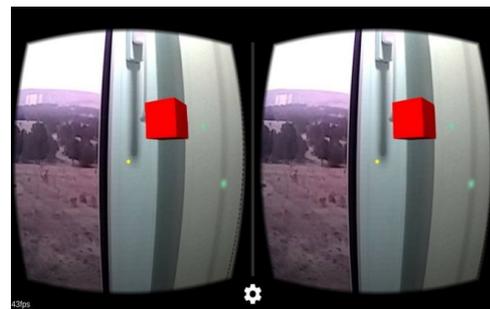


Fig 4. Find object mode

The speed of the user is tried to measure from the data received by the accelerometer sensor with existing algorithms in practice. Acceleration with numerical measurements are calculated as a vector with x, y, and z axis movement value. Speed calculation is made on the difference of the GPS position.

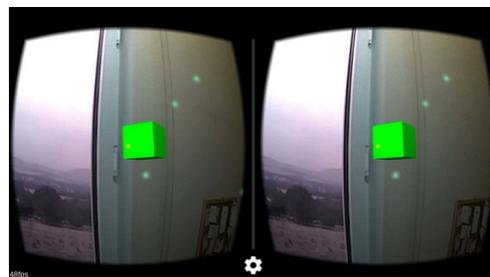


Fig 5. Found object

## CONCLUSION

Personalized healthcare concept is innovative and important field of the study. This area has many new projects and academic studies. The software is expected to produce data-intensive depending on the personal activity information. The generated data-

intensive, infrastructure creates significant knowledge in subsequent studies to interpret the removal of the intelligent systems.

One of the most important emerging areas of research in today's world is "quantization of Habits". The daily habits and movements are converted into digital data for implementing more efficient and active day with the reports which are generated by the application. In the present application, the report made via a mobile application to analyze the information received from a sensor worn on the wrist is available. In this study, increase the quality of the sports activities is enhanced with augmented reality. The application running on scenarios is developed on the Unity to run on android. Scenarios which run on this application have been created.

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### REFERENCE

- [1] U. M., T. S.M. and U. S., "Augmented Reality and Application Sample on Education," International Journal of Advances in Software Engineering & Research Methodology– IJSERM, vol. 2, no. 1, pp. 44-46, 2015.
- [2] M. Ulas and S. Tasci, "A Review About Augmented Reality Tools And Developing A Virtual Reality Application Based On Education," Academic Journal of Science, vol. 02, no. 139-146, p. 03, 2014.
- [3] J. D. J. and M. H. R., Learning Disabilities, Grune & Stratton, 1967.
- [4] D. R. A. and O. J., Supporting and promoting argumentation discourse in science education, Studies in Science Education, 2008.
- [5] M. Felder and L. Silverman, "Learning and Teaching Styles in Engineering Education," Engr. Education, vol. 78, no. 7, pp. 674-681, 1988.
- [6] M. Ulas, N. Bozkurt, S. Taşçı, A. Boyacı, A. O. Tanyıldızı, M. M. Karabulut and S. Ulas, "Çağdaş Bilim Merkezlerine, Öğrenimi Destekleyici Öğretim Uygulamaları Ve Yenilikçi Çözüm Önerileri," in 4th North Africa and Middle East Science centers network, Bursa, 2014.
- [7] M. K. B. K. A. S. Y. A. A. F. T. Sefer Gümüş, "Sağlık Pazarlaması Ve Uygulamaları," Uluslararası Hakemli Pazarlama Ve Pazar Araştırmaları Dergisi, 2014.
- [8] N. K. W. WAGNER, "Recommendations for He Promotion of Physical Activity in Children",," Journal of Public Health, vol. 14, pp. 71-75, 2006.
- [9] H. G. K. BENJAMİN, "Strength Training for Children and Adolescents",," Physician & Sportsmedicine, vol. 31, no. 9, 2003.
- [10] B. K. ., M. K. K. G. Ali Serdar Yücel, "Spor Yapan Çocukların Spor Tercihleri Ve Bunu Etkileyen Bazı Faktörlerin İncelenmesi," International Refereed Academic Journal Of Sports,, 2014.
- [11] H. K. İ. Kılıçaslan, "Türk Halk Oyunlarının Sergilenmesinde Sahnenin Ergonomik Yaklaşımla Değerlendirilmesi," in 19. Ulusal Ergonomi Kongresi Bildiriler Kitabı, Balıkesir, 2013.
- [12] A. S. Y. N. Ç. B. K. Murat Korkmaz, "7-17 Yaş Arası Farklı Gelişimsel Özellikleri Olan Çocuklara Sahip Ailelerin Stresle Başa Çıkma Yöntemlerinin İncelenmesi," International Journal of Family, Child and Education, 2014.
- [13] A. S. Y. M. K. Ahmet Atalay, "Ergonomi Ve Sporda Ergonominin Kullanım Ve Öneminin İncelenmesi," Uluslararası Hakemli Mühendislik Ve Fen Bilimleri Dergisi, 2012.

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