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Augmented reality based iot concept for smart environment

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***Abstract*-In this paper we have discussed about various applications based on ARIoT. Ultimately, an augmented reality based IoT system in the era of E-commerce .When making purchasing decisions at a retail location we will pick up the material and examine it closely, looking at the pictures. Through "augmented reality" customers can take their two-dimension experience with products to three-dimension. Deliveries can be tracked through IoT capabilities. By that they can obtain the efficient result through the real world entities.**

Keywords: ***Augmented Reality (AR) , IoT , ARIoT , Ecommerce***

I. INTRODUCTION

Augmented reality (AR) is a straight or indirect view of a physical, real-world scenario whose elements are supplemented by computer-generated sensory input such as audio, video or GPS data. It is related to a more common concept called mediated reality, in which a view of reality is modified by a computer. As a result, the technology functions by enhancing one's current perception of reality.

Fig 1:Augmented Reality(AR)

AR framework enabled by a simple extension to the bare IoT, called the "ARIoT," distributing the aforementioned scalability burden to the individual objects. It is expected that in future, basic IoT infrastructure will have already made it possible for mobile (AR) clients to identify and connect to the "things" in the environment (similar to identifying Wi-Fi access points)[3].

Augmented reality (AR) is changing the visible features for enterprise and developers of IoT solutions. .Augmented reality presents specific opportunities for rapid scale and adoption in the enterprise. By including augmented reality into their IoT strategy, enterprises can enhance service, customer experiences, operations, and the engineering. The process of augmentation is triggered when AR markers are detected, then appropriate AR content is presented to the user based on the detected marker. The markers can be in the form of pre-defined images which are detected and tracked in a real-time using image processing algorithms within the live video stream[2].

The AR technology was used for military, industrial, and medical applications, but very soon it has applied in the commercial and entertainment domains. The technologies which AR take place are :camera, location sensors, display and image processing engine. For example Sensors in the soil can help farmers exactly when watering is necessary. It is not only monitor moisture, but they can also track the temperature of their crops and keep track of their equipment. By walking through the field the farmer see the soil moisture level and the temperature of the crops .It is also used to monitor the performance of water pump.

Nowadays, the important devices supporting the AR applications are the smart phones. Furthermore, application distribution channels such as Google Play and iTunes enable speed and efficient deployment of applications.

If the data can be cognitively analyzed by machines, why is it so important that humans are able to visualize it? The answer here is simple. Ultimately, the point of the Internet of Things and the technology which goes into making it a reality is to unlock the full capabilities of human potential. Augmented Reality is so often brought up alongside this concept, is because they understand the unlimited possibilities it will bring to human existence.

II. RELATED WORKS

The Intelli-Mirror (an Augmented Reality (AR) based implementation of an interactive system termed "Intelli-Mirror) uses Image Processing techniques to detect a user and then displays a garment image on the person. The Intelli-Mirror provides the user with the ability to switch between the selections available in an entire inventory of clothing. This negates the need of continuously having to physically change clothing every time a customer wishes to try on a new garment. This effectively reduces the time to shop to just the decision-making time. The implementation thus provides relief from many of the problems associated with physically changing clothing. The Intelli-Mirror is also an Internet of Things (IoT) device implemented on a Raspberry Pi capable of updating itself to the newest inventory. It can also provide data for user analytics to aid in clothing design and marketing.

An application of Augmented Reality (AR) within a smart city service to be deployed in the domain of public transport in the city of Novi Sad in Serbia focused on providing a simple and efficient method to citizens for accessing important information such as bus arrival times, bus routes and tourist landmarks using smart phones and AR technology. The AR information is triggered by image and geo-location markers and the data is provided via secure IoT infrastructure. The IoT infrastructure is based on bus-mounted IoT devices which utilize secure CoAP software protocol to transmit the data to the associated cloud server[2].

A scalable Augmented Reality (AR) framework enabled by a simple extension to the Internet of Things (IoT) infrastructure, called the "ARIoT." Through ARIoT potential user-proximal target objects are dynamically identified in any IoT-enabled space, tracking feature information is directly obtained from the IoT objects enabling fast recognition and tracking (independent of the number of the total IoT objects everywhere), and generic interactive contents are augmented as an IoT service to the AR client. To further improve the AR tracking performance ,which often depends on feature appearances, introduces a method in which the preferred tracking method is determined by the very IoT object in hand. [3].

Hand-held based Augmented Reality Application that enables wheelchair users to interact with items placed beyond their arm's length, with the help of Augmented Reality (AR) and Radio Frequency Identification (RFID) technologies. The system is an interactive AR application that runs on different interfaces, allowing the user to digitally interact with the physical items on the shelf, thanks to an updated inventory provided by an RFID system. The resulting experience is close to being able to browse a shelf, clicking on it and obtaining information about the items it contains, allowing wheelchair users to shop independently, and providing autonomy in their everyday activities. [4].

A mobile based real time information providing system with augmented reality, called Smart Advisor. Smart Advisor can make user's life convenient by informing necessary information and actions in advance by recognizing and tracking the interest object captured by the camera in mobile devices. For robust recognition in various environments, an object matching technique based on binary descriptors is applied with adaptive illumination compensation in limited search window. This system can be applicable to various areas, such as medical treatment, education and game through the interlocking with IoT.

In these paper we presents the illumination compensation to enhance the matching accuracy. To minimize the speed loss illumination compensated

within the area of detected object. If the object is initially detected search window is setup and the histogram equalization is applied within the window[10] we adopt the tracking by detection scheme so the search window is updated every fame base from the average area from the previous 5 frame[5].

Dynamic markers based on LED communication, which can be decoded through cameras embedded in smart phones. These dynamic markers can directly deliver sensor information to the rendering device, on top of the object ID, without further network interaction. In this system the worker approaches an electrical panel and points a smart phone at an AR dynamic marker. The smart phone decodes the information sent by the AR marker and obtains the device ID of the electrical panel and dynamic status information (average energy consumption and status codes).This information is shown to the maintenance worker via the AR interface.If additional data are needed, the smart phone application can use the device ID obtained from the AR marker to send a query to the backend infrastructure. Note that this is not compulsory in many cases, as the status codes will quite often be enough to inform the worker of the situation. [6].

Augmented Reality (AR) associates virtual reality with data from the physical world (human sensory modalities) which are obtained through physical analytics. In this way, automobile or machine manufacturers are attempting to equip their service technicians with a 'digital' toolbox, in order to reduce millions of kilometers, tons of paper, spare parts deliveries, and much more. AR has continued to advance and is focused not only on gaming but also on an ever growing number of applications in the industrial world.

Due to the capabilities of the Internet of Things, we are able to link any existing device (sensors) to backend service via a network. Intelligent sensor technology, machine-to-machine algorithms, analytics (big data) and cloud computing open up new possibilities for data linkage and evaluation[7].

EPRA is a digital educational material that is designed as a web site called “Teaching Basic Programming with Augmented Reality”. This web site (Fig. 3) includes theoretical reference contents and a number of AR activities with various didactic goals for Programming teaching. In [8], the authors describe an experience carried out in an informal learning environment, namely, a visit to a Mathematics exhibition at a museum that uses AR to provide additional information. There are two groups: one that participates in an interactive way using AR, and another one that visits the sample using the traditional method. The goal of the authors was to compare the mathematical knowledge acquired by both groups. Based on the results presented, it is concluded that the addition of AR to an informal context (museum) is effective for acquiring Mathematics-related knowledge.

III. ARIoT IN E-COMMERCE

By adding a “fitting room” component to an ECommerce site not only can consumers see what clothing and accessories will look like on them from head-to-toe using webcam technology but they can also virtually change their look in a matter of seconds.

Fortunately there are now several smart phone apps which use AR to take a photo of a room and can place furniture in the room to see exactly if the colors work and to make sure the couch will fit.

Deliveries can be tracked, adjusting speed and route as needed with the use of GPS and sensors. Customers can access the same data so they know exactly where their orders are along the way. If you sell or buy the products covered by warranty, this cut back further be tracked by the IoT so alerts can be sent if a yield starts to malfunction.

IV. CHALLENGES

Having all those gains and benefits does not come without concerns. Using this technology one may

not be able to correctly estimate the speed of an object or a car or ignore some of the threats of the real, surrounding environment. And there are serious concerns about those technologies – some can be physical threats, other – behavioral, privacy, security and some can be placed even at a level of "National security threat" [8].

V. CONCLUSION

An Augmented based IoT is capable of providing a much friendlier environment. In this paper, we have described a novel approach to link real-world entities (with sensor and actuator capabilities) to virtual world information relying on proximity communications. Augmented Reality and IoT has wide range of applications like Cutting Inefficiency and Diagnosing Technical Problems , Smart helmet and Maintaining a Fleet of Heavy Equipment Vehicles and education field. By that we can interact the real world with efficient way and the time delay for communication is to be reduced.

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