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# Enforcing High Performance of Augmented Reality using Android Smart Information Broker in E-learning Sessions

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**Abstract:** Schools, educational institutions and universities are migrating teaching tools and utilities to modern technological innovations such as replacing books with tablets, iPads, along with Android based devices. Tablets proponents encourage educational institutes and universities to switch their printed textbooks to digital and Books in an effort to increase student's creativity and interactivity; this is caused by the revolutionary efforts to introduce software tools which are utilized to interact students as well as stimulate his or her creativity. Within this particular method, augmented reality is used as another level of books representation along with the visual display tools utilized by teacher and learner in the learning session. Augmented Reality (AR) improves the visual and textbooks contents through rendering information, behaviors and knowledge into a digital entity which is represented the visual objects throughout the lecture material. The possibility of employing augmented reality within the domain of E-learning is highly encouraging because of the high level of interactivity, it presents within the materials introduced along the sessions of E-learning.

## INTRODUCTION

Today we live information age where the wealth of knowledge and flow informational on the impact of technological advances the emergence of the computer and the internet and employ them in various spheres of life, this progress has led to the emergence of methods and new ways of teaching depends on the activation of the new technological techniques to make a quantum leap in the educational processGoi and Ng[1]. it has become the E-learning best way which is indispensable to the development of methods of modern education and the emergence of a new term is E-learning has appeared several labels for E-learning including education via the internet or distance learning is known as E-learning as a modern revolution in the techniques and methods of education that makes use of the most recent reached by the technique of hardware and software in operations learning from the use of electronic means of the offer to lay down lectures in traditional classrooms as well as the application of multimedia in classroom learning and self-learning and ending with the construction of virtual

classrooms and smart schools that make it possible for learners Attendees and have interaction with seminars and lectures that are used in some other countries by the interactive TV technologies and internet, so is the E-learning method education using modern communication technologies of networks and computers, multiple image, graphics and voice, electronic libraries and search mechanisms to deliver scientific material for the learners with greater benefit, less effort and shortest time[2].

**Concept of augmented reality within E-learning:** The term of Augmented reality is normally combined software and hardware technologies implemented to enhance the environment reality this can be done by implementing software technologies throughout two main dimensions: the first dimension is software technologies utilized to improve the level of informatics hold by the element of the environments, the second dimension is where software program technology are employed for increasing the level of interactivity between the individuals and environment[3].

Basically, the environment in ARcan be abstracted to collection of objects and most of the objects are symbolized by digital entities which have functionalities and attributes this abstraction enables IS and also ultimately enterprise IS to incorporate these digital entities using extra function alities and information to gain the knowledge attained through these entities interaction[4].

Anyway, visual contents within E-learning are playing an essential role in transferring awareness to the studies, student concluded that an image is well worth 1000 words within E-learning session; that is why lectureis actually broadcasted and recorded as videos (such as: youtube.com which is containing video lessons for real classes)[5]. The only missing component that inhibits electronic lectures to be considered as an effective alternative to the real lectures is the interactivity in which students should sit down and watch but may not participate. It has been altering over time from the first augmented reality appearance where several layers are included in the video lectures; all these layers tend to be generated dynamically to enhance the level on knowledge obtained by the students, after all, this specific study is focused to enhance the delivery of knowledge in E-learning sessions[6].

AR is simply not a digital reality, it can be a real reality delivered with computer produced contents to impose considerably better conceptualization and understanding to the environment, whilst digital reality is the environment simulation. In this study, it will investigate two dimensions which are: Richness of information and also Interactivity in addition to obtain this kind of information autonomously in the web[7].

**Problem statements:** The major tool utilized to express concepts within a particular knowledge domain in E-learning sessions are visual contents, therefore, the details conceptualization associated with these visual contents will increase student's efficiency to get the highest level of knowledge and information Basically, students may not keep enough information and knowledge regarding the visual contents showed by the lecturers and teachers in the teaching session that prevents providing intended knowledge for chosen destination such as students. In this study we have several persisted problems for example: how much information required increasing the lecture reality to improve knowledge delivery? Just where augment information can be stored as well as how it is organized? What is retrieving information method utilized to query for specific information? In addition to how information can be updated? One crucial question spilled out through this study is how student's behaviour using augmented reality impacts the information structure in the stores? Student's behavior by using the visual contents as well as the information given by AR is actually not obtained as knowledge source for gaining experience together with wisdom to get other session.

## MATERIALS AND METHODS

**The proposal system:** The proposed system is introduced an innovative technique to allow determining physical objects identified through augmented reality sensors, this kind of technique is accomplished by embedded in android based agent which can understand objects in the scene as well as employ available resources to indicate it. Anyways any image captured by these sensors could be represented as the following:

$$I = \sum_{i=1}^{N} C_i . \vec{v}_i \quad (1)$$

Where:

$I$ = Image captured by the sensor
$C_i$ = ith concept within the image
$\vec{v}_i$ = ith semantic for corresponding concept

And we have

$$\text{Repository} = \sum_{i=1}^{N} C_j . \vec{u}_j \quad (2)$$

Where:

Repository = Internet web pages
$C_j$ = jth concept within the internet web pages
$\vec{u}_j$ = jth semantic for corresponding concept semantic is revealed from the annotation that describes corresponding concepts

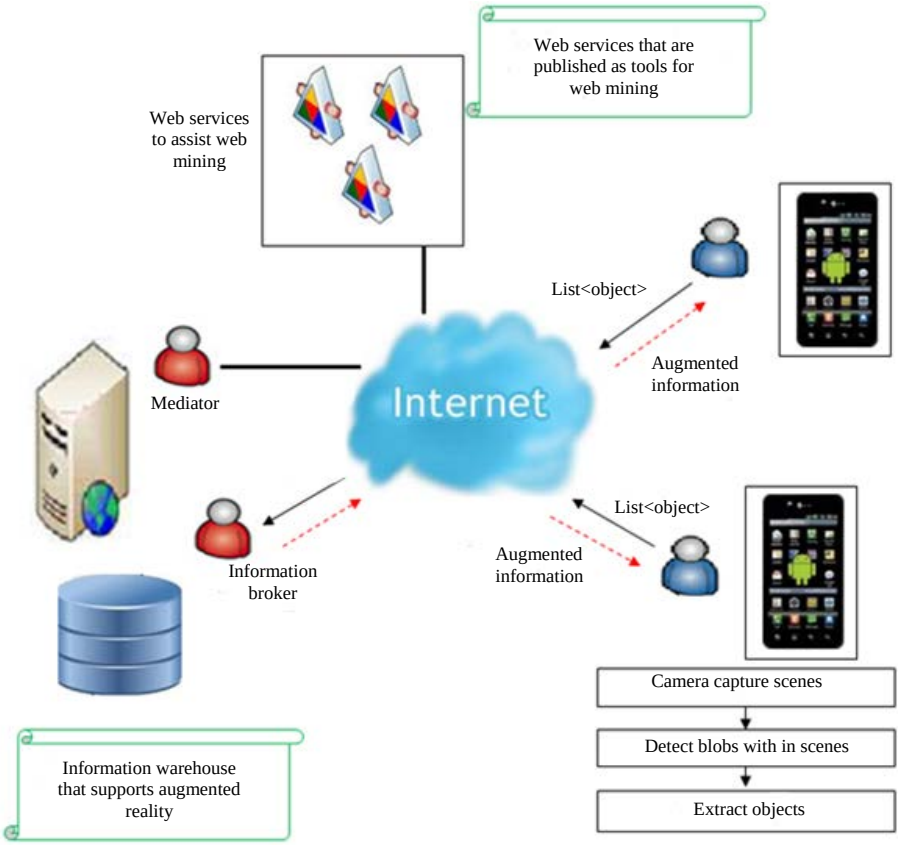


Fig. 1: The proposed system general structure

Vector projection is given by the following formula:

$$\mathrm{Proj}_v u = \frac{u.v}{|v|^2} \times \vec{v} \tag{3}$$

Thus, we have:

$$C_i \equiv C_j \text{ iff } \mathrm{Proj}_v u \cong u \tag{4}$$

In this proposal and based on Eq. 4, firstly, we should decompose captured image directly into visual objects collection, then obtain knowledge in terms of extracted objects through, automatically surveying internet by an Agent. The basic structure of the suggested system is provided in Fig. 1.

**XML notation to AR warehouse:** Android based AR objects are producedby using image processing approaches on two levels: the first level is object level where most important areas are pointed out where the low level features are evaluated, in the second level which is the level of concept in which object is conceptualized in semantic level. Generally, simple sciences (for instance: cameras focus on only a single object such a human, car, etc.) could be made of several concepts while with a big number of objects (for example, cameras capture just one entity using details for example, car image through details on doors, exterior and interior)although complex scenes are consisting of many objects and concepts (such as, cameras capture a view for a street inside the city) In this study a special observation is needed to warehouse AR; this can be determined along the investigation lifecycle, the notation of XML is introduced to give java agents the capability to retrieve and match corresponding knowledge pertaining to certain objects. This is a crucial skeletal system to the XML observation recommended to describe objects.

Within local storage, details is symbolized by nodes of XML

```
<location altitude ="" >
    <object>
        <attribute name="" />
        <attribute value="" />

        <annotation …. ></annotation>
        <video></video>
        <music></music>
        <VoiceXML …. ></VoiceXML>
</object>
```

## RESULTS AND DISCUSSION

**Research Hypothesis:**

- $H_1$: smart Information broker have the ability to update the reality through information advance level because of its capabilities to integrateand acquire knowledge from global warehouses and resources

This hypothesis could be modeled through the following proposed system:

$\exists_{reality} \forall_{object \in reality}$ Smart Agent (object) Smart Object
$\exists_{ibroker} \forall_{Smart\ Object}$ Seekslnfo (ibroker Smart Object)/\
Supply info (Smart Object, ibroker)→Passive (ibroker)
$\exists_{ibroker} \exists_{Smart\ Object} \exists_{info \subset warehouse}$ Change (info)/\Notify (Smart Object, ibroker)→Active (ibroker)
$\exists_{ibroker}$ Active (ibroker) Passive (ibroker)→inf broker
$\forall_{info\ resource} \exists_{inf\ broker}$ Access (info Resource, infbroker)
/\Has Mining (infbroker)
→Smart Inf Broker

- $H_2$: the behavior of students is a rich resource of knowledge regarding the information presented by the AR system

This particular hypothesis will be investigated through starting a monitoring session regarding the student's behavior in being able to access augmented information offered by information agent.

$\exists_{Student} \forall_{Smart\ Object}$
Interact (Smart Object, student)→Accessed Object
$\forall_{Smart\ Object} \exists_{info}$ Visual (info)\/
Audio (info)\/ Textual (info)→Augmented (Smart object)

- $H_3$: improving the actual interactivity between the material and the student is promoting the augmented reality level and then the student's conceptualization

Since, it has been presented in the introduction of the current research which is focusing on the process of E-learning as well as how much knowledge can be transferred along specific learning session, therefore, the more tools released in the process of augmentation the more conceptualization could be provided. For instance including a compiler directly in visual content which symbolizes a source of code to get computer language gives a great potential pertaining to a student that will examine the code as well as trying to change the contents then examine the result.

- $H_4$: tagging digital lecture documents (such as voice, video and textual) enhance the possibility to include its contents as AR in certain domain; moreover, annotating these tags could influence the level of automatic conceptualization for the lectures through smart software module

By investigating this research hypothesis, multiple lecture of visual contents are annotated and analyzed manually in initial phase and after that analyzed the auto-annotation for obtainable documents (such as the objectivity is actually forproducing content integration system and for improving the augmentation process).

## CONCLUSION

This research introduces new approach in order to promote the process of augmentation performance for a reality within a particular domain; this study is focused to enhance the visual contents utilized in the process of E-learning. The substantial contributions provided are: Innovative method implemented by the broker to obtain information for objects in a specific reality, wherever ontological representation with regard to the scene is applied to query information coming from global repositories.

Warehousing system for knowledge and information utilized to increase the E-learning sessions reality. Information is organized and connected mainly according to their locations. The behavior of students is considered as grading and mining information sourceprovided by the broker information where statistical methods could be implemented on the information applied in the process of augmentation.

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