Final Year Project Topic: Application of AR in Employee Training

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Project Background

Idea Background
My final year project is about implementing an application of Augmented Reality (AR) in employee training, especially in property management. It is ubiquitous that different conglomerates and corporations would like to provide many trainings to their employees. However, most of the employee training method are typical lectures or paper materials. These kind of training methods would be not enough interactive; thus, it would be not enough effective and efficient to train up some skills or mindsets for the employees. While everyone is talking about technology and innovation these days, AR technology may be one of the solutions to facilitate and enhance the employee trainings effectiveness, implement employee training in a more interactive and creative way to create a better result.

Introduction of Augmented Reality (AR)
Pondering over AR technology, AR is a general term for sort of technologies used to mingle computer generated information with the user’s own human sensors. A typical example of AR is using a projector to augment a real-world object for a presentation. As well as artificial intelligence, AR is also not a new idea, but the AR revolution has started with advances in the popularity of smartphone and different technological appliances.
Feasibility Analysis

1. Technical Feasibility
Considering the functional area, although people may not be familiar with the IOS implementation and maintenance, the system is only a simple system so lacking IT knowledge may not be a big concern for any corporation using it. We are going to build an IOS app using Swift mainly to perform AR training courses function with Swift’s ARKit. In addition, since corporations are commonly using paper materials or lectures to hold employee trainings, there is no existing system to integrate with our system so the compatibility of our system is high.

2. Economic Feasibility
Cost
After development, the cost consists of the cloud server cost and domain cost, assuming only little maintenance work will be needed to be done in the future.

Benefit
The system would help corporations to manage the employee training record in a more efficient and less time-consuming way so corporations would be able to reduce administration costs. Shortening the average training time of each employees and the new AR training system would also improve learning experience and satisfaction and thus increase effectiveness of the training result.

3. Organizational Feasibility
AR technology application is not common in property management industry and the system does not strategically have conflicts with existing rules and policies of any corporations, corporations would probably accept the system unless the system provides terrible user experience to the employees.
Project Objective

This project will focus on the customer service aspect of employee training. As customer service industry plays an essential and effective role in Hong Kong. Lots of conglomerate and corporations provide a series of training to their employee on how to provide a best service for their customer. This project would like to simulate some real-life situation of dealing with customers’ request on the AR browsers, and the employee will need to choose the most suitable reaction to cope with the customers’ request.

This project would utilize some customer service skills training programs to create some tasks. The project would simulate some cases mentioned in those customer service training programs to demonstrate a more interactive method to train employees. There will be different types of tasks for the employees to deal with, for example, building rapport with customers, delivering service to meet customer needs and dealing with some emergency situations. It will be demonstrated in a role-play method, employees will look around with the AR browsers in a smartphone device, they would find some virtual customers in the AR browsers and they would need to deal with them. By choosing some multiple choices, the customers will react positive or negative emotions to let the employee the choices are correct or wrong.

Business Assumptions and Dependencies

User Identity
There are 2 types of identity of users in the system which Employee and Administrator. Employee can apply for the training courses and check their learning progress. Administrator can edit, add or delete the content of any training courses, view all employees’ learning progress and update the system.
**Scope and Limitations**

Feature List:
- FE-1: Register, login and update account/profile
- FE-2: Apply for training courses
- FE-3: Use the AR training courses
- FE-4: View learning progress (Employee)
- FE-5: View Employees’ learning progress (Admin)
- FE-6: Manage the training courses (Admin)
- FE-7: Notification

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<th>Feature</th>
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| FE-1: Register, login and update account/profile | 1. Register account with username and password  
2. Specify a name, contact email address  
3. Employees can retain lost passwords through provided email address |
| FE-2: Apply for training courses | 1. Employees can apply for any training courses available on the systems |
| FE-3: Use the AR training courses | 1. Employees can go through the training courses material in Augmented Reality format  
2. Training Route implementation  
3. Relative AR elements displaying with respect to the relevant real-life environment |
| FE-4: View learning progress (Employee) | 1. Employees can view the summary of courses they have finished |
| FE-5: View Employees’ learning progress (Admin) | 1. Administrator can view the statistics of the learning progress of all employees |
| FE-6: Manage the training courses (Admin) | 1. Administrator can add or delete any training courses  
2. Administrator can edit the content of any training courses |
| FE-7: Notification | 1. Members receive notification and email when they have got training courses required to take |
Project Methodology

Swift will be the priority development platform used in this stage of the project. Although there are several different development platforms on the market, Swift is the most suitable platforms for me to develop AR project. I was used to try Unity as the development platform, but I decided to change to use Swift.

Swift VS Unity

Swift: Using SceneKit on a 3D game engine for native iOS development and comes directly integrated with Xcode. When it comes to build a new consumer or enterprise iOS app and requiring Apple’s UI elements (like buttons, gestures and notifications) look, SceneKit of Swift is the better choice. Being an Apple product, SceneKit integrates beautifully with XCode and integrate 3D scene view with all built-in 2D UI elements in a pretty seamless manner.

Unity: Unity is mature a 3D game engine, which has gotten closely linked to VR and AR because of its strong focus on 3D content. The primary language of development is C#. It is usually use for building a game or an immersive experience, especially one with lots of visual 3D content like character animations, game maps, special effects and physics simulations.

After I have decided the features of the AR employee training app, some features for example notification and AR training materials are required to use SceneKit in Swift for implementation. As a result, I have changed to use Swift as the development platform of this project.
Project Schedule and Milestones
Unified Process will be adopted to execute this project and the project will be divided into 4 iterations.

The main objectives of the iterations:

- **Inception**
  - Project Organization
  - Requirement Analysis
  - Sep-Nov

- **Elaboration 1**
  - AR Functions
  - Summarise training content
  - Dec-Jan

- **Elaboration 2**
  - Front-end app development
  - Member Systems
  - Feb-Mar

- **Construction**
  - Feedback Collection
  - Deployment of Release 1
  - Apr

**Total: 7 months**

The main responsibilities of the stage of inception and elaboration 1 have been accomplished. Therefore, the project is on schedule. The following stage will be focused on developing the features of the AR app.
What has been accomplished
1. Vision and Scope
2. Requirement Analysis
3. Use Case Diagram
4. Use Case Description
5. User Interface Design
6. Basic AR Plug-in
7. Training Materials
**some of the diagrams and user interface design will be showed in the appendix.

What will be done
1. Changes after FYP Interim Presentation

Different situations with implementation of relative AR elements
E.g. when the camera senses the employee’s location is in the backstairs of a building, a mouse will appear, and a respective question will appear for the employee to answer.
AR Training route

There will be a travel route of the training course. A relative floor plan will be showed after the employee has chosen a training course. The employee shall follow the required route for finishing all the AR training check points.

2. Front-end apps development
   However, the project is still needed to devote on making the back-end correspond with the front-end website, in a bid to make the functions in the website workable. At the same time, the documents did before may need to be updated due to the changes on the user requirement and features changing during the development process.

3. Testing and bug fix
   Both before and after the alpha version of the system being implemented, testing and bug fix activities are continued. The testing method are as follows.
Appendix:
Some of the Use Case Diagrams

Some of the User Interface Design