Simulacrum

Simulated Virtual Reality for Emergency Medical Intervention in Battle Field Conditions

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Supervisor: Assist. Prof. Dr. Murat YILMAZ
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Established in October 2013
Research in
- Virtual Reality
- Augmented Reality
- Game Design Research
- Game Ontologies & Intelligence
- Advert/Serious Games

Finished Thesis
- Ulaş Güleç, Educational Game-Based Learning Framework About Laws Of The Game For Football Referees, 2015.
- Ali Al-Tael, Automated Classification of MMOG Players among the Participants Profiles in MOOCs, 2015.
- Şahin Kayalı, An exploratory study to assess analytical and logical thinking skills of the software practitioners using a gamification perspective, 2015.
- Mert Yılmaz, A Gamification approach to improve the software development process by exploring the personality types of software practitioners, 2016.
YOU ARE LOOKING AT
Sedanur Doğan
PRESENTER

TODAY’S TOPIC IS
Simulacrum: Simulated Virtual Reality for Emergency Medical Intervention in Battle Field Conditions

WE ARE CURRENTLY HERE

VR Lab Collaborators
Virtual Reality Laboratory

Colonel Dr. Mustafa Dinç – MODSIM - Project Management Department of General Staff of Republic of Turkey
Prof. Dr. Veysi İşler – Simsoft & Middle East Technical University
Emrecan Çubukçu – Reotek A.Ş.
Berke Atasoy – DesignStroll – Netherlands
Elif Taşkın – Turkish Red Crescent
Assoc. Prof. Dr. Orhan Çınar - GATA – Academic Emergency Department

Simsoft
DesignStroll
GÜLHANE
1858
TURK KIZILAYI
1868
Published Papers (in English)

• Aydan, U., Yilmaz, M., Clarke, P. and O’Connor, R., Teaching ISO/IEC 12207 Software Lifecycle Processes: A Serious Game Approach, accepted for publication, Computer Standards and Interfaces, 2017.
• Gulec, U., & Yilmaz, M. (2016). A serious game for improving the decision making skills and knowledge levels of Turkish football referees according to the laws of the game. SpringerPlus, 5, 622.

Published Papers (in Turkish)

Virtual Reality
What is it?

General Information

• Virtual world with real world characteristics
• 3D world which is generated by computers
• Appeal to various senses
• Generally includes Head Mounted Displays, controllers, walkable platforms, etc.

Developments in VR

• Developing VR products:
  o Oculus Rift by Facebook
  o HTC Vive by HTC
• Investments are over 1.1 Billion Dollars in 2016
HTC Vive

What is it?

HTC Vive

HTC Vive is a VR product that has:

- A head mounted display
  - Binocular Optics
- 2 sensors
  - Laser-based System
- 2 controllers for each hand
  - Haptic Feedbacks
Our Motivation

Why are we doing this project?

- Using a Virtual Reality product is exciting.
- We would like to learn more about virtual reality technology.
- We aimed to combine the fields of computer engineering, virtual reality, education and gaming.
- We are excited for developing a project for General Staff.
Basic Objectives

Here we explain purpose of our project

Definition
There is not a training program about medical intervention techniques which is:

- Cost effective
- Easily accessible
- Frequently repeatable
- Possible to study on cases which are hard to encounter in real life

Purpose
Design a system for the topic of “Immediate Medical Intervention During Combat” with following features:

- Immersive Virtual Experience
- Based on Advanced Human-Computer Interaction
- 3 dimensional computer graphics
- Training simulation is based on employee training method of simulation technique.
Similar Projects

Here is a project with similar purpose

First-aid simulation game for Red Cross Youth, DIANA, SITEG simulator, COMET, Combat Medic

Combat Medic

- Developed by Virtual Heroes in 2014
- Developed for US Army
- Online First Person 3D Virtual World
- Works on PC – Microsoft Windows
- Covers top 3 modern battlefield injuries:
  - Hemorrhage (Bleeding)
  - Airway Management
  - Tension Pneumothorax (Chest Injury)
Simulacrum

Here we explain working principle of our project

- Virtual Reality Desktop Application (Windows 10, Mac OS X)
- HTC Vive compatible
- Aims to train military personnel about first-aid and medical intervention techniques
- 2 different simulation modes:
  - Training Mode
  - Battlefield Mode
Training Mode

Training mode is designed for training and measuring the knowledge of first-aid and medical intervention techniques. This mode will consist of 3 parts:

- **Educative Video Part**
  - 360° video
- **Quiz Part**
  - Multiple Choice Questions
- **Practice Part**
  - 3D Virtual World
  - Measure the improvement of the users’ medical skills
**Simulacrum**

Here we explain working principle of our project

**Battlefield Mode**

- Battlefield mode is designed for practicing medical intervention techniques during combat situation.

- Participant will act as a proper soldier before practicing medical intervention technique.
Simulacrum

Here we explain working principle of our project

**Planned Project Components**

Stated systems involve with following terms:

- Inventory System: GUI, 3D graphics and realistic interaction with the virtual content
- Scenario Generator: Random scenario generator algorithm
- Navigation System: A* Search Algorithm for path finding
- Aggro System: Using Collision for selecting target
Simulacrum
Planned Project Components: Inventory System

**With HTC Vive**

Medical Instruments as 3D Objects

Hands as HTC Vive Controllers
Simulacrum

Planned Project Components: Inventory System

Without HTC Vive
Simulacrum:
Planned Project Components : Scenario Generator

- Participant selects random scenario
- Game Master
  - Game Master selects a random battlefield scenario
  - Simulation is initialized according to selected scenario
- Gets shot randomly
- Fellow NPC Soldier
- Game Master
  - Locates the injury area
- Selects appropriate medical intervention tech. according to injury area

Today's Topic is:
Simulacrum: Simulated Virtual Reality for Emergency Medical Intervention in Battle Field Conditions
Simulacrum
Planned Project Components: Navigation System

A* Search Algorithm for Path Finding
Simulacrum
Planned Project Components: Aggro System

**Fire Radius**

- **Enemies**
- **NPC or Player**

**Simulacrum: Simulated Virtual Reality for Emergency Medical Intervention in Battle Field Conditions**
Development Methodology

Which software development process we are using

- Two different methodologies are used during development of product:
  - Waterfall for development phase of documentation
  - Scrum for development phase of simulation

**Development Methodology**

**Simulacrum: Simulated Virtual Reality for Emergency Medical Intervention in Battle Field Conditions**
### Development Methodology

#### Gantt Chart of the Project

<table>
<thead>
<tr>
<th>Group/Activity</th>
<th>Start Date</th>
<th>End Date</th>
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<tbody>
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<td>Literature Review</td>
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<td>SRS Documentation</td>
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<td>Testing &amp; Release</td>
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<td>Designing Battlefield</td>
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<td>Spirit 3</td>
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**Today's Topic:**

**Simulacrum: Simulated Virtual Reality for Emergency Medical Intervention in Battle Field Conditions**

**Sprint 1:** 17.12.2016 - 22.01.2017

**Sprint 2:** 23.01.2017 - 28.02.2017

**Sprint 3:** 01.03.2017 - 06.04.2017

**Sprint 4:** 07.04.2017 - 13.05.2017
Here are the tools that we planned to use:

- Unity 3D Game Engine
- Blender
- Photoshop CS6
- Mixamo Fuse
- Visual Studio Community 2015
Applied Tübitak Programs

1. 2209 – A Üniversite Öğrencileri Yurt İçi Araştırma Projeleri Destek Programı (done)

2. 2241 – A Sanayi Odaklı Lisans Bitirme Tezi Destekleme Programı (in progress)
Conclusion

• A Virtual Reality System
• Primary purpose is creating a simulation for training military personnel about first-aid and medical intervention techniques in battlefield conditions
• Advanced Human-Computer Interaction
• Currently at the design and development phase
Acknowledgement

We are grateful to:

• General Staff of Republic of Turkey (Genel Kurmay)
• GATA
• Turkish Red Crescent (Türk Kızılayı)
References
The sources used in this project

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• Unity3D, Retrieved 07 January 2017 from http://unity3d.com
Thank you
Any questions?