Artificial teacher

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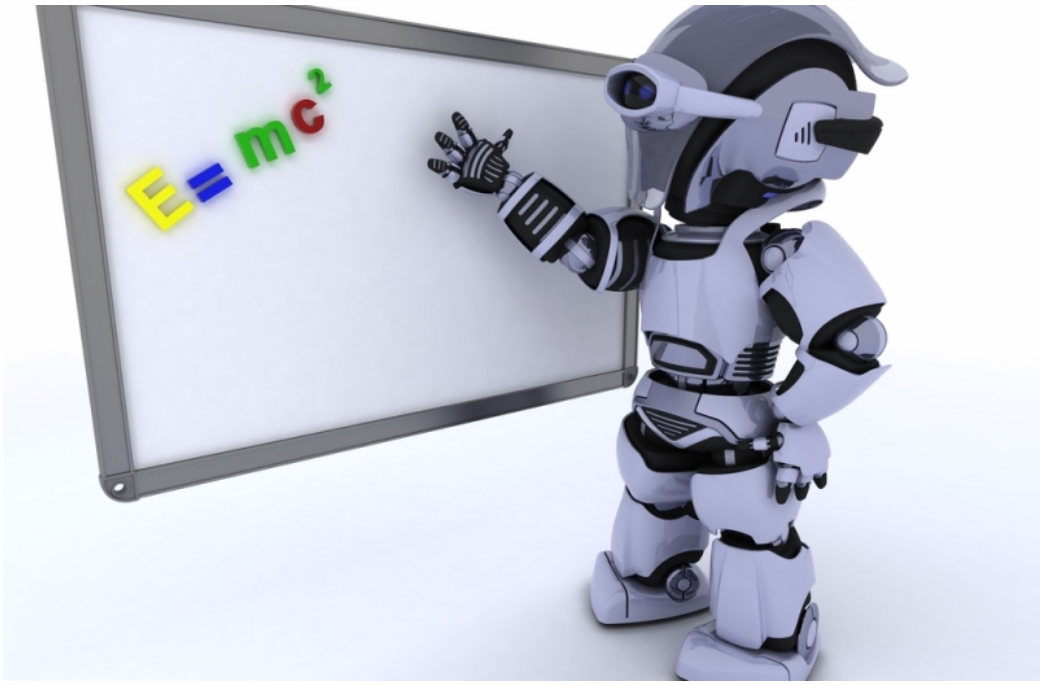
Abstract

In fact there are a lot of built-in learning management systems, but there are not any system that combines the newest technologies in education - there are not any system that uses artificial intelligence and virtual reality at once.

The core aim of our project is to create system that combines these techniques and to build ”artificial teacher” that combines best practices in organizing training so that it will be interesting, useful and much easier for the students. The most important part of our project is to fertilize students, showing them that their subjects is not as difficult as sound.

Teacher will train student by lessons and different types of exercises which will include theoretical part, but will mostly be oriented practically.



1 Introduction

"Learning management system"

It is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs.

"Artificial teacher"

It is a system that must teach students by interactive, interesting, useful and much easier way for them. It can be represented as "individual mentor" in specific subject.

There are a lot of built-in learning management systems, but there are not any system that combines artificial intelligence and virtual reality at once.

The aim of our project is to create system that to build "artificial teacher" by following newest technologies and best practices in organizing training so that it will be interactive, interesting, useful and much easier for the students. The most important part of our project is to fertilize students, showing them that their subjects is not as difficult as sound.

Teacher will train student by lessons and different types of exercises which will include theoretical part, but will mostly be oriented practically.

2 Implementation

Our project is divided by two parts:

beauty Design, which must implement human facial expressions for better sense of reality.

intelligence Application Public Interface that must return material which must be learnt by student

communication Live bot chat for all questions during the lesson that "artificial teacher" presents.

Each part has a lot of specifics and thus that this project is so hard, but it would give a different view of learning, a more modern look.

2.1 Problems

2.1.1 Application Public Interface

The most important thing when you develop artificial intelligence is that you must have enough data, which you will use for training of the AI.

Current training data is only sample data and it is not so formal, but is enough for start.

2.1.2 Design

Design is not ready yet, because it costs a lot of time until we design 3D object and until we implement all human facial expressions.

2.1.3 Communication

Communication includes voice recognition and text-to-speech technologies. But the biggest problem is how to understand what the student asks and how to answer him/her.

3 Techniques

- C++ for AI in combination with FastCGI++
- Unreal Engine for future VR application
- ... for future building 3D model

4 Future

Until now we have developed only API, which returns some resources (as recommendation), but it is easy to transform resources (which now are videos and exercises) into topics (which can be text of the lesson or exercises).

In the future we have already planned construction of 3D human model of "artificial teacher":

- with integrated all human facial expressions
- with realistic hand movements
- with realistic speech

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- Bulgarian Academy of Sciences
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References

[1] *GNU Compiler Collection*. `https://gcc.gnu.org/`.
Copyright © 2009 Free Software Foundation, Inc.

[2] *MariaDB*. `https://mariadb.org/`.
Copyright © 2017 MariaDB Foundation

[3] *MariaDB++*. `https://mariadb.org/`.
Copyright © 2017 MariaDB Foundation

[4] *LaTeX*. `https://www.latex-project.org/`.