



ELEMENTS OF GAMIFICATION IN DISTANCE AND BLENDED LEARNING FOR BOOLEAN ALGEBRA COURSE

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Abstract. The issues of using augmented reality when studying a course of Boolean algebra are considered to increase students' interest.

There are now many different platforms that offer quality training in many areas and compete with traditional learning tools.

Blended form has proven to be quite effective when conventional daytime learning is supported by distance technology. At present, students can obtain theoretical material from digital digital sources of information, and for practical mastery of the material there are guides and recommendations. But it is possible to interest students/trainees with the involvement of gamification of educational components.

One way to optimise the assimilation of material for training is augmented reality.

It is like creating visual effects for films, but with a major difference. Everything is performed on a mobile device in real time, and that's impressive.

The process of augmentation takes 3 steps: tracking, scene understanding, and rendering. Input data comes from the camera, accelerometer, and gyroscope. Then it is processed to calculate the motion of the camera in the physical world. This allows to draw 3D content on top of the image.

Correct work of ARKit requires well-textured and lit environment, a flat surface for visual odometry, and static scene for motion odometry. If the environment does not correspond to these requirements, ARKit provides the user with information on the tracking state. There are 3 possible states: not available, normal, and limited.

The core of ARKit is about letting you drop objects into an environment, and manipulate them using the touchscreen. Other than recognising real-world objects, the main aim is to keep track of objects as the device is moved. As soon as it loses track of this, the illusion is shattered.

To create a correspondence between real and virtual spaces, ARKit uses a technique called visual-inertial odometry. This process combines information from the iOS device's motion sensing hardware with computer vision analysis of the scene visible to the device's camera. ARKit recognises notable features in the scene image, tracks differences in the positions of those features across video frames, and compares that information with motion sensing data. The result is a high-precision model of the device's position and motion.

World tracking also analyzes and understands the contents of a scene.

World tracking is an inexact science. This process can often produce impressive accuracy, leading to realistic AR experiences. However, it relies on details of the device's physical environment that are not always consistent or are difficult to measure in real time without some degree of error.

Design AR experiences for predictable lighting conditions. World tracking involves image analysis, which requires a clear image. Tracking quality is reduced when the camera can't see details, such as when the camera is pointed at a blank wall or the scene is too dark.

Augmented reality (AR) is simply the ability to digitally place virtual elements into the real-world and interact with these elements as if they were actually present. AR opens exciting new possibilities in many areas, including navigation, gaming, military technology, travel enhancements, and more.

Logic Board – app with AR, in this book learn six basic logic operators from Boolean algebra. Each operator obeys truth table, has two input gates (A and B) and one output gate (Q).

A Truth Table shows the values of the circuit output for all input values.

Description for operator and Truth Table user can find in the Glossary.

Scan the surface and follow messages in the gray info view on the top right corner.

By default you'll see your first Logic Board with AND operator.

To turn on the diode his gate should get 1.

User should connect gates to each other. Just press on a gate (yellow circle) and you'll see possible connections.

User can remove connection, just press on the yellow line.

After user add all connections, user should press on the two red buttons, they'll change color to green it means that inputs of the operator got 1. In app user can looking to the truth table and see behaviour for AND operator if A and B is 1 Q will be 1.

Logic Board can contains several columns, each column contains operators.

Column should contains at least one operator.

User also have the opportunity to create columns yourself and add them to the desired sequence on the board.

Thus, it is possible to improve the quality of training by changing the form of perception of information and visualisation of material.

References

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