Gamification & Visualization Projects

exposit

VR visit to the Great Synagogue of Slonim

VR visualization of the Great Synagogue of Slonim for the Belarus Shtetl project aimed at the actualization of Jewish heritage.

Challenge

The Jewish people have always been an integral part of Belarusian history. Before World War II, around 15% of the total Belarusian population were Jews, who made a great contribution to Belarusian culture and the development of Belarusian society. The Second World War, the Holocaust, mass emigration and Soviet ideology had a devastating effect on the culture of Belarusian Jews: Jewish heritage and its role in the history of Belarus and Europe still remain unknown to modern residents of the region. That's why Belarusian-Jewish Cultural Heritage Center with the support of the Goethe-Institut Minsk decided to revive the Jewish heritage using modern VR technologies.

Description

VR visualization of the Great Synagogue of Slonim for the Belarus Shtetl project aimed at the actualization of Jewish heritage. Belarus Shtetl is a digital project by Belarusian-Jewish Cultural Heritage Center and Goethe-Institut Minsk that includes an interactive exhibition, multimedia presentations, educational program and photo books telling about the large Jewish population existed in Central and Eastern Europe before the Holocaust. The project immerses you in the context of the cultural and social life of Jewish people in the 20th century using 2-d or VR illustrated stories. Historical archival information in conjunction with high-tech has helped to establish an interactive visualization solution that may become a base for the creation of the first Jewish Museum in Belarus.

Task

VR reconstruction of the Great Synagogue of Slonim aimed at actualization of Jewish heritage of Belarus.

Solution

Exposit took part in the Belarus Shtetl project as a Unity development team and implemented VR visualization of the Great Synagogue of Slonim for an interactive exhibition. Our team began the development by visiting the historical building in Slonim to better understand the architecture and create a 3D model of the synagogue as realistic as possible. We explored the real object, saw elevation plans and historical materials, took photographs of interior and exterior details as well as made photographic materials for creating a 360-view inside and outside the synagogue.

We chose the Unity technology for the 3D model development to allow the project creators to quickly adapt the solution for other devices (for example, as a smartphone app), if necessary. The VR reconstruction of the synagogue included the following elements of detail:

- Geometry, textures for the interior and exterior of the main building;

- Minimal environment (trees, grass, etc.);

- Exterior without additional outhouses;

- Interior reconstruction based on digital materials;

- Reconstruction of complex bas-reliefs (coat of arms, columns).

The preparation of high-quality digital materials for detailing allowed us to create a realistic 3D model as the basis for a virtual tour of the Great Synagogue of Slonim. Users can plunge into the architectural context wearing VR glasses and freely move around the structure using navigation and points of interest. The implemented solution allows users to explore the details of the interior and exterior and get a detailed description of the individual elements. The tour is based on a custom script and is accompanied by background music to create the atmosphere (volume changes depending on the user's movements).

A virtual tour of the synagogue gives users the opportunity to study in detail the historical background of the Jewish Shtetls of Eastern Europe and to rethink the way Jewish culture has affected the history and development of Belarus.

The implemented visualization solution will be used as a part of the interactive exhibition of the Belarus Shtetl project and will probably become one of the fundamental elements in the creation of the first Jewish Museum in Belarus.

Key implemented functionality:

○ Creation of a 3D model of the synagogue in its original form and 360-view of the current state of the building;

○ Support for a VR headset without controllers including the ability to interact with elements by holding the viewer gaze (moving to a specific position, viewing information);

○ Support for a VR headset with controllers (only motion control by pressing buttons) without interaction with the elements by hands;

○ Implementation of a synagogue tour in a virtual environment based on a custom script (movement through points of interest, musical accompaniment).

Technologies used   Unity3D
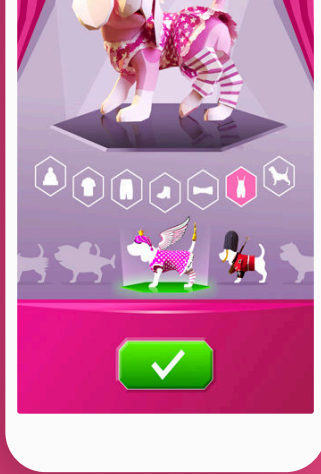
Wow Dog

A multi genre Unity game with a beagle as a main character.

Wow Dog is a dog owner simulator that allows you to treat, feed, wash the dog and play with it, as well as to takepart in online exhibitions. You can participate in Wow Dog Show to show your clever, educated and beloved dogaround the world. The main goal of the game is to raise the best dog in the world and win every competition.

Task	Unity game development from scratch, manual testing.

Solution	Our team has developed a virtual Unity-based pet game from scratch. It is a pet owner simulator that allows youto care of a beagle. All the implemented functionality has been covered by manual tests including functional(black box testing), localization and usability testing.

Implemented functionality:

○ Ability to care for a dog (you can wash, feed, put to sleep and play);

○ Exhibition mini game - ability to take part in competitions and earn coins;

○ Different levels of difficulty;

○ Ability to spend earned coins on the new clothes.

Planned functionality:

○ Wow Dog Selfie that allows its user to photograph the best moments of the game and share them withfriends in social networks;

○ Wow Dog Chat that allows user to communicate with the dog on any topics. Users can write different questions and receive funny answers sharing stickers, stories and compliments. Answers can be shared withfriends.

Technologies used	Unity3D

Interactive English

Playful educational game for adults for learning English.
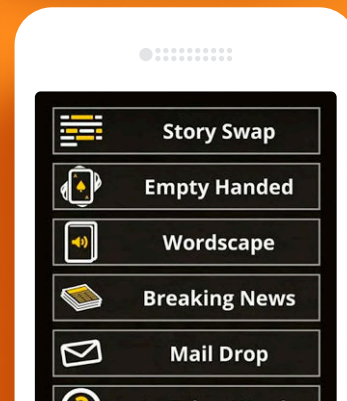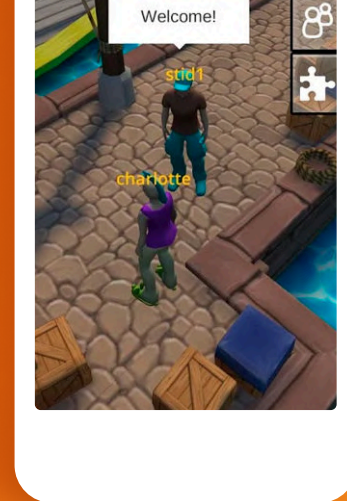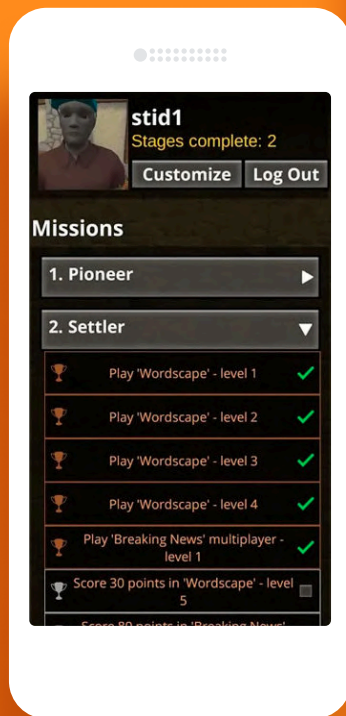
Description

Playful educational game for adults that rapidly develops English language proficiency and literacy. Using apopular gaming construct, learners follow a series of missions they must complete before they can "level up" andadvance in the game. The application allows its users to communicate online and play the game in both single-player and multiplayer modes. Each player has an individualized view of this learning path so he or she can trackprogress. The game is also available in the browser version.

Task

Development of mobile version of the application, using the Unity3D technology (on the client) and SmartFox(on the server).

Solution

Exposit specialists have developed a mobile version of the educational game, including:

- A new system of mission levels and step-by-step instructions for beginners;

- The system for changing the logic of the participants' selection in the virtual world (according to thelocation);

- Integration with new content;

- A new system of awards.

Technologies used

Unity3D

SmartFoxServer

Study Platform

A series of interactive cartoons for elementary school students to learn maths.
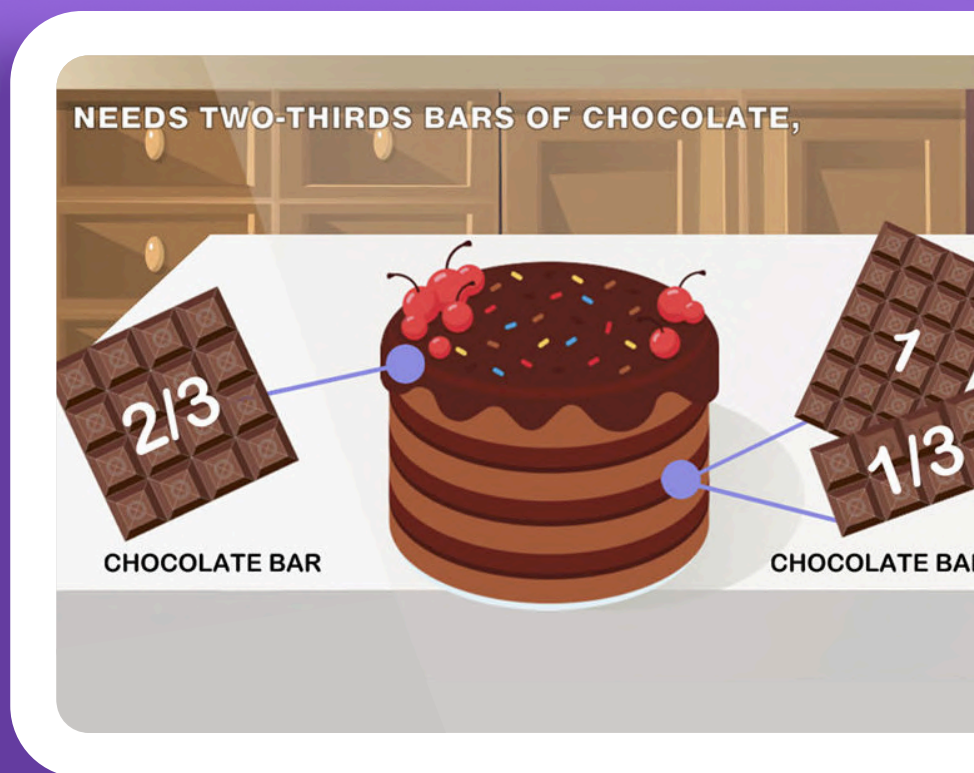
Description

Study Platform is a series of interactive cartoons on the educational Web platform that help elementary schoolstudents learn mathematics in a playful way. Each cartoon has its own story line where a hero needs to solve amath task. There are several interactive mathematical tasks (examples, equations, etc.) inside each cartoon.Cartoons are devoted to various topics of the same complexity (fractions, multiplication, etc.).

Task

Interactive game development using timelines for creating full-fledged story.

Solution

We have developed 8 web applications with interactive cartoons from scratch using Unity-technology Timelines.These applications help elementary school students to study mathematics.

Implemented functionality:

- Creating project architecture;
- Assembly of cartoons using Timelines Unity-technology;
- Implementing interactive tasks in cartoons;
- Integration with API Legends of Learning (client's library);
- Localization setting.

We also provided smoke testing within the project to assure quality of the product.

Technologies used

Unity

Timelines
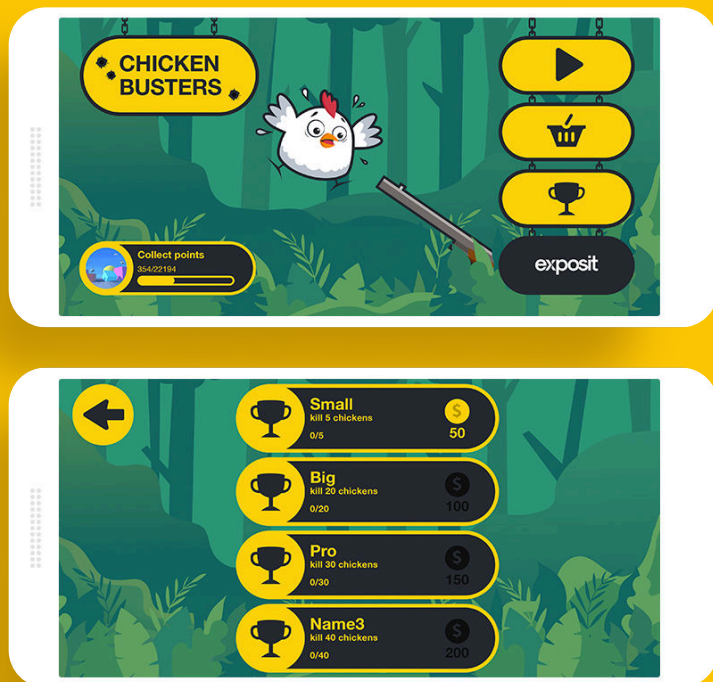
Chicken Busters

Arcade game on behalf of the chicken hunter performing a clean-up task.

Chicken Busters is an easy but interesting arcade inspired by good old Moorhuhn. A player is going to visitdifferent locations, performing a clean-up task. The game on behalf of the chicken hunter consists of severallevels. Each level represents a specific location. A player could peek in the Exposit office, take a walk in the forestand even explore space. During levelling up a player score points and earn coins that allow him or her to buyupgrades, unlock new locations and gain achievements.

Task	Unity game development from scratch, testing and publication on Google Play.

Solution	Our team has developed an arcade game on Unity, the main goal of which is to eliminate as many chickens aspossible and, accordingly, score as many points as possible.

Implemented functionality:

- Various thematic levels including Exposit office, forest, etc.;

- Ability to play and compete with friends for the best record;

- 360 degree gyro control;

- Various improvements including aim brushing up, double points and so on;

- Secret objects for each location, the destruction of which can help to earn additional coins and time ordecreases points;

- Boss chicken with a health counter for every level.

Technologies used	Unity
	Android

Data Generator

A virtual room in 3D space with scripts for changing interior.

Description

As part of the development of an application for changing interior design, extra datasets were needed to train theneural network. It could help to better define the walls in real rooms. We decided to test the hypothesis thatthrough generating of an artificial dataset would be possible to get good results in training a neural network.Then a lot of human resources would not be needed for wall marking.

The application uses several photos for training the neural network:

- Photo of the room itself;

- A mask where there is only a white wall to define the walls in the room.

Two options were tested:

- A set of photograph + mask (black and white, where the walls were colored in white, and the rest - wereblack);

- A set of photograph + data (the position of the angles in pixels in the photo).

Task

Development of datasets for neural network training using Unity3D.

Solution

Our Unity specialists created a virtual room in 3D space, where they arranged various interior objects andcameras. There we implemented scripts that change walls, wallpapers, interior items and create a randomlyassembled room based on the position of the walls.

How are walls defined? After cameras set up, scripts start their rotation up to 360 degrees. When the camera rotates a certain number of degrees, depending on a given number of photos, the application takes a picture ofwhat the camera sees now.

Simultaneously the detected wall turns green, and then each green pixel changes towhite, and all the others are painted black. That is how a black and white mask is created, where the wall is white.

To reproduce the process described above, we implemented the generation of a CSV file for each new photo. Thisfile contains the coordinates of the corners of the walls.

As a result, it was decided that such an artificial generation of datasets could help in case when the neuralnetwork can not determine the atypical room or walls.

Technologies used   Unity3D
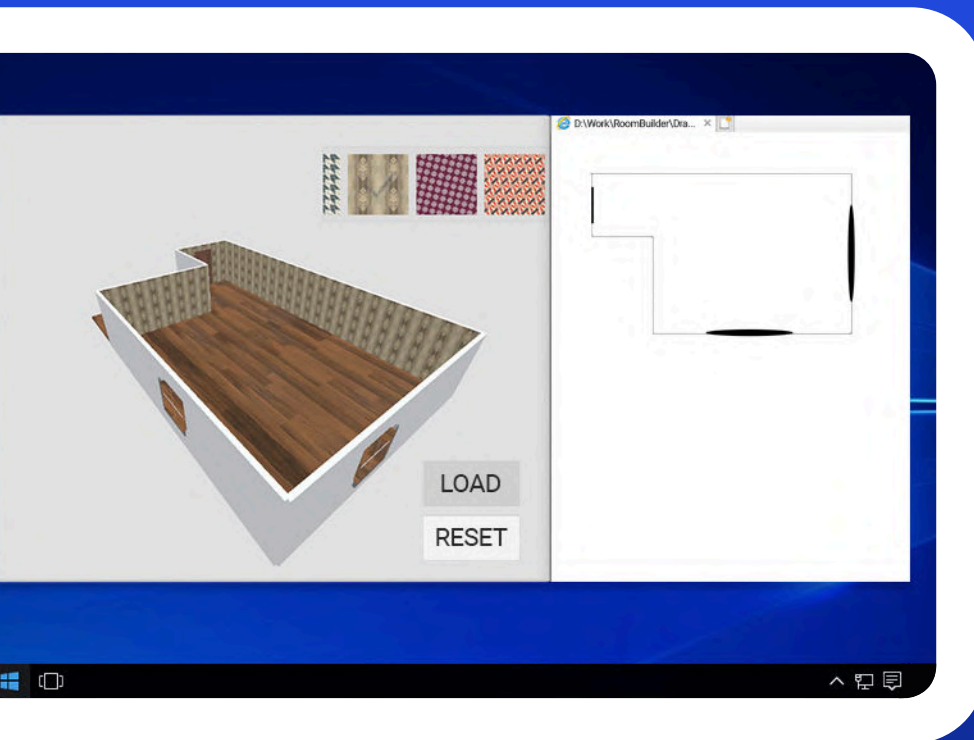
Level Builder

**Unity app creating builds with 3D rooms.**

Description	Application for creating builds with 3D rooms based on the design drawing in vector format.
Task	Assembling demonstration builds with a 3D location on the basis of the design drawing in vector format.
Solution	We have implemented a Unity application, that uses design drawings as input data for building 3D rooms on therequired platform (PC or mobile) and creating a Windows application using WPF, that was the shell for theproject. In this project, we also implemented the SVG Reader.

Now it is possible to specify a picture using a third-party Windows program and it will create an EXE or APKprogram with a level based on the picture. |
| **Technologies used** | Unity3D

WPF |
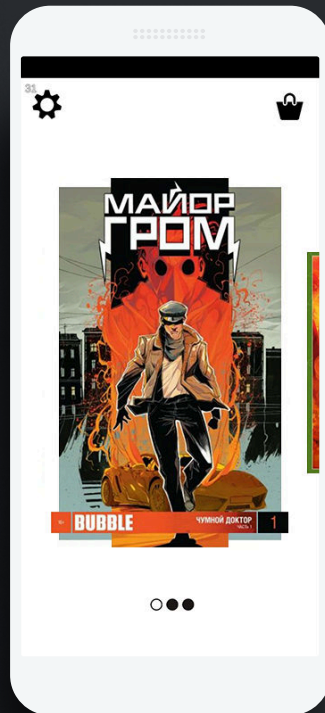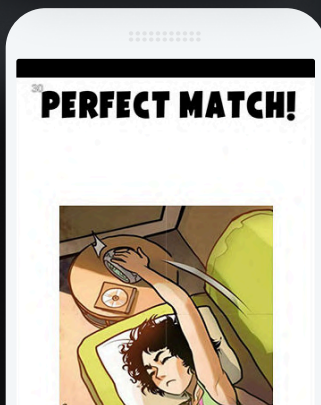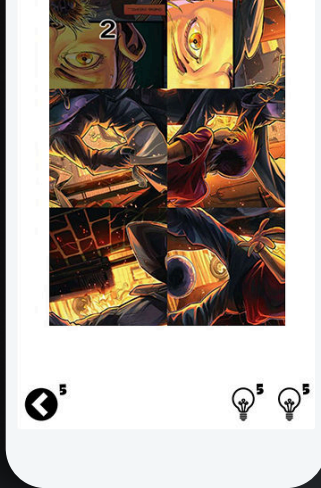
Puzzle

2D game designed for doing puzzles with unusual mechanics.

2D game designed for doing puzzles with unusual mechanics. The gameplay of this game differs from ordinarypuzzles thanks to the ability to rotate puzzles, plus its own mechanics with connected blocks has been developed.

Task	Creating a puzzle game from scratch based on Unity.

Solution	Our Unity developers have created a 2D puzzle game. During game development the direction of the gamechanged from 18+ to games with comics (you do puzzle and then you get a paid comics book page). The game UIwas prepared according to the provided layouts. The core functionality with dynamic content loading wasdeveloped using AssetBundles to reduce the size of the source application. So pictures for puzzles are loaded intothe application at the moment of opening the level.
	Doing puzzles, players open more difficult levels. The game has restrictions on the number of actions (steps thata player can take to finish a puzzle). There are a set of tips and bonuses available (correct and additional movesare displayed).
	Manual testing was also provided within the project.

Technologies used	Unity
	AssetBundles