Základní informace

Jméno projektu	Mobile Augmented Role-playing Game
Zkratka	*MARPG*
Vedoucí	*Jakub Gemrot <jakub.gemrot@gmail.com>*
Konzultanti	
Anotace	ARPG is a location-based augmented reality role-playing mobile game which offers player options such as combating, crafting and discovering.

Motivace

Mobile games are getting more and more popular, since they bring games to more people, mostly casual players. Mobile gaming also brings new possibilities, since mobile phones have many sensors that can be used for game controls, especially GPS, accelerometer, gyroscope, camera. There have already been some successful games using these innovative ideas, like Pokemon Go, Maguss or Underverse, which use GPS data to move around the real world map and AR for some special game mechanics. But there is still a lot of unexplored potential.

Another successful concept is location based games such as geocaching or geofun. In these games, there are location bound points, which the player must visit. In geofun, there is usually even some historical facts or interesting facts about the places the player visits. But it is still mostly touristic application that shows interesting places.

The project aspires to combine location bound story based quests made by community and mobile RPG games.

Popis projektu

The aim of the project is to implement a platform for a location-based augmented reality (AR) role-playing game (RPG) for Android mobile devices.

The game will contain separate quests. Quests will be short bound stories/tasks consisting of dialogues with NPCs, combat and minigames (woodcutting, crafting, finding hidden objects and plant growing). The player will be collecting items around the world, craft them and trade with other players. By completing quests and using his/her gathering and crafting skill the player will unlock new abilities and recipes for the crafting system hence the inclusion of RPG elements. For some items, the player will also need to gather resources at appropriate locations (e.g. a wood from forest). In this way the player will be rewarded by the time spent by seeing his/her statistics increasing and unlocking new powerful skills and items. The game will also allow the players (users) to make and upload new quests via standardized packages. Uploading these quests to the game will not need an update of the application itself.

The game will be divided in 10 screens:

S1. one for the map, from which the player will be able to see his/her position,traders,enemies and people that will give them quests;
S2. one screen for the inventory from which the player will be able to equip/unequip items or delete them;
S3. another screen will be used for tracking quests;
S4. another one will be used to resume the statistics of the player (health/stamina/mana/strength etc.);
S5-8. four screens will be used for four mini-games that will reward the player if completed. Two of them will use AR features to be solved.
S9. last screen will be used for the augmented reality combat.

To put it into the list, the game will feature:

1.1. Location-based map integration
1.2. RPG elements
1.3. Augmented reality combat
1.4. Augmented reality mini games (x2)
1.5. Other minigames (x2)
1.6. Quests, Quest packages and Package Editor
1.7. Items: crafting and trading (in-game currency)

More detailed description now follows.

1.1. Location-based Map Integration

During the gameplay, the player sees his character on real world map. The character will be controlled via GPS, so a player must move physically in order to move his character. On the map, there will be intractable objects visible, which the player can interact with, e.g. non-player characters that a player can speak with, enemies that player can attack, other objects (trees, buildings, etc.). A player can interact with them when he/she is close enough by basically tapping the object on the map.

1.2. RPG Elements

The game will contain traditional RPG elements. Firstly, health and combat system will be introduced (See Section 1.4.). The inventory system will be implemented to allow player to collect items, keep them in his/her inventory, convert them into in-game currency or trade them for other items. Items will be divided in three category: equippable, consumable and reagents (See Section 1.8). The player will have some gathering skills (woodcutting, fishing), by using them the player will gain experience and after gaining certain amount of experience the skill will level up. Levelling up with the skills will allow the player to gather new reagents using them, which will be used to craft more powerful items.

Killing enemies and completing quests will grant experience to the player. After some threshold the player will level-up, increasing statistics and unlocking new combat skills.

1.3. Augmented reality combat

Augmented reality games are becoming a front-runners of gaming industry. Nowadays, this is not just the fantastical concept. AR games allow you to fight aliens, capture fantastical creatures, defend kingdoms in the real world. With our game, we want to provide an augmented reality role playing world to the player. Our platform implements a real-time one versus one combat system. The opponent character and the battle itself will be animated in AR. The player is not allowed to move and is only able to attack and/or use special abilities by basically clicking on them. A gameplay will be cooldown based. The player will have the choice to toggle between the augmented reality mode and the regular mode.

1.4. Augmented reality mini games

The game features 2 augmented reality supported mini games, which can be enabled during quests. One of the mini games will be using the phone’s camera to find reagents or herbs for the crafting skills. Those objects will be randomly distributed around the streets of the map. The player is supposed to tap on them in order to collect. Second one will be taking care of a plant, the player is going to see the pot in augmented reality and need to plant the seeds, water the seedlings, trim dead leaves and balance the sunlight. After the plant grows, the player will gain experience points. If the player does not take care of the plant and it dies, he/she needs to start the mini-game over, remove the dead plant and put new seeds.

1.5. RPG mini games

Two more minigames, which will use sensors the mobile phones can offer, as gyroscope and accelerometer, will be woodcutting and crafting. In woodcutting the player will have to make a movement similar to swinging an axe with his phone. In crafting, the player will have to balance two ingredients on scales in order to make a potion.

1.6. Quest lines, quest packages and Package Editor

The quest is a series of short tasks; task examples are dialogues with NPCs, discovering new locations, combat with NPCs and performing a mini-game. As a part of the development, we provide a few basic quest lines with several quests.

Players will be able to create new quests using Package Editor. Package Editor will be a plugin for Unity, which will allow the user to define his quest line by creating several quests, which can be customized by defining his own NPCs and its properties (i.e. locations, custom meshes, and textures), choosing quest mini games, setting quest rewards, etc.

Package Editor will be generating a standardized data package in format of Unity AssetBundles, which can be loaded by the game during runtime. For our purposes, Unity AssetBundles format contains a definition of the quest line data packed into a JSON file and the game objects needed in the quests. Users are able to load quest packages into the game anytime during the gameplay.

1.7. Items: crafting and trading (in-game currency)

The player will be able to obtain items either from killing monsters, as a reward for quests, or via gathering and crafting. Items will be of three types - equipment, consumables and raw materials. Equipment can be equipped to provide some bonuses to player attributes. Consumables can be consumed for some bonuses, such as health restoration. Raw materials can be crafted to items from one of the two preceding categories. All items will have a value and the player will be able to sell them for ingame currency. With that ingame currency, player will be able to buy other items.

Platforma, technologie

Target Platform:
Android

Technologies and Frameworks:
Unity3D, Blender, ARCore, MapBox API with OpenStreetMaps, Bitbucket

We will be using Unity3D game engine, which is well suited for mobile games development. It also offers support by ARCore, which is needed to support augmented reality.

We will use Bitbucket version control service to synchronize the work.

For augmented reality, we will utilize ARCore, a Google’s platform which provides SDK for Unity for building augmented reality applications.

Integration of Unity3D and OpenStreetMap will be done by using Mapbox, which is an open source location data platform for mobile and web applications that is optimized for Unity3D game engine.

We already combined ARCore and Mapbox in a small proof-of-concept application in Unity3D and we already tested it on an Android mobile phone confirm that both are working together as intended.

Odhad náročnosti

The project is meant for 5 developers.

- Architecture specification: 2 month
- Core gameplay: 6 months
- Location-based map integration: 2 months
- Augmented reality combat: 3 months
- Augmented reality mini games: 3 months
- Serialization for quest packages and the packaging editor: 3 months
- Game balance corrections: 1 month
- User interface: 2 months
- User experience testing: 1 month
- Unit testing will be done during the development process; every developer is expected to write unit tests and isolate each part of the program.

Vymezení projektu

Projekt je zaměřen na následující oblasti (zaškrtněte vyhovující):

Diskrétní modely a algoritmy	
	diskrétní matematika a algoritmy
	geometrie a matematické struktury v informatice
	optimalizace
Teoretická informatika	
	Teoretická informatika
Softwarové a datové inženýrství	
X	softwarové inženýrství
X	vývoj software
	webové inženýrství
	databázové systémy
	analýza a zpracování rozsáhlých dat
Softwarové systémy	
	systémové programování
	spolehlivé systémy
	výkonné systémy
Matematická lingvistika	
	počítačová a formální lingvistika
	statistické metody a strojové učení v počítačové lingvistice
Umělá inteligence	
	inteligentní agenti
	strojové učení
	robotika

Počítačová grafika a vývoj počítačových her	
	počítačová grafika
X	vývoj počítačových her