# Introduction

## Computer Games and Artificial Intelligence

The term *computer games* refers to interactive games operated by computer circuitry. The platforms on which computer games are played include personal computers, arcade consoles, video consoles and handheld devices [1].

It is believed that the first electronic game was created by William A. Higinbotham – of the Brookhaven National Laboratory, in 1958, as interactive technology demonstration available for laboratory’s visitors. *Tennis for Two* was working on analog computer and was simulating a tennis game on an oscilloscope. It was presenting a simplified projection of a tennis court from the side, featuring a gravity-controlled ball that needed to be played over the net. The players used analog controllers to adjust the trajectory of the ball and a button to hit it with an invisible racket [2].

Since then, computer games evolved from small programs or devices developed by individuals to major commercial projects produced by teams of experienced developers working, in some cases the process lasted for years on a particular product. The whole industry is estimated to be worth $11.7 billion in 2008 just in United States, which places it in front of music and film industries [3].

In most computer games, the players interact not only with other human players, but also with non-player characters (NPCs) – characters appearing in the game that are controlled by game program and not by human player. In order to provide more realistic, human-like behavior of NPCs, game creators started to use some of the techniques developed in the field of artificial intelligence (AI). The term *game AI* appeared relating to NPCs controllers simulating intelligent behavior in a computer game [4].

Entertaining game AI has been broadly recognized as a second most important factor in a particular game’s commercial success, with only graphics being more important [4].

## First Person Shooter games

Computer games are divided into relatively small sets of different game genres e.g. strategy, sports, racing, adventure etc. However, in many cases it is not possible to associate a particular game with just one genre. One of the most popular and financially significant computer game genres is a First Person Shooter genre, commonly abbreviated with FPS.

In FPS, the player sees the three-dimensional world through the eyes of his or hers character – from the first person perspective. In most of those games, a player has to fight against other players and NPCs using special items and firearms while navigating through three-dimensional real-world like environment.

This genre is also considered to be attractive for a research, as NPC’s actions usually have direct influence on the state of a game and its environment. In a football simulation game, for instance, the team’s result depends not only on particular NPC’s actions, but also on actions of other team members. There are also many similarities between controlling NPC in FPS game and controlling a real-world mobile robot, like a problem of path-finding [5].

## Machine Learning and Computer Games

## Thesis Overview

[1] Encyclopaedia Britannica, inc., *The New Encyclopaedia Britannica.*, Chicago: Encyclopaedia Britannica, 2007.

[2] J. Gettler, “The First Video Game?.”

[3] Entertainment Software Association, *2009 Sales, demographic and usage data*.

[4] P. Tozour, “The Evolution of Game AI,” *AI Game Programming Wisdom*, 2002.

[5] B. Gorman, M. Fredriksson, i M. Humphrys, “QUASE: An integrated API for imitation and general AI research in commercial computer games,” *Proceedings of CGAMES'05 conference*, 2005.