Universitatea Alexandru Ioan Cuza Iași

Facultatea de Informatica

**BACHELOR THESIS**

**Application of K-means Algorithm in Video Games**

Graduate

Andrei Ghiran

Coordinator

Prof..lect.dr. Moruz Alex

Iași, 2020

SUMMARY

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1. INTRODUCTION

From the day I started my studies at the faculty of computer science I knew I wanted to pursue a career in game developing. To be one step closer to my career of choice I decided that for my bachelor thesis I would combine my passion for game developing and the limitless applications of machine learning. Using the Unity engine I developed a simple game that showcases the K-means algorithm by using it to train an Artificial Intelligence adversary for the player.

The game has a simple premise, the player controls a blue square that can only move on a grid in the 4 cardinal directions and must reach the goal, the AI adversary, with the same movement constraints as the player and only moving at the same time as the player, must intercept and bump into them to end the game. The adversary doesn’t know the position of the player at all times, he has a vision radius in witch he can detect the player, acquire his position and save it in a file for later use. The K-means algorithm uses the saved player locations to form clusters and determine an advantageous position from where the adversary can intercept the player, the using the A star algorithm the adversary will find a path to this more advantageous position and follow it.