Posudek diplomové práce

Matematicko-fyzikální fakulta Univerzity Karlovy

Autor práce	Bc. Jan Koblížek
Název práce	Group navigation in RTS games using flow networks over flow field regions
Rok odevzdání	2023
Studijní program	Informatika **Studijní obor** Počítačová grafika a vývoj počítačových her

Autor posudku	RNDr. Jiří Švancara, Ph.D.	**Role**	Oponent
Pracoviště	KTIML		

Text posudku:

The thesis focuses on the implementation of an improved algorithm used to navigate a set of agents from a similar starting area to a single goal area. Such an algorithm is most useful for real-time strategy games where a large army needs to be moved around a map as fast as possible. At the same time, the computation of the movement needs to be fast to not hinder the smoothness of the gameplay.

Overall, the text is written in very solid English with no language issues, only a few typos, and some formatting issues such as missing labels, missing punctuation, and in one case a wrong figure (Figures 6.6 and 6.7 are the same).

It is clear that the student examined a lot of relevant work as can be seen in section 2. I especially appreciate that it is always resoned about the used techniques and other options are explored before a specific technique is chosen. This can be mainly seen in Section 3, but the same idea applies to the experiments and other parts as well. The core of the work are Sections 4-6. In Section 3 the original algorithm Flow Graph is introduced and performance issues are described. An improved algorithm called Regional Flow Graph (RSG) is proposed that tries to mitigate the found issues. The main contributions of RSG are improved map decomposition and path assignment at runtime rather than at the planning stage. The experimental results described in Section 6 confirm the expected behavior of the algorithm. It provides faster computation and faster finishing times in exchange for a longer preprocessing period which might be useful in many cases where the map does not change often. Numerous other results are also observed, such as the number of replans, etc. As a result of the experiments, the author identifies some issues still present in the movement of the agents and for some of them proposes a possible fix.

For the defense, I would like to ask the two following questions. First, the student created their own testing simulation. To the best of my knowledge, there already exist simplified strategy games that let developers test numerous things. Did you look for any existing solution for the testing environment and if so, why did you decide to make your own? Ie. what was missing in those existing solutions? Secondly, the proposed algorithm works well when a set of agents is moving from a single location to the same target, however, it shows some problems when a group of agents is interfering with the flow of the agents. Have you considered (perhaps as a future work) a more realistic setting where there are mobile obstacles (ie. other agents, or even other streams of agents)? Specifically, suppose that two groups of allied agents are moving from two locations to two targets and their shortest paths cross. Can you envision your algorithm successfully tackling such a situation?

Práci doporučuji k obhajobě.

Práci nenavrhuji na zvláštní ocenění.

Pokud práci navrhujete na zvláštní ocenění (cena děkana apod.), prosím uveďte zde stručné zdůvodnění (vzniklé publikace, významnost tématu, inovativnost práce apod.).

Datum   28.08.2023   **Podpis**