FACULTY OF INFORMATION TECHNOLOGY CTU IN PRAGUE

Assignment of master's thesis

Title:	Evacuation model with leading and following agents focused on evacuation of (pre)schools
Student:	Bc. Matej Šutý
Supervisor:	Ing. Pavel Hrabák, Ph.D.
Study program:	Informatics
Branch / specialization:	Knowledge Engineering
Department:	Department of Applied Mathematics
Validity:	until the end of summer semester 2023/2024

Instructions

The thesis should combine the idea of using a hierarchical system of multi-agent coordination for evacuation simulations (developed in Janovská, 2021) with expert knowledge on pre-school children's behaviour during evacuation (captured by Najmanová, 2020). The work should result in an evacuation model/software prototype, where the dynamics of the following agents (children) are consistent with the expert knowledge, and the planning actions of leading agents (teachers) are inspired by real-world instructions and limitations.

1. Survey evacuation models enabling assisted evacuation with a focus on evacuation of (pre)-school activities. Focus on cellular models.
2. Survey studies dealing with applications of multiagent planning algorithms in evacuation simulations.
3. In cooperation with the fire engineering expert (H. Najmanová) identify basic principles of children's behaviour and teachers' activities during evacuation. Suggest a transformation of those principles to rules of agent interaction in the cellular model.
4. Design and implement the cellular model of evacuation with the above-mentioned features enabling the application of planning algorithms for the actions of leading agents.
5. Perform several simulation experiments and compare various leading agent strategies with respect to total evacuation time.

Electronically approved by Ing. Magda Friedjungová, Ph.D. on 27 December 2022 in Prague.

FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE

Literature:

Janovská K. Hierarchical Control of Swarms during Evacuation. Prague, 2021. Bachelor thesis. FIT-ČVUT.

Najmanová H. Evacuation of pre-school children aged from 3 to 6 years. Prague, 2020. Doctoral thesis. FSv-ČVUT.

Electronically approved by Ing. Magda Friedjungová, Ph.D. on 27 December 2022 in Prague.