SCCS Chair Retreat 2020 - Vadere Hands-On Session

Intro

Vadere is a simulation framework for pedestrian flow analysis. Vadere's core features:

- Command-line interface (CLI) and an easy-to-use GUI interface.
- Shipped with different locomotion models:
    - Gradient Navigation Model (GNM)
    - Optimal Steps Model (OSM)
    - ...

Motivation for pedestrian stream simulations:

- Improve design of buildings to minimize evacuation times.
- Simulate dangerous situations **without** harming real humans.
- ...

Goals for Hands-On Session

Get familiar with Vadere - its features and its limitions.

First Steps

1. Download Vadere from http://www.vadere.org/releases/ (`vadere.retreat2020.<operating_system>.zip`)
2. Unzip `vadere.retreat2020.<operating_system>.zip`
3. Open `vadere-gui.jar`
4. In GUI, open Vadere project containg four examples: `Project -> Open... -> ./Scenarios/Retreat2020/vadere.project`

Examples

We prepared four small examples:

1. Get started in the first example and compare two different locomotion models in Vadere.
    - **Used scenarios:**
        - 01-MinimalExample-OptimalStepsModel
        - 01-MinimalExample-GradientNavigationModel
    - **Steps:**
        1. Get familiar with the GUI.
        2. Compare different locomotion models by running both simlations.
        3. Compare both simulations in the PosVis (see `Output files` section in the GUI)
            - How do the trajectories differ between OSM and GNM?
            - Visualize densities in both scenarios by drawing a rectangle with the "Voronoi diagram" tool in the toolbar.
2. In the second example, you should measure the density.
    - **Used scenario:** 02-Density-Measurement
    - **Steps:**
        1. GUI: `Data output`.
        2. Add a density processor (recommended: `PedestrianDensityCountingProcessor` with a `radius` of 1.5 [m]) to measure the density in each timestep for each pedestrian.
        3. Add a file to write the density information to (select `TimestepPedestrianIdKey` as `Data Key and the output processor from (2)`).
        4. Analyze output files: What is the max. observed density value? Note: Vadere stores the output to `path/to/project/output/<scenario_run>` (in GUI: Right-click on an output in the `Output files` panel and then `Copy output path to clipboard`)
3. Estimate how long it takes to evacuate 500 agents from Marienplatz and check your estimation against a simulation. Note: you may also increase the number of agents, but depending on your hardware the simulation may take a while.
    - **Used scenario:** 03-Marienplatz-Evacuation
    - **Steps:**
        1. What is a reasonable location and shape for source(s)?
        2. Place single or multiple targets? Note: Make sure all targets have the same Id and are set in the `source` JSON field `targetIds`.
        3. How fast should the agents run? (`Topography -> attributesPedestrian -> [speedDistributionMean | speedDistributionStandardDeviation]`)
        4. Use the `PedestrianEvacuationTimeProcessor` to measure the evacuation time per pedestrian. What is the maximum and mean evacuation time? Note: Select `PedestrianIdKey` as `Data Key` for the corresponding output file.