

Participatory Design in Digital Twins

Web-based Platforms for Participatory Spatial Decision Making



Background and aim:

The decisions made on the spatial configurations and distributions in the built environments (urban or rural developments) directly influences the life of multiple stakeholders. The aim of the project is to provide mechanisms for involving different stakeholders in the spatial decision making process and facilitating their negotiations through Spatial Decision Support Systems (SDSS).

Research question:

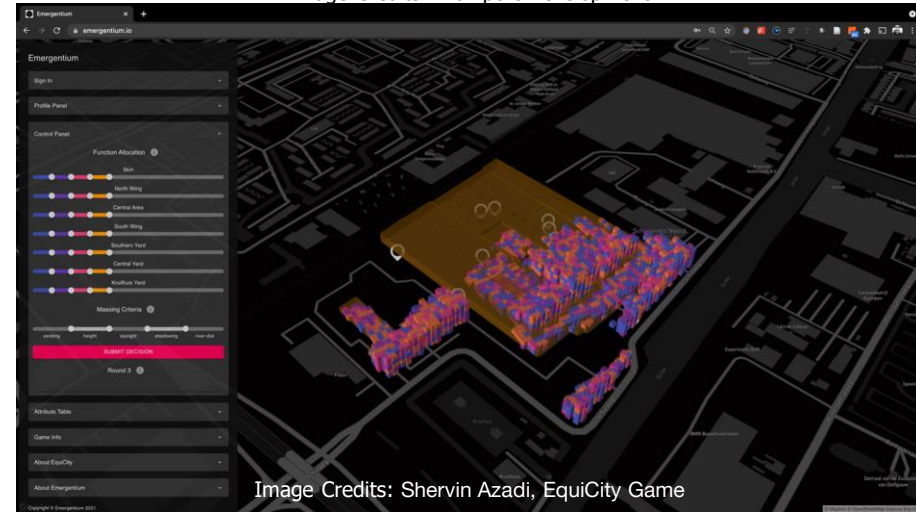
How to make digital twins for participatory spatial decision making?

Design objective:

To design and prototype a Multi-Actor and Multi-Criteria Spatial Decision Support System.

Methods:

- geo-spatial computing (geo-informatics)
- geo-spatial analysis (spatial queries)
- geo-spatial Database Management Systems (DBMS)
- Computer Programming (Python/C#)



```
sun_count = len(sun_dirs)
vox_count = len(vox_cens)
# initiating the list of ratio
vox_sun_acc = []
# iterate over the voxels
for v_id in range(vox_count):
    # counter for the intersection
    int_count = 0
    # iterate over the sun rays
    for s_id in range(sun_count):
        # computing the ray id from voxel id and sun id
        r_id = v_id * sun_count + s_id

        # summing the intersections
        int_count += hits[r_id]

# computing the percentage of the rays
# an intersection (aka could see the sun)
sun_access = 1.0 - int_count/sun_count
```

