Combined study with the staff members in ESKOO units and Vaasa Central hospital:

What types of virtual natural environments best support the well-being of clients/patients and care personnel?

Methods

- User data from VR headsets
- Structured interviews
- Stress level –energy level survey

NATUREACH

Client Pilot 3.2 Patients in Eating Disorders Outpatient clinic in Vaasa central hospital (Wellbeing Services County of Ostrobothnia)

- **Target groups:**
  - Patients with eating disorder
  - Care personnel in Eating Disorders Outpatient clinic
- **The aim for nature-based interventions:**
  - To support care, reduce anxiety (for example at mealtimes) and increase the well-being of the patients with eating disorder, and to activate them to seek out nature even after the treatment period
  - To promote care personnel's well-being, recovery and stress-management during and after work shifts.

VCH staff members in VR demo

NATUREACH

Settings for interventions and measuring methods for effects (3.2)

- **VR equipment and other supplies:**
  - VR headsets
  - adjustable recliner, grass-like carpet, a fan for wind effects, special pillows
- **Methods for patients:**
  - Head and eye movement via VR headsets
  - Client impact evaluation made by staff

- **Methods for staff:**
  - Stress-Energy survey
  - Interview
  - Head and eye movement via VR headsets
- **Participants**
  - 20 staff members
  - Trials with the patients
- **Timeline for data collection:**
  - 6/2024 – 6/2025

NATUREACH

Research group

Martta Ylilauri, University of Vaasa

Environmental analysis:

Ann Dolling (Researcher at the Department of Forest Ecology and Management), Sveriges lantbruksuniversitet SLU

Elisabeth Bohlin (Researcher at the Department of Forest Ecology and Management) Sveriges lantbruksuniversitet SLU

Anna María Palsdottir (Associate Professor in Landscape Architecture with specialization in Environmental Psychology, Senior Lecturer in Nature-based and Nature-assisted Interventions)

Stress-energy survey:

Lisbeth Slunga Järvholm (Prof. physician at Department of Public Health and Clinical Medicine Units: Section of Sustainable Health), Umeå university

NATUREACH

HEATMAP as a graphical analysis method

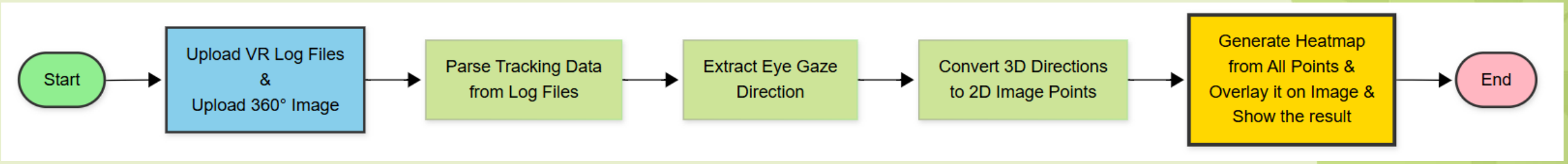


Figure 1. How to create a heatmap

- In principle, the analysis is performed by first determining the coordinates of headset position in the video image.
- From this, the direction in which the focus shifts is calculated based on the rotation, and finally, the pixels that the viewer's eyes are looking at are modified based on the gaze vector.

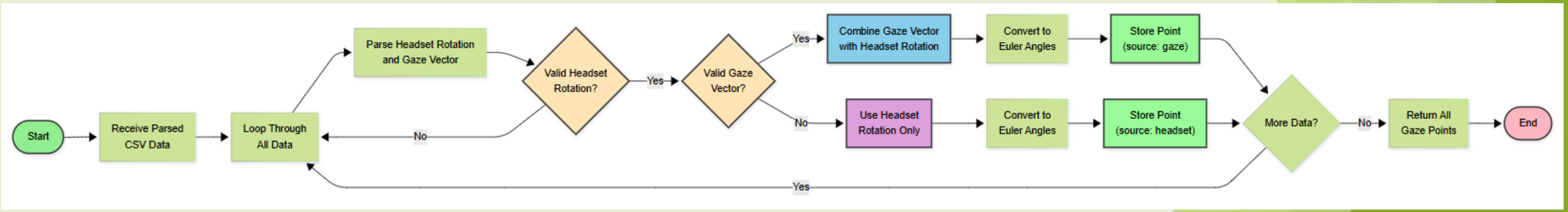


Figure 2. How gaze points are read from headset rotation and gaze vector

NATUREACH

- Head tracking & Eye tracking data collected by custom media player and stored in a CSV file

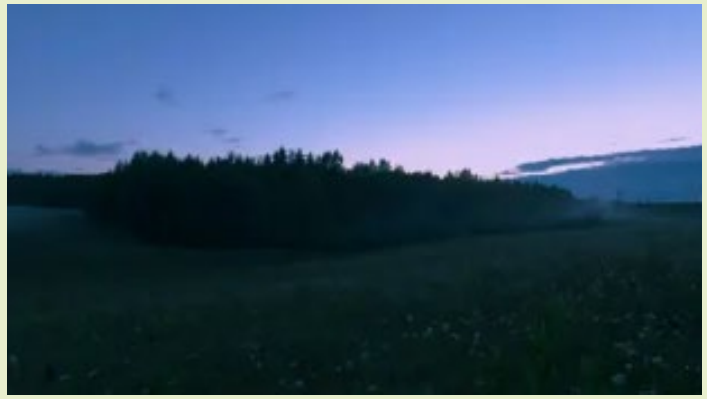
Milliseconds	HeadsetPosition	HeadsetRotation	GazeVector
0	(-0.31, 1.03, -0.39)	(-0.02941, 0.37164, -0.04802, -0.92667)	(0.07, 0.10, 1.00)
1001	(-0.29, 1.05, -0.39)	(0.04313, 0.32866, -0.01368, -0.94336)	(0.23, -0.13, 1.00)
2002	(-0.19, 1.04, -0.36)	(-0.01074, -0.09961, -0.00847, -0.99493)	(0.15, -0.01, 1.00)
3004	(-0.19, 1.02, -0.34)	(-0.11089, -0.09525, -0.00393, -0.98925)	(0.07, -0.06, 1.00)
4002	(-0.20, 1.06, -0.37)	(0.08471, -0.08758, -0.04033, -0.99173)	(0.13, 0.10, 1.00)
5007	(-0.22, 1.07, -0.37)	(0.10933, -0.04666, -0.06173, -0.99099)	(0.07, -0.25, 1.00)
6002	(-0.22, 1.07, -0.37)	(0.09651, -0.05179, -0.06007, -0.99217)	(0.29, -0.22, 1.00)
7008	(-0.20, 1.02, -0.37)	(-0.08871, -0.30352, -0.00434, -0.94868)	(0.31, -0.02, 1.00)
8013	(-0.20, 1.04, -0.42)	(0.01218, -0.44786, 0.00354, -0.89401)	(0.20, 0.14, 1.00)
9009	(-0.24, 1.07, -0.41)	(0.08419, -0.36621, -0.06703, -0.92429)	(0.14, 0.12, 1.00)
10014	(-0.22, 1.05, -0.44)	(0.04976, -0.55701, -0.01831, -0.82881)	(0.11, 0.06, 1.00)
11009	(-0.28, 1.06, -0.42)	(0.05353, -0.47481, -0.04106, -0.87750)	(0.01, 0.06, 1.00)
12013	(-0.27, 1.06, -0.44)	(0.06590, -0.48944, -0.03087, -0.86899)	(0.19, 0.05, 1.00)
13013	(-0.27, 1.06, -0.43)	(0.05771, -0.48974, -0.03470, -0.86926)	(0.20, 0.04, 1.00)
14000	(-0.27, 1.06, -0.43)	(0.05612, -0.48290, -0.04667, -0.87263)	(0.22, 0.05, 1.00)
15017	(-0.27, 1.06, -0.42)	(0.05422, -0.48529, -0.04731, -0.87139)	(0.17, 0.04, 1.00)

NATUREACH

Eskoo & Vaasa Central hospital:
most viewed environments (with data at least 5 minutes long)

1. Seaside Cliffs (25)

2. Meadow in a summer night (23)



3. Seagull with eggs (21)

3. Pine forest in morning fog (21)

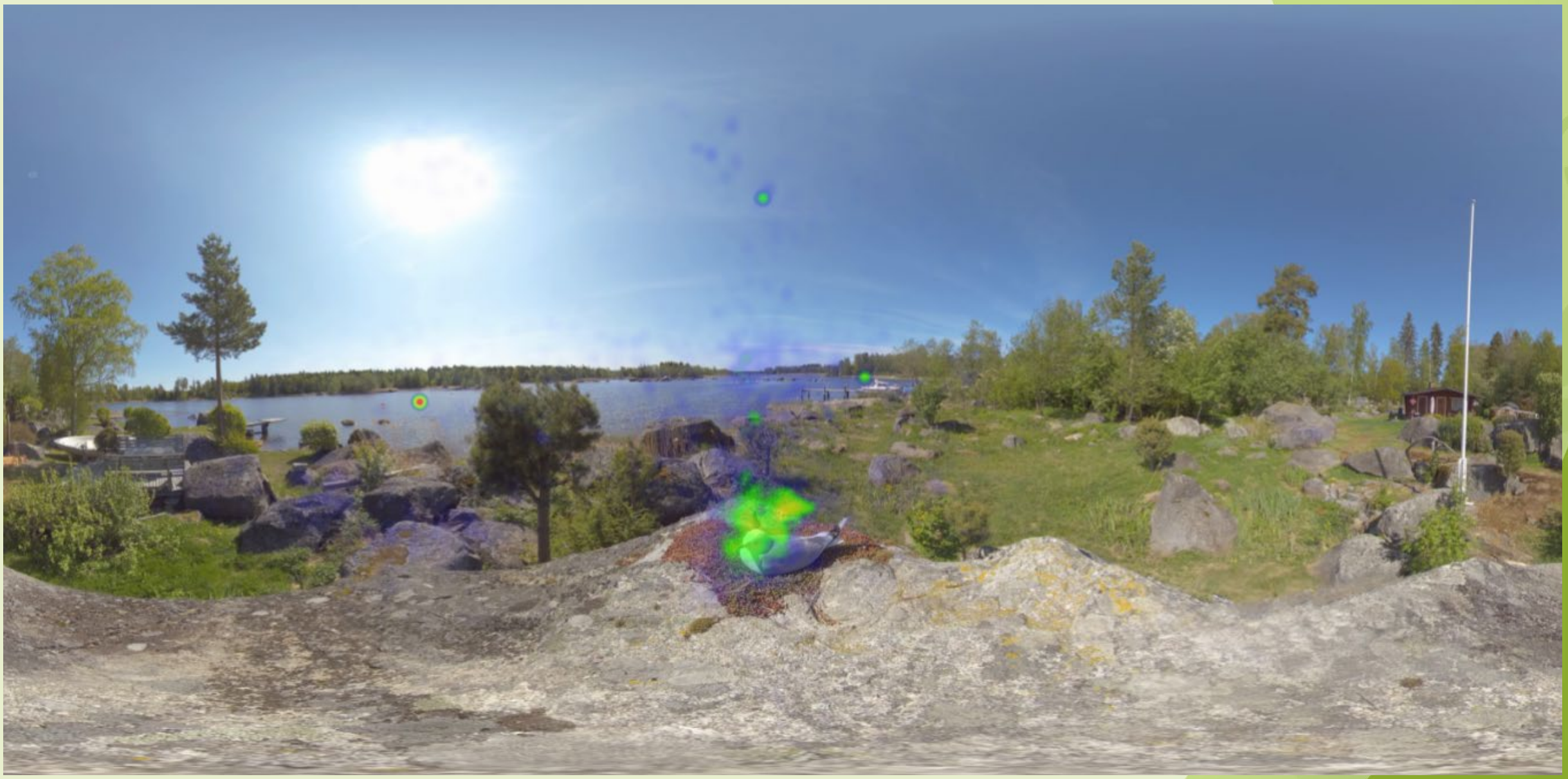
NATUREACH

Seaside Cliffs

NATUREACH

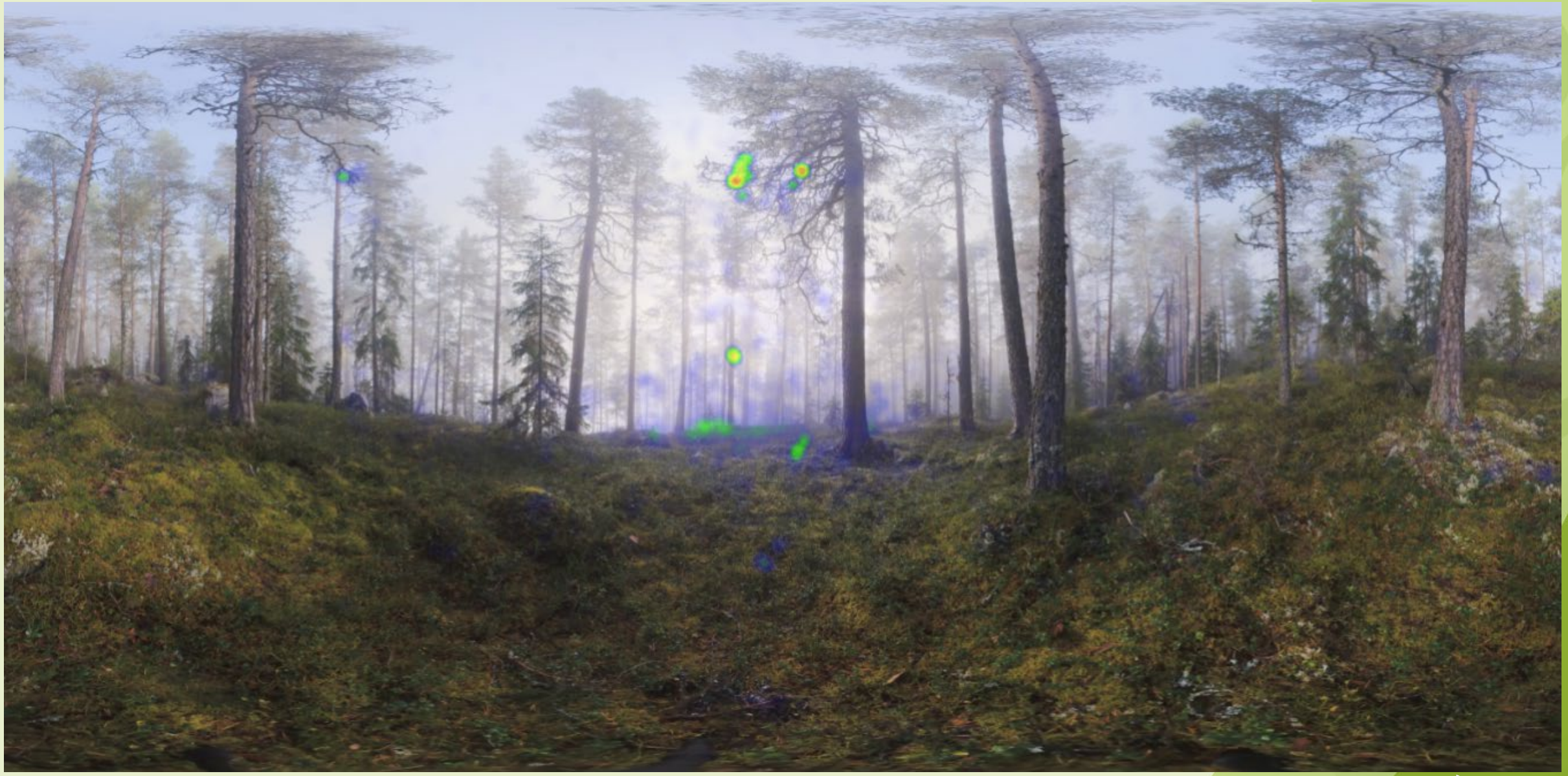
Meadow in Summer night

NATUREACH



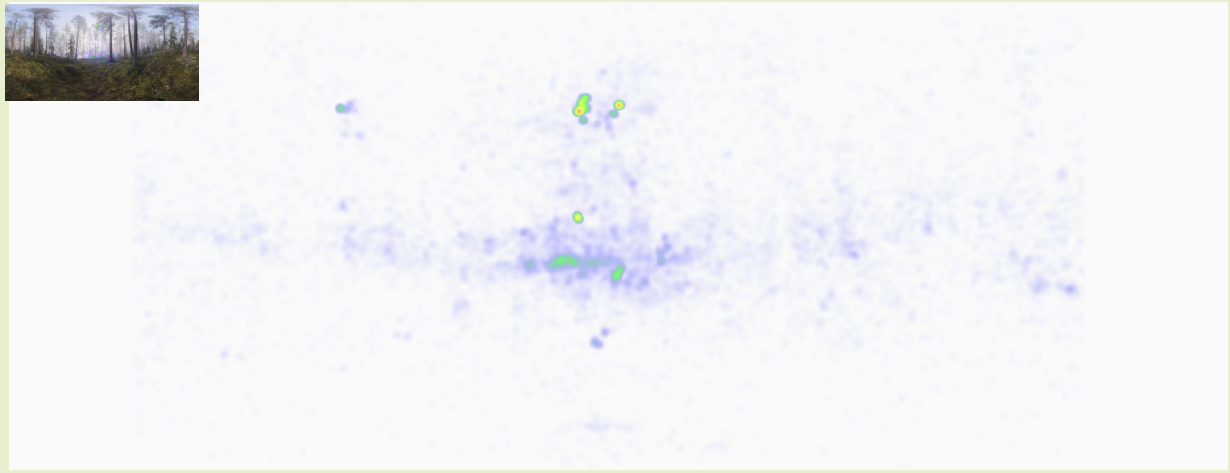
Seagull with eggs

NATUREACH

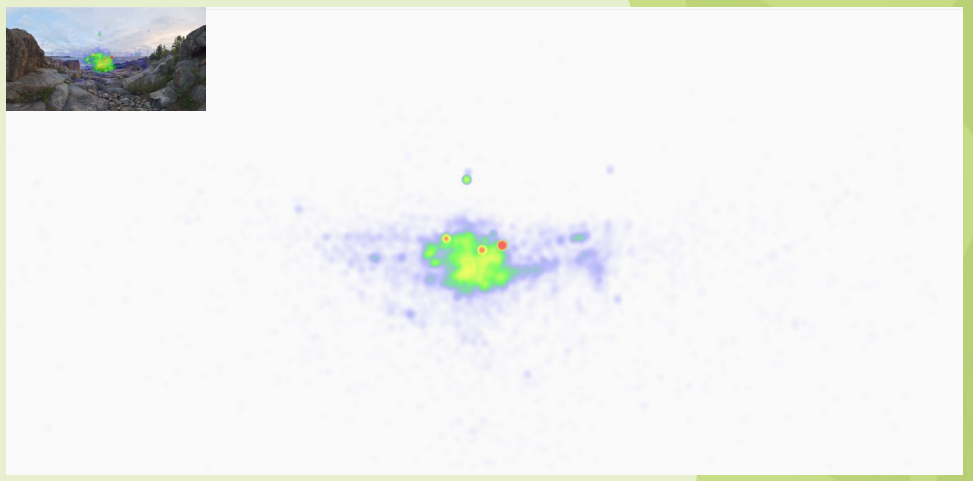


Pineforest in the morning fog

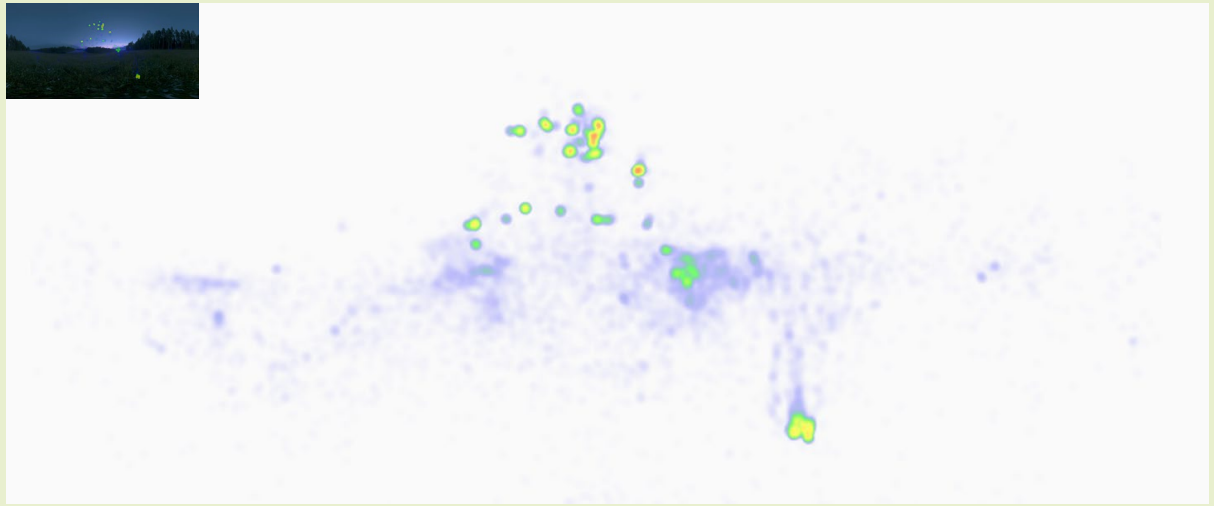
NATUREACH



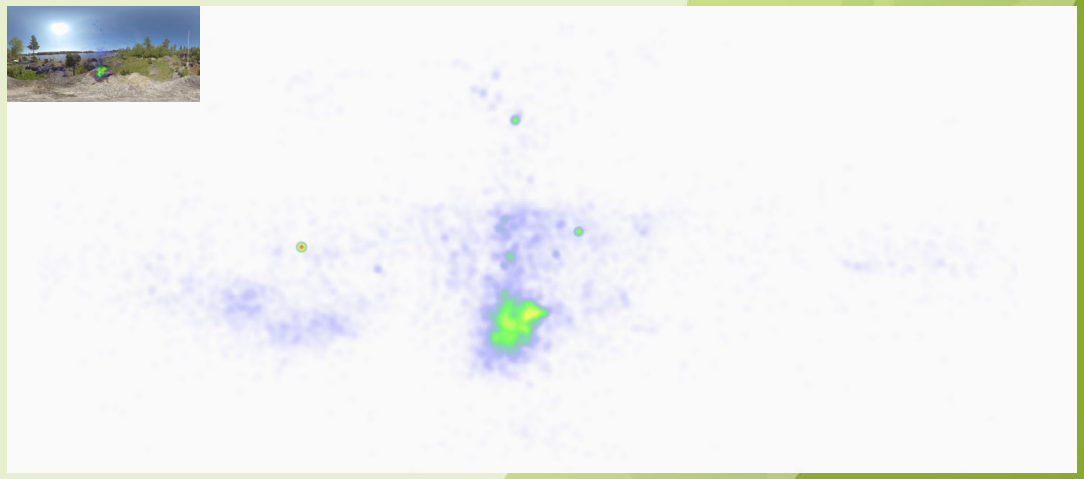
Pineforest in the morning fog



Seaside Cliffs



Meadow in Summer night



Seagull with eggs

NATUREACH

Environmental analysis

- **What are the ecological, psychophysical and socio-cultural factors that create places that promote well-being?**
- **What creates a sense of well-being in a particular virtual natural environment/place?**
- **What makes a place a salutogenic place?**
    - Natural and rural settings: type of forest, water area or other nature types, country cottages, farms, including wild or domestic animals
    - **Aesthetic and visual qualities** of natural elements and landscapes
    - The **importance of the soundscapes**
    - Psychological and social-cultural factors: Strong positive experiences in childhood or earlier stages of life, **emotional and sensory memories**, roots, family history and socio-cultural inheritance, traditions, values.
- It is possible to experience a “sense of place” in a virtual environment
- It is important to increase knowledge how to enhance the immersive experience within virtual nature

NATUREACH

Thank You!

More details from client groups and interventions
https://www.slu.se/en/natureach