A Mobile Application to Share Georeferenced Tourist Experiences on a Discrete Global Grid

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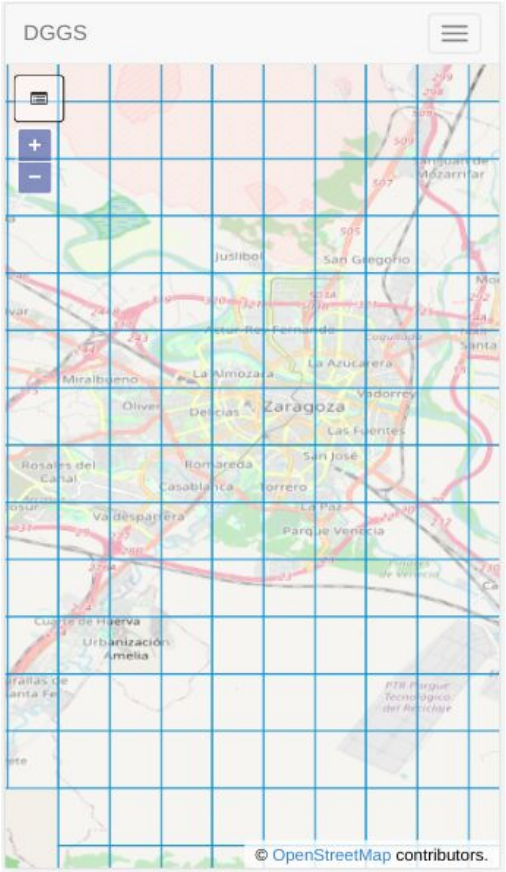
Agenda

- The Prototype
  - Grids Based on a DGGS
  - The rHEALPix DGGS
  - Architecture and Technology
  - User Interface
- Emotional Cartography
- Conclusion and Future Work

The Prototype

- Mobile application with web technologies
- Basemap + standard GIS visualization tools (i.e., zooming and panning)
- A multi-resolution grid is used to make it easy to define areas of interest by just selecting and deselecting cells
- Emotions are then associated to those areas

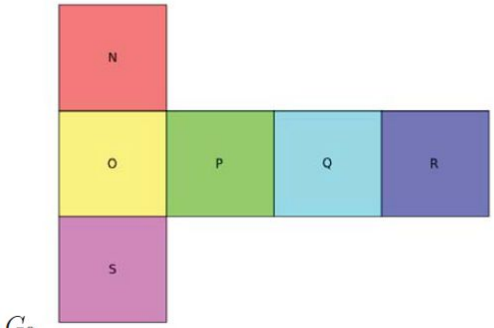


Grids are Based on a DGGS

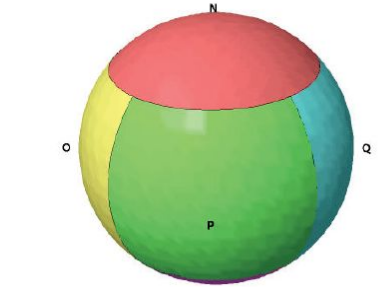
- Instead of defining an ad-hoc grid, we have used a Discrete Global Grid System **(DGGS)**
- According to the Open Geospatial Consortium **(OGC),** a **DGGS** is a spatial reference system that uses a hierarchical tessellation of cells to partition and address the globe
- We have used **rHEALPix**, a **Quadrilateral DGGS**, because it is easy to work with rectangular cells

The rHEALPix DGGS

Quadrilateral DGGS



G_0



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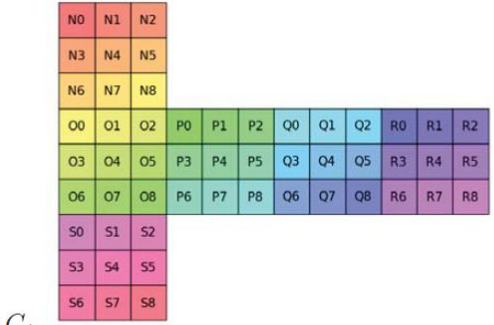
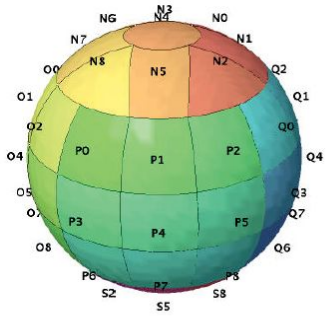


G_1

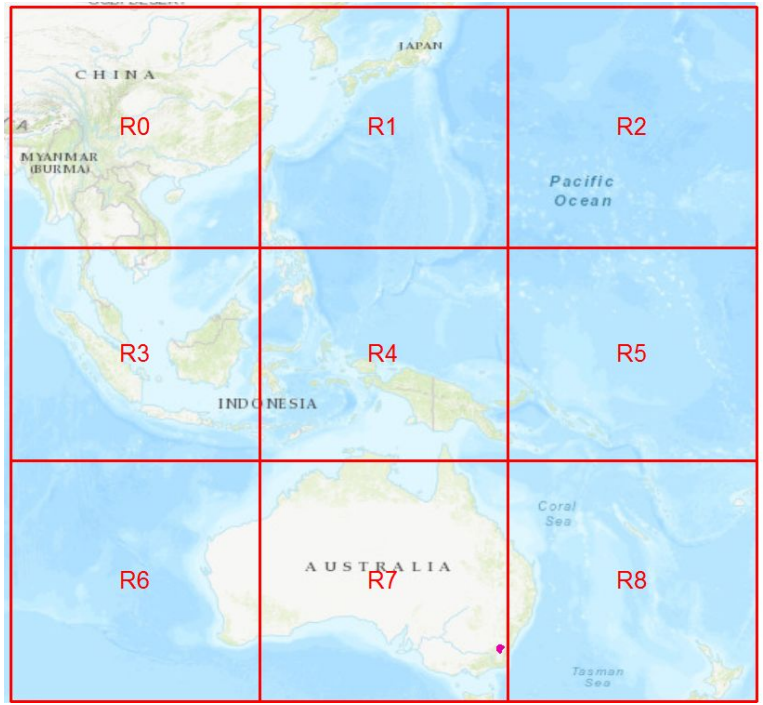


G'_1

Gibb, R. G. (2016). The rHEALPix discrete global grid system. E&ES, 34(1), 012012.

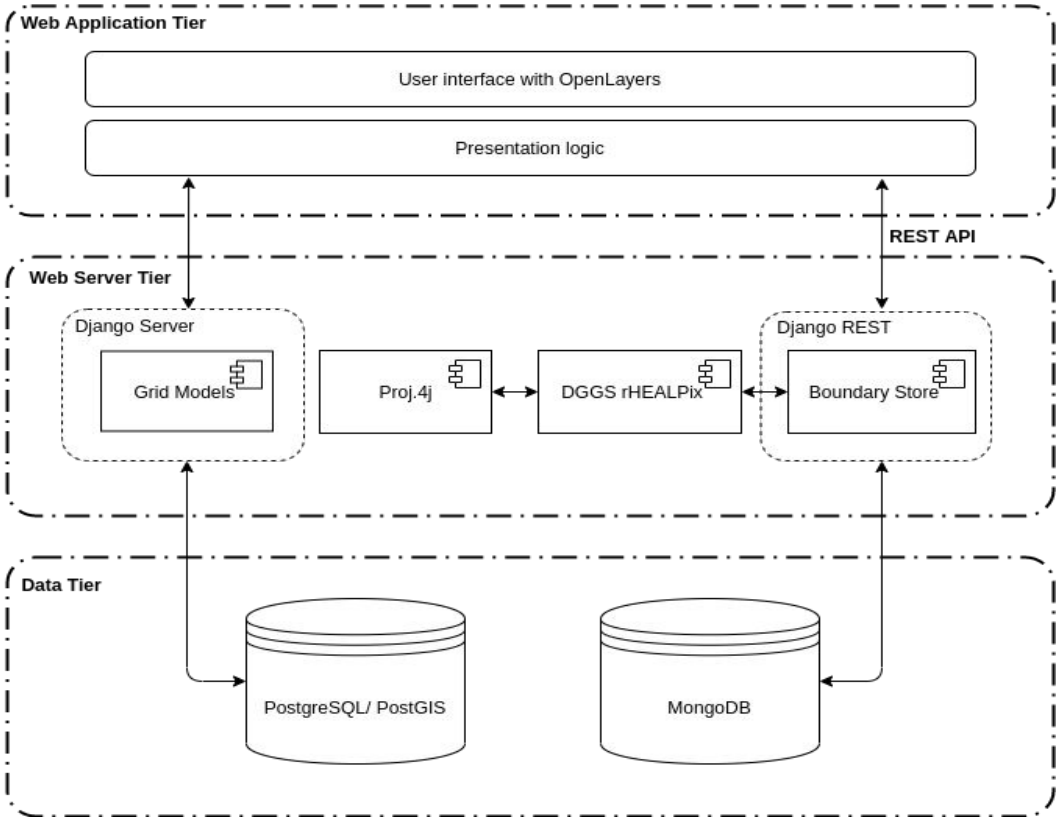
The rHEALPix DGGS

Each cell is subdivided into 4 or, as shown in the figure, 9 cells at the next resolution level



Gibb, R. G. (2016). The rHEALPix discrete global grid system. E&ES, 34(1), 012012.

Architecture and Technology



Architecture and Technology

A **3-tier architecture** style has been followed for this web application

Web Application Tier: Django templates, Bootstrap and OpenLayer, with OSM basemaps

Web Server Tier: The Django framework (Python)

Data Tier: PostgreSQL and MongoDB

All technologies are **Open Source**

Github repo: https://github.com/IAAA-Lab/grid-field

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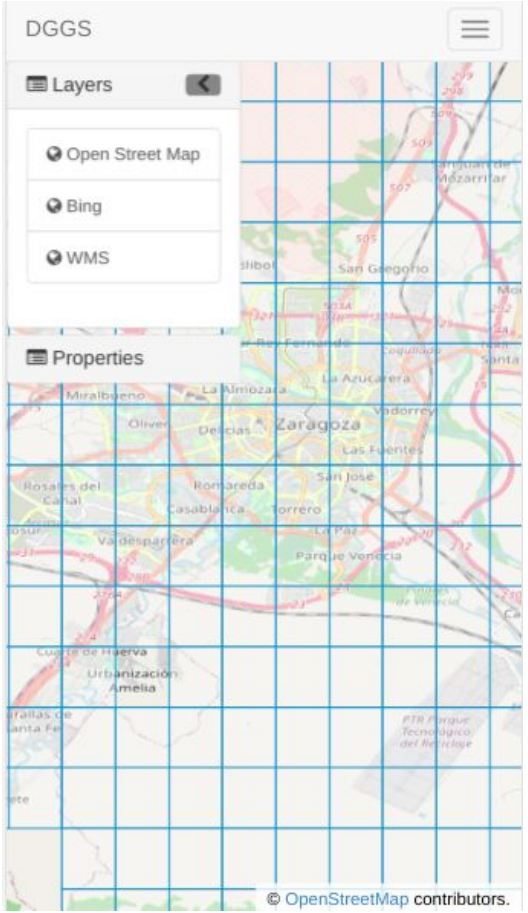
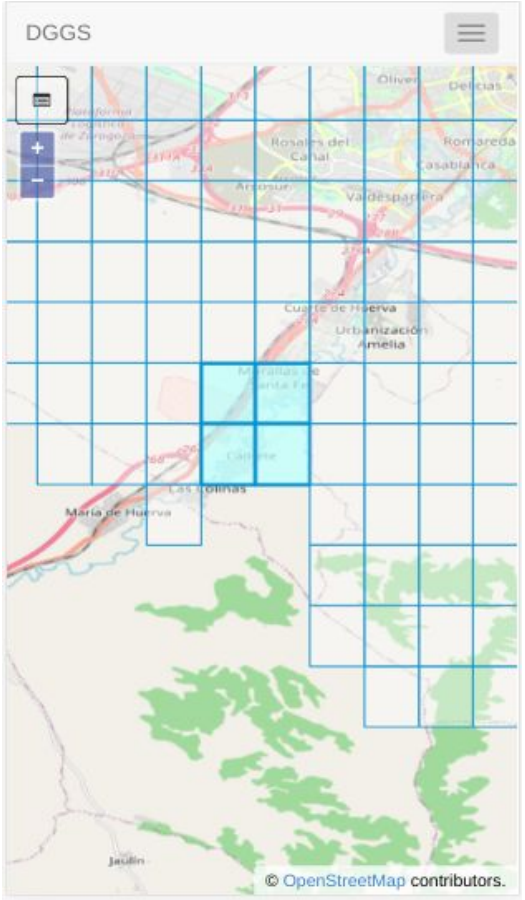
User Interface

- This is the main interface of the application
- Different base maps can be chosen
- The figure shows OpenStreetMap



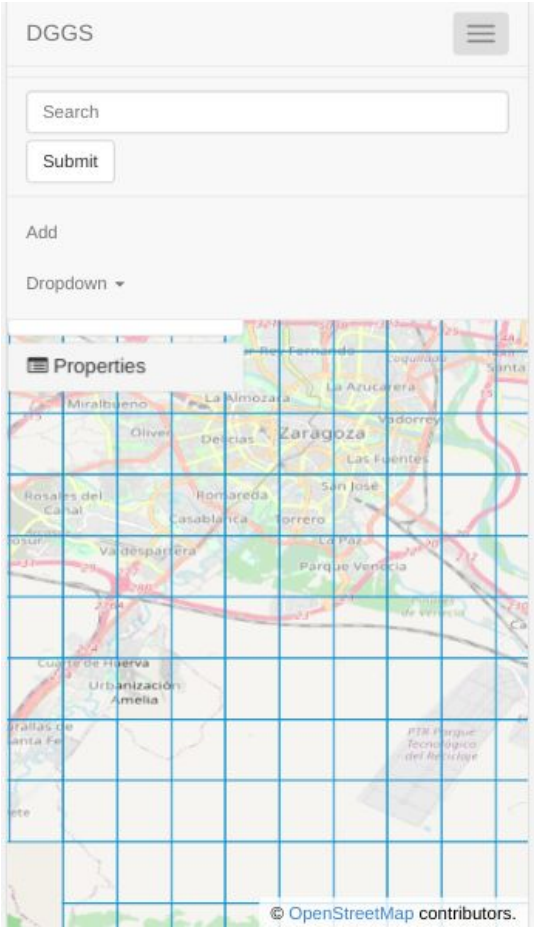
User Interface

- The users select and deselect cells just by tapping on the screen of their mobile phones
- Selected cells are highlighted in a different color
- In this way, an area can be defined without drawing a vector polygon, which can be uncomfortable on the screen of a mobile phone



User Interface

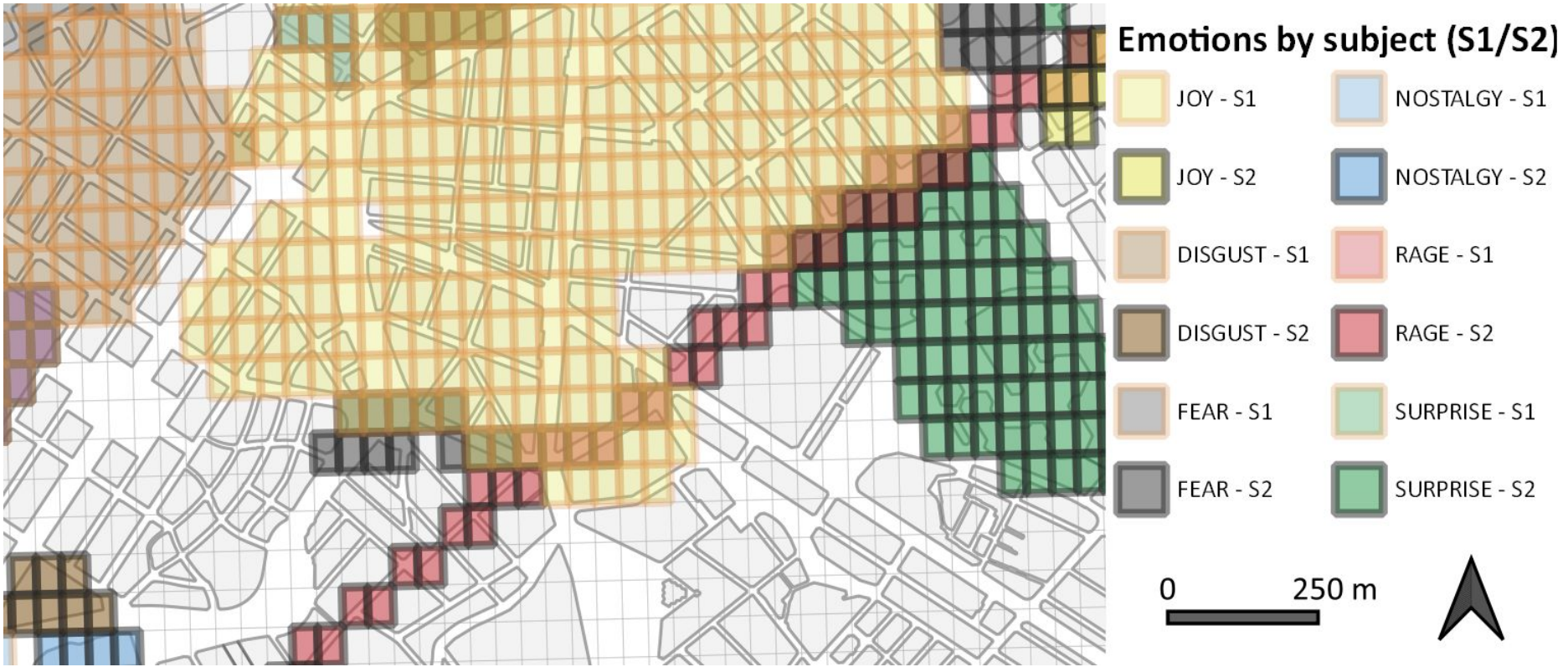
After defining an area, the users add the main emotion that the area caused on them (fear, anger, joy...)



Emotional Cartography

- A methodological process to represent the emotional spaces that form the territory
- Emotional spaces can be analyzed alongside the physical spaces
- Spatially diffuse areas are to be expected, and the emotions may vary a lot among scales
    - For example, a city in general may elicit joy, and a particular neighborhood can cause intense fear or disgust
- The multi-resolution grids of a DGGS seem adequate to analyze this kind of data

Emotional Cartography



Conclusion and Future Work

- The prototype for capturing tourist data on grids based on DGGS is nearly finished
- The use of the DGGS provides standardized, well-defined and well-behaved grids for the data capture
  - But also the promise of simpler data analysis and integration
- We are working to define and carry out experiments with users
- Analyzing the captured data and producing useful, beautiful, and innovative emotional cartography with them will be the next task
- Discovering patterns in those emotion-related data should provide additional insights about the territory
  - Not usually considered in traditional cartography

Thank you for your Attention

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