

Happy Housing



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TUMs student population as of the 2022/2023 winter semester enrollment is about 50,000 where 20,500 are international students [1]. According to [2], Munich's average rental cost is 44% higher than the national average. Hence the difficulty for foreign students to successfully secure affordable accommodation in Munich is a big problem. On a more serious note, it is very difficult to verify apartments in person for anyone, thus more difficult for handicap students to find a place to live, as they have no means of for verifying whether apartments are accessible by a wheelchair or not.

IMPRINT

Mapping Project
Winter Semester 2022/2023
Technical University of Munich

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KEYWORDS

Emojis, handicap, housing, interactive map.

LINK

<https://happyhousing.wheregeospatial.com>

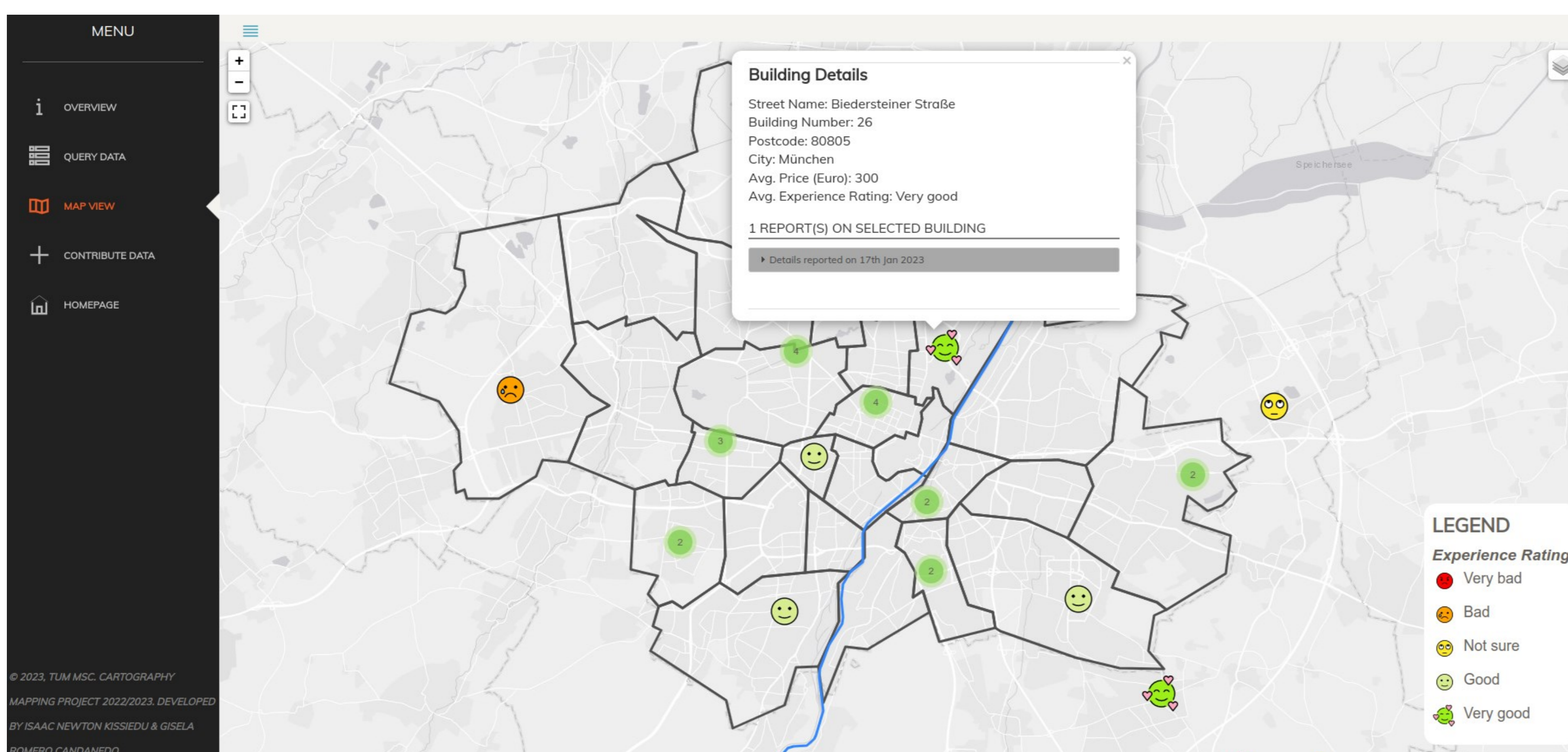


Fig.1 Happy housing map, showing data on tenancy experiences using emojis.

AIM

This project intends to provide reliable information to new international students at TUM, through an interactive map based on an intuitive cartographic display with emojis. An important feature is enhancing accessibility for handicap students driven by the fact that finding accommodation in Munich in general is difficult [3][4], finding suitable accessible accommodation can be way more difficult.

METHODS

Acquisition of data: address, accessibility, rent amount and other information was collected through a google forms questionnaire from Cartography M.Sc. intakes.

```
//Function to get buildings as a geojson format
public function getBuildingsGeojson($request, $response, $args) {
    $query = $this->db->pdo->prepare("SELECT id,street_name,house_num,postcode,city,lon,lat,avg_price,
    avg_exp,created_at,updated_at,st_asgeojson(point AS geometry FROM buildings_info");
    $query->execute();

    # Build GeoJSON feature collection array
    $geojson = array();
    $type => "FeatureCollection",
    "features" => array()
    );

    while ($row = $query->fetch(PDO::FETCH_ASSOC)) {
        $properties = $row;
        # Remove geojson and geometry fields from properties
        unset($properties["geometry"]);
        $feature = array();
        "type" => "Feature",
        "geometry" => json_decode($row["geometry"], true),
        "properties" => $properties
        );
        # Add feature arrays to feature collection array
        array_push($geojson["features"], $feature);
    }
    $status = $response->getHttpStatus();
    return $response->withJson($geojson, $status);
}
```

Fig. 2 PHP code to query buildings from data base

Simultaneously, dummy data was created for the development and testing of the web application. This enabled room for collecting as much data as possible.

Development: with the help of HTML, CSS, JavaScript, leaflet, PHP and PostgreSQL, a database and a web app map were developed and presented for feedback (Fig 2.). Geocoding was one of the main considerations to assign the addresses provided with its corresponding coordinates using the OSM *nominatim geocoding api*.

QGIS, ArcGIS pro and R were used for preparing the spatial layers provided by the Cartography M.Sc. Chair for its suitable use.

RESULTS

The workflow gave as a result the web application shown in Fig. 1. Happy housing map is open to user customization. It is possible to click on each emoji to get more information on the accessibility judgment by the contributor, experience, and price of the selected address.

With the created database the experience and price layers are updated with any data submission. Also, TUM campuses and an aesthetic base map are on display for harmonious use.

The spatial analysis and statistics are displayed on the "overview" tab (Fig. 3). It is possible to have a deeper insight into the average prices and accessibility information provided by each of the stored entries.

FUTURE WORK

The team, looks forward to collaborate with future colleagues and a bigger contributor community to enrich the created data base. Also to joining hands with any innovation-oriented initiative or organization that would like to help us push our idea for further development.

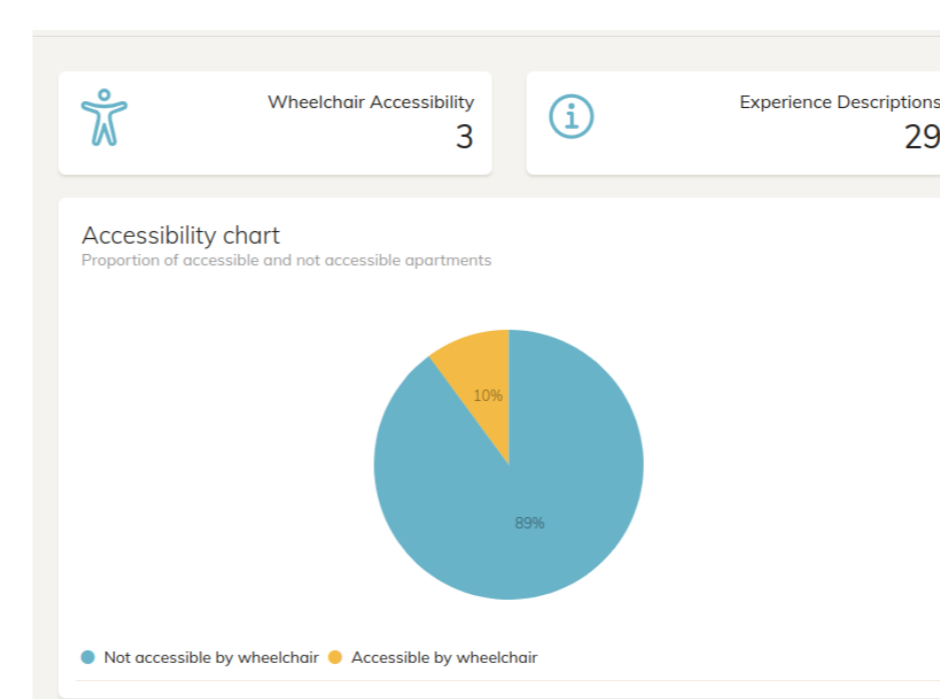


Fig. 3 Statistics of accessibility obtained from the collected data.