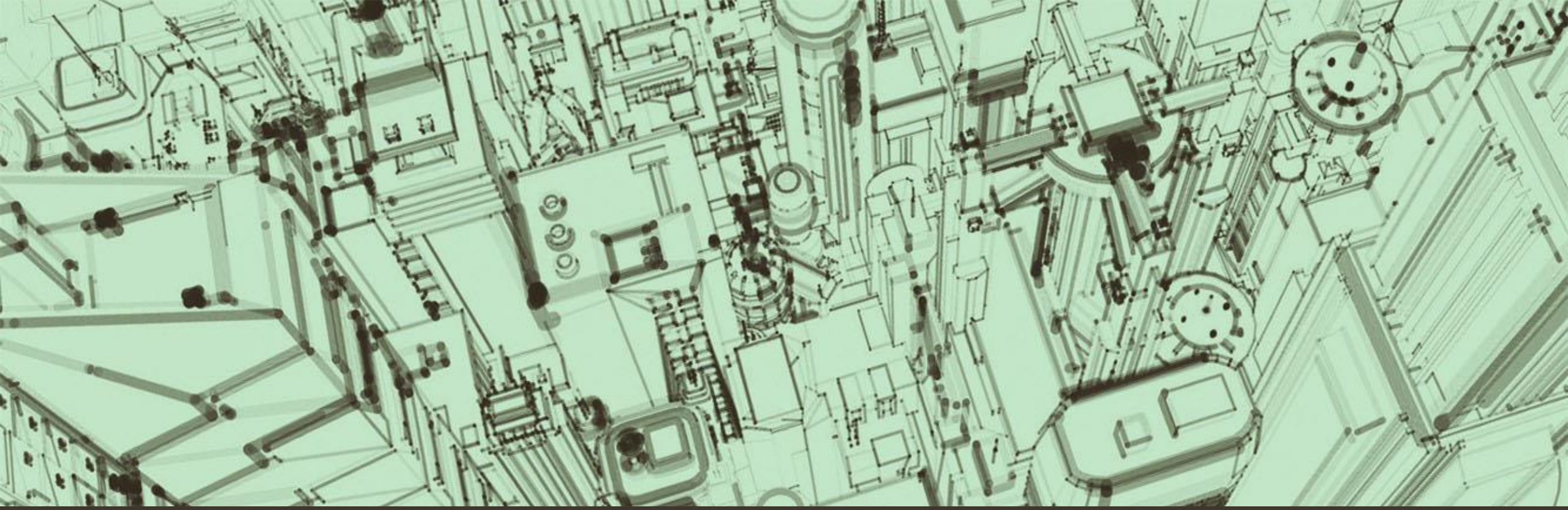


Effective Billboard Analytics

Geo-Spatial Modeling for Data-Driven Ad Placement

Problem Statement & Goal

- **In 2025**, Germany's Out-of-Home (OOH) advertising market is Drastically increased.
- Despite this growth, brands **risk wasting up of OOH budgets** due to:
  - Poor billboard placement (e.g., low visibility or wrong side of traffic)
  - Mismatched audience targeting

- **Goal**: Develop a spatial analytics model to optimize billboard placement using KPIs like footfall, price, visibility, and demographics. This will maximize visibility and audience impact, enabling data-driven advertising decisions.

General Approach

Step-by-step process :

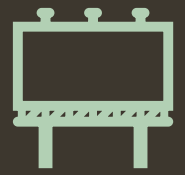
1. Collect billboard data: location, type, optional- (operator, image)
2. Add spatial attributes: price category, visibility score (VAC), age demographics
3. Visualize in ArcGIS Pro with icons, symbols and colors
4. Allow user-driven filtering by age to support decisions
5. Outcome: A map-based decision-support system

Data Situation

Source: Self-collected sample billboard dataset for Berlin, Hamburg, Frankfurt and Munich

Attributes used:

- Latitude/Longitude
- Type of Billboard (Board, Poster, Bus Stop Ad)
- Operator (e.g., Ströer Media)
- Price Category (Premium, Mid, Budget)
- Visibility Score (VAC proxy)
- Target Age Group
- Image URL for pop-up visualization
- **Tools :** ArcGISPro, Excel, GoogleDrive and postimage.com (for images)



Outcome

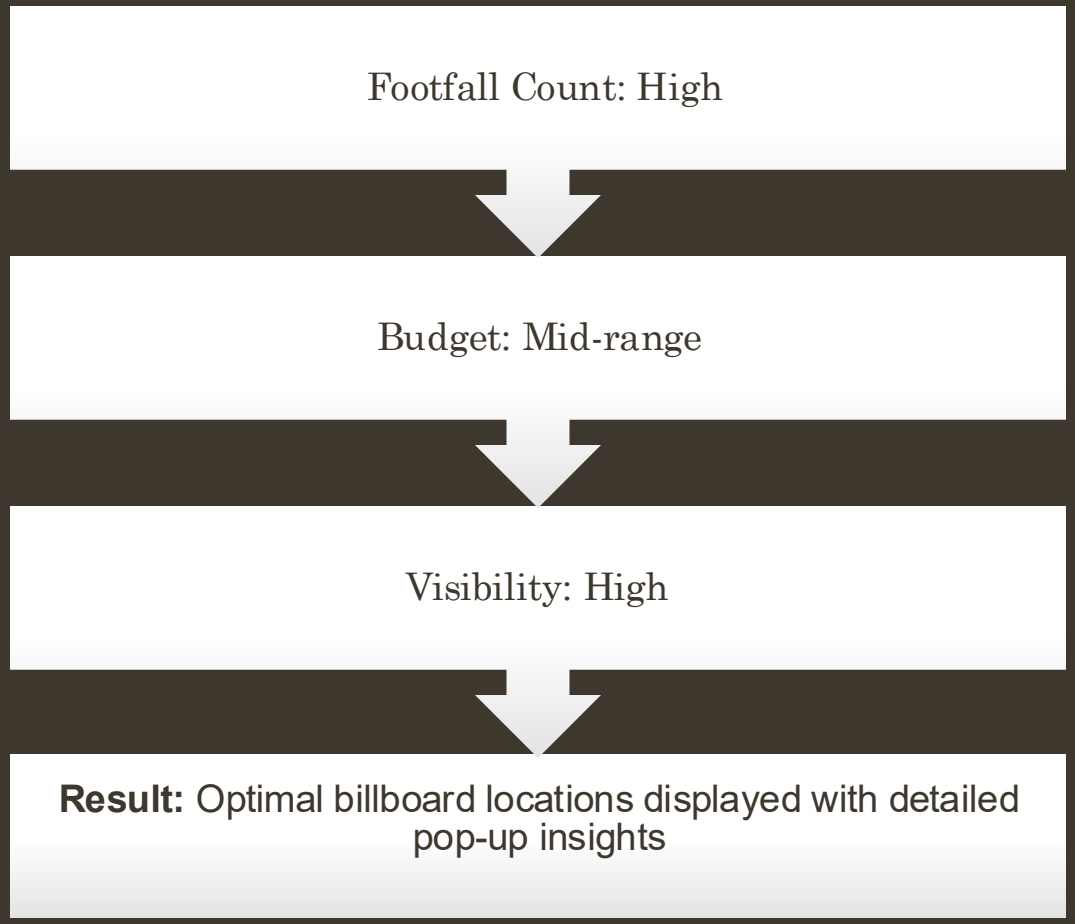
- We built a prototype in ArcGIS Pro that turns billboard data into a decision-ready map.
- By integrating **target age groups**, **visibility score**, and **price categories.**
- Visually scan billboard locations using clear icons and halo effects.
- Instantly spot high-visibility, age-appropriate, and budget-matching ad spaces.
- Click on any location to view real billboard images and contextual data.
- Use **a age-group filter** to narrow down the most effective placements.

This tool bridges business KPIs and location intelligence helping marketers make faster, smarter, spatially-informed decisions.

Targeted Billboard Selection: A Practical Scenario

Case: A fitness brand wants to advertise in areas with high footfall and age group 20–35

Model Visualising points After Selecting the required Age range---------->



Findings & Recommendations

Findings

- Billboards in central locations offer high visibility (VAC Score) but come with higher cost
- Low-cost ads in peripheral areas are budget-friendly but often lack alignment with the target demographic

Recommendations

- Use this tool for early-stage campaign planning
- Demographic filters for optimal ROI

Lessons Learned

- Location is the main driver of billboard ROI.
- Data-driven site selection beats intuition.
- Matching demographics and footfall to campaigns increases impact.
- KPIs like price, visibility, and traffic reveal true site value.
- Reliable data prevents costly placement mistakes.

Limitations & Next Steps

- Limited to Berlin, Frankfurt, Dusseldorf, Hamburg (prototype)
- Visibility data is a proxy (not real visibility index)
- No live footfall data yet(static data)

Next Steps:

- Enable filters for additional KPIs
- Scale the model to nationwide datasets
- Integrate OpenStreetMap pedestrian layers or dynamic sensor footfall data
- Expand into a full SaaS planning tool with broader data integration

Resources

Custom Dataset: Created from scratch using open-source platforms

- Location Data and Type of Board : Overpass-Turbo, MapComplete
- Visibility Factor : static data (calculated with footfall)
- Price : Mockup (confidential, not shared by companies)

Tools: ArcGIS Pro, Excel, Google Drive

Resources

Icons: MapComplete, FlatIcons, Custom PNGs.

Images: Mapcomplete , Posterimage.com

Acknowledgement:

Thanks to Ströer Media for initial guidance about the data privacy.

Backup-Pages

Q1: Why did you choose to filter only by age group and not VAC Score, price, or type?

- We chose age group as the key filter because it's the most decisive factor for campaign targeting. For example, a gym or fashion ad performs best when matched to a relevant demographic.

Q2:Why are there multiple layers instead of one combined layer?

- We used multiple layers (one per billboard type) because:
- Each type (e.g., Boards, Posters, Column Ads) uses distinct symbology
- Separating them improves map clarity and interpretation
- ArcGIS Pro allows us to manage them individually while still pulling from the same Excel data source

Backup-Pages

Q3: Why show billboard photos in the pop-up?

- Real images
- Provide ground truth to decision-makers.
- Help evaluate placement quality (e.g., obstructions, surrounding area).
- Build confidence in map-based choices instead of relying solely on coordinates metadata.

Backup-Pages

Q4:.What is VAC?

- VAC stands for Visibility Adjusted Contact.
- It’s a standardized metric in out-of-home advertising that estimates how many people actually notice an advertisement, adjusted for visibility and viewing conditions.

Q5:How is VAC Score Calculated?

- VAC is not a raw count of passersby — it's adjusted based on:
- Viewing angle and distance
- Traffic flow (pedestrian or vehicular
- Time in view (how long the ad is visible)
- Obstructions, size, elevation, lighting, etc.
- VAC is usually expressed as a percentage of gross contacts (i.e., "opportunity to see").

Backup-Pages

Example for vac:

If 10,000 people pass by but only 6,500 are likely to see the ad due to visibility conditions,

→ VAC = 65%