VisiFy: A Data-Driven Approach to Storefront Evaluation

Approach and Assumptions

Our team developed **VisiFy**, an analytical tool designed to help business owners evaluate their storefront locations. Unlike traditional visibility assessments, which focus solely on physical obstructions, **VisiFy integrates real-world business data**, emphasizing target audience demographics. Our scoring system assigns a **weighted score (out of 100%)** based on two primary factors:

1. **Visibility Score (70%)** – Derived from obstructions, multiple viewpoints, and traffic conditions.
2. **Business Suitability Score (30%)** – Based on target audience alignment, income levels, traffic conditions, and brand saturation.

We assume that **visibility alone does not guarantee business success**—matching the right audience with an optimal storefront location is crucial.

Mathematical and Statistical Reasoning

Visibility Score (70%)

To quantify storefront visibility, **VisiFy utilizes Google Maps API** to retrieve street-view images (latitude/longitude-based). Our model then processes these images using **YOLOv8** computer vision model to identify object detection through single processing.

- Image resolution: **1224 × 568 pixels (695,232 pixels total)**
- **Obstruction Deduction Rule:** For every **7,000 obstructed pixels**, **1 point is deducted** from the visibility score.
- **Inside-Store Detection:** Some Google Maps API images are taken inside the business. To correct this, **TomTom API** helps verify exterior road images.

For driving visibility, **TomTom's traffic API** provides **real-time road speed data**, helping assess how well a storefront is perceived by drivers.

Target Audience Score (30%)

A perfect storefront location means little if the **demographics do not align** with the business's target audience. Our **30% business suitability score** is broken down as follows:

Factor	Weight (within 30%)	Calculation Method
Age Match	30%	If outside 1 standard deviation (±2 years), subtract weighted points.
Income Match	15%	Deduct points based on median income deviation.
Traffic Score	30%	Subtract (speed - 30 mph) from a standard range (0–60 mph).
Brand Saturation	25%	Within a 100m radius, competitors reduce score; non-competitors increase score.

Final Score = 0.7×Visibility Score+0.3×Business Suitability Score

Conclusion

VisiFy is a data-driven tool designed to evaluate storefront locations by combining AI-powered visibility analysis with real-world business intelligence. By using Google Maps Street View API, VisiFy retrieves storefront images and leverages YOLOv8 to accurately detect visual obstructions. In addition, TomTom API adds on to visibility scoring by confirming external road views and providing real-time traffic insights. Additionally, demographic and financial data—including age, income, and brand saturation—are integrated to compute a comprehensive location score. VisiFy's effectiveness is assessed through metrics such as prediction accuracy, scoring consistency, computational speed, and market validation. Its practical applications extend to business owners selecting optimal storefront locations, franchise expansions, and real estate investment decisions.

Although there can be some limitations from APIs such as outdated imagery or incomplete regional data, VisiFy is still highly scalable because of the integration of cloud deployment and global reach of integrated APIs. Some future enhancement to VisiFy will be using machine learning models to train historical business success data to give higher accuracy scores to business owners.