**Hyper-Local Business Intelligence, Powered by Agentic AI**

***LOGO***

**1. Executive Summary**

ZoneScout is a multimodal AI agent that transforms visual intent into high-precision business data. It addresses the "Visual Friction" in lead generation by allowing users to define search zones via map screenshots or strict postal boundaries, rather than vague radius searches.

By orchestrating a "Hybrid-Cost" pipeline—combining **Gemini 1.5 Flash** (Vision), **Google Places API** (Data), and **Llama 3.3** (Reasoning)—ZoneScout delivers verified, niche-specific B2B leads with zero hallucinations.

**2. The Problem: "The Radius Trap"**

* **Imprecise Targeting:** Standard tools use "Radius Search" (e.g., "5 miles from center"). This fails for territory managers who need data for a specific industrial park, neighborhood, or zip code, often bleeding into irrelevant areas.
* **Data Noise:** Searching for niche categories (e.g., "SaaS Startups") on Maps often returns "Computer Repair Shops" or "Marketing Agencies." Manual filtering is slow and expensive.
* **Visual Disconnect:** Users often know *where* they want to search visually (e.g., "That new development on 5th Street") but lack the exact coordinates.

**3. The Solution: The 3-Stage "Sniper" Pipeline**

ZoneScout rejects the "shotgun" approach of radius search in favor of a "sniper" approach using strict Bounding Boxes (Viewports) and Agentic Verification.

**Stage 1: The Boundary Engine (Dual Input)**

* **Mode A: Visual Search (Screenshot)**
  + **Input:** User uploads a screenshot of a map (Satellite or Street view).
  + **AI:** **Gemini 1.5 Flash** (Google AI Studio) analyzes the image, identifies landmarks/intersections, and calculates the precise North/South/East/West latitude limits.
* **Mode B: Pincode Precision**
  + **Input:** User enters a Zip/Pincode.
  + **Logic:** The system queries the Geocoding API to retrieve the strict geometry.viewport (the official government boundary box), **ignoring** the center-point radius.

**Stage 2: The Deep Search (Data Layer)**

* **Constraint:** The system passes the calculated Bounding Box to the **Google Places API (New)** using the locationRestriction: rectangle parameter.
* **Result:** This forces Google to return businesses *strictly* within the visible box or zip code, ensuring zero geographic drift.

**Stage 3: The "Judge" Agent (Verification Layer)**

* **The Problem:** Google Data is often generic (e.g., Category: "Software Company").
* **The Agent:** An autonomous **Llama 3.3 70B** agent (via Groq) acts as a strict auditor.
* **The Logic:** It reads the business name, types, and editorial summary against the user's *semantic* criteria (e.g., "Must be a B2B Fintech startup, NOT a bank branch").
* **Verdict:** Only leads that pass this "Agentic Audit" are approved.

**4. Technical Stack (The "Hybrid-Cost" Architecture)**

* **Frontend:** Streamlit (Python) – For a real-time, reactive interface.
* **Vision Model:** **Gemini 1.5 Flash** – Chosen for its native multimodal capabilities and high free-tier limits.
* **Reasoning Model:** **Llama 3.3 70B (via Groq)** – Chosen for its sub-second inference speed, critical for maintaining a "live" feel during verification.
* **Data Provider:** **Google Maps Platform** – Places API (New) & Geocoding API.
* **Backend Logic:** Python 3.10+, Pydantic (Schema Validation), AsyncIO (Parallel Processing).

**5. Key Features**

* **📍 Strict Boundary Enforcement:** No radius. No drift. Data is strictly confined to the visual viewport or postal code.
* **📸 Visual Intent:** "Draw" your search area by simply taking a screenshot.
* **🧠 Semantic Filtering:** Filters based on what a business *does*, not just its category tag.
* **⚡ Async Verification:** Verifies 20+ leads in parallel using Groq's LPU architecture.

**6. Future Roadmap**

* **Phase 2:** Integrate **Firecrawl** to scrape landing pages of verified leads for deeper signals (e.g., "Do they use Shopify?").
* **Phase 3:** "Competitor Density Heatmaps" – Visualizing the verified leads on an interactive map.
* **Phase 4:** CRM Integration (HubSpot/Salesforce export).

**Why This is a "Top 1%" Project:**

1. **Solves a Real Business Problem:** It moves beyond "chatting with data" to **generating revenue-generating leads**.
2. **Engineering Maturity:** It demonstrates an understanding of **cost-optimization** (balancing Free Tier AI with Paid APIs) and **spatial constraints** (Viewport vs. Radius).
3. **Agentic Workflow:** It showcases the ability to orchestrate multiple AI models (Vision + Reasoning) to solve a complex task.