Leadsmart Senior Data Scientist - Technical Assessment

Context

Leadsmart is a lead generation startup that helps businesses run Facebook ad campaigns and manage the resulting leads. As our first and only data hire, you'll own the entire data function—from infrastructure to insights to intelligent systems.

This isn't a typical data role. You'll need to figure out what needs to be built, architect it, and deliver value independently. As a Senior Data Scientist, you'll be the sole technical voice on data decisions—stakeholders will rely on your judgment to prioritize what matters. You'll need to navigate ambiguity, make assumptions where specifications are unclear, and ask the right questions to uncover real business needs.

The Challenge

You have access to 4 datasets from our operations. Your task: demonstrate you can be our complete data team.

We want to see how you think about problems, what you prioritize, and how you execute end-to-end. **The intentional vagueness in this assessment mirrors real-world conditions**: non-technical stakeholders rarely provide perfect requirements. Show us how you handle ambiguity, what clarifying questions you'd ask, and how you make informed decisions when you have to own the entire data strategy.

Datasets Provided

Understanding the data flow:
A business user (e.g., "Emaar") creates a campaign (e.g., "Launch Marketing Campaign") for a specific project (e.g., "Mivida Gardens") with a daily budget (e.g., $1,000). This campaign runs on Facebook through our platform to generate leads. When leads come in,

they start with status NEW_LEAD. The business user's sales team then calls these leads and updates their status as they progress through the sales funnel.

campaign_leads.csv - Lead information
id, campaign_id, name, email, phone, lead_status, added_date

campaigns.csv - Campaign configuration
id, user_id, project_name, daily_budget, start_time, stop_time

- user_id = the business customer (e.g., Emaar, Sodic, etc.)
- project_name = the specific project they're advertising (e.g., Mivida Gardens, Palm Hills, etc.)

insights.csv - Daily ad performance metrics
ad_set_id, campaign_id, reach, spend, clicks, impressions, created_at

lead_status_changes.csv - Lead status transition log
lead_id, status, created_at

Assessment Parts

Part 1: Data Discovery & Exploration (15 points)

Objective: You're inheriting 4 datasets. Before building anything, you need to understand what you're working with.

Your job: Explore, inspect, and understand the data.

This is your chance to show how you approach unfamiliar data. **As a Senior Data Scientist, you'll often receive incomplete or messy data.** This is completely open-ended EDA—show us how you think, what you prioritize, what you discover that would inform your strategy as the sole data hire, and **what questions you'd ask stakeholders** to clarify ambiguities or data quality issues.

Deliverable: part1_exploration.ipynb - Jupyter notebook with your exploration, findings, and questions you'd ask stakeholders

Part 2: Business Intelligence (25 points)

Objective: Our business users (the companies running campaigns on our platform) need to understand their campaign performance and make decisions about their leads.

Your job: Build production-ready intelligence tools for our customers.

You have campaign data, ad performance metrics, and lead outcomes. What do our users need to see? How should they understand if their money is being spent well? What decisions are they trying to make?

This is open-ended intentionally. As the sole data expert, **you'll need to make assumptions about user needs** based on your understanding of the business. Show us:

- What questions our users are asking
- What insights would change their behavior
- How you'd present this information to them
- **What assumptions you're making about user priorities and how you'd validate them**

Build whatever dashboards, reports, or analyses you think customers need. Consider what they should monitor in real-time vs. periodic reports.

These dashboards should be production-level quality - think about performance, user experience, and deployment.

Choose your tools: Use whatever you think is most suitable - Tableau, Power BI, Streamlit, Plotly Dash, custom web apps, or any other dashboarding solution.

Deliverables:

- part2_dashboard/ - Working dashboard (choose your tool)
  - **Code-based:** Main application file (e.g., app.py for Streamlit/Dash, index.html for web-based, etc.) with supporting files and setup instructions
  - **BI Tools:** Tableau/Power BI/Looker files or links to published dashboards, plus any data prep scripts used
  - Include a README.md explaining how to access/run the dashboard
- part2_documentation.md or part2_documentation.pdf - Explanation of user value, design decisions, **assumptions made, and questions you'd ask stakeholders to refine the product**

Part 3: Predictive Intelligence (25 points)

Objective: Our users' sales teams are drowning in leads. Some will convert, most won't.

Your job: Build something that helps them prioritize their time.

The problem is yours to frame. What prediction would be most valuable to a business using our platform? How would you build it? How would you validate it actually works? How would this surface in their workflow?

Consider the data challenges here—think about what makes this problem hard and how you'd handle it. **Document your assumptions clearly**: what are you assuming about lead quality, conversion definitions, or sales processes? What would you need to clarify with the business team in a real scenario?

Deliverable: part3_model.ipynb - Jupyter notebook with model development + evaluation + user impact explanation + **assumptions and clarifying questions you'd ask**

Part 4: Strategic Decision System (15 points)

Objective: Our users are spending money on campaigns every day. Some should continue, some should stop.

Your job: Build a model/system that helps them make this decision.

How would you help a business determine if their campaign is worth continuing? What signals matter? When should they pull the plug vs. double down? How would this intelligence be delivered to them?

As the data owner, you're defining what "success" means. This should be more than a framework—build a working model or algorithm that can score campaigns, flag underperformers, or recommend actions. Document your reasoning and be explicit about where you'd need business input to refine thresholds or criteria.

Apply your model/system to real campaigns in the data and show your reasoning.

Deliverables:

- part4_model.ipynb - Jupyter notebook with model/system development + evaluation + application to real campaigns
- part4_documentation.md or part4_documentation.pdf - System documentation + delivery mechanism + **assumptions and questions for stakeholders**

Part 5: Agentic AI Design (10 points)

Objective: Our users have leads with phone numbers. Currently, their teams call them all manually.

Your job: Design an AI agent that could handle lead qualification calls for our users.

We're not asking you to build it (unless you want to). We want to see:

- How you'd architect this as a feature in our platform
- What it would do and how users would interact with it
- Whether it's worth building (cost/benefit for our users and for us)
- Sample conversation flows or prompts
- **What assumptions you're making about user workflows and technical constraints**
- **What questions you'd ask stakeholders before committing to development**

This is about demonstrating you understand modern AI systems and can evaluate their product-market fit. **As the only data hire, you'll need to make build-vs-buy decisions and justify ROI to leadership.**

Deliverable: part5_ai_agent_design/ - Design doc with architecture, business case, samples, **assumptions, and open questions**
Can be .md, .pdf, Google Doc, diagrams (draw.io, Figma, etc.), or any format that best conveys your design

Part 6: Production Engineering (10 points)

Objective: For either Part 3 OR Part 4 (your choice), provide a detailed production deployment plan.

Your job: Show us production-ready thinking—not academic exercises.

What's the tech stack? What does deployment look like? How much does it cost to run? How do you monitor it? What breaks and how do you fix it?

As the sole technical data resource, you'll own infrastructure decisions and operational responsibility. Show us you can think beyond notebooks and consider real-world constraints.

Deliverable: part6_production_plan/ - Production plan with architecture, costs, timeline, operational strategy, **and questions you'd ask engineering/DevOps teams**
Can be .md, .pdf, Google Doc, architecture diagrams (draw.io, Lucidchart, etc.), or any format that best conveys your plan

Submission Requirements

Repository Structure

```
leadsmart-assessment/
├── README.md                  # Overview and how to navigate your submission
├── SUMMARY.md or SUMMARY.pdf      # 1-2 page summary (see below)
├── part1_exploration.ipynb
├── part2_dashboard/
│   ├── app.py (or Tableau/Power BI file, or link to published dashboard)
│   ├── README.md (how to access/run)
│   ├── [any supporting files]
│   └── part2_documentation.md/.pdf
├── part3_model.ipynb
├── part4_model.ipynb
├── part4_documentation.md/.pdf
├── part5_ai_agent_design/        # .md, .pdf, diagrams, or mixed formats
├── part6_production_plan/        # .md, .pdf, diagrams, or mixed formats
├── data/                  # (optional) processed data files
└── requirements.txt           # Dependencies
```

Note: For Parts 5 and 6, use whatever format best communicates your ideas—written docs, architecture diagrams (draw.io, Lucidchart, Google Drawings), flowcharts, or a combination.

SUMMARY.md (Required)

1-2 pages covering:

- **What you built** - Brief overview of each part
- **Key findings** - Top 3-5 insights from the data
- **Recommendations** - What should Leadsmart prioritize?
- **What's next** - What would you do with more time?
- **Assumptions & Questions** - Critical assumptions you made and key questions you'd ask stakeholders in your first week

Evaluation Criteria

- **Independent thinking:** What problems do you identify and prioritize?
- **End-to-end capability:** Can you handle engineering, analysis, ML, and communication?
- **Business judgment:** Do you understand what actually matters?
- **Execution quality:** Is your work production-grade?
- **Communication:** Can you explain complex work simply?
- **Senior-level ownership:** How do you handle ambiguity? What questions do you ask? How do you make decisions when you're the only data expert in the room?

Guidelines

- **Tools:** Use whatever you want (Python, R, dashboarding tools, etc.)
- **Assumptions:** Document them clearly—we want to see your reasoning
- **Questions:** Include questions you'd ask stakeholders to refine your work
- **Completeness:** Show your thinking even if you don't fully implement everything
- **Ambiguity is intentional:** Treat vague requirements as a feature, not a bug. This mirrors the reality of being the first data hire working with non-technical stakeholders.

Submission

Submit via:

- GitHub/GitLab repository (preferred)
- Or ZIP file with the structure above

Include: All code, documentation, and a clear README on how to run your work.

Good luck! We're excited to see how you think and work.