

## **Data Scientist Case Study**

We're excited to learn more about how you approach data problems! This case study will give you the opportunity to showcase your skills. You'll have 48 hours from the time you receive this case study to submit a completed response. During your interviews, be prepared to present your findings to us. A slideshow is recommended.

### **Context**

Cohere Pets is on a mission to simplify veterinary care for pet owners and veterinarians, aiming to ensure pets receive necessary procedures without delay, thereby preventing major health risks. When a pet requires a procedure, veterinarians must obtain prior authorization ("auth") from the pet owner's insurance company before proceeding. This ensures that the procedure is covered by insurance and is clinically appropriate for the pet. Typically, the insurance uses medical claims history to determine whether an auth is approvable or not.

Currently, to approve or deny auths, Cohere Pets uses rules, which are essentially "if/else" statements that auto-approve auths if the veterinarian correctly answers a set of questions that determine clinical appropriateness. To streamline this process, Cohere Pets' Data Science team wants to also develop machine learning models that automatically approve some prior authorizations at the time of submission. Cohere Pets generates revenue by managing these prior authorizations on behalf of insurance companies.

### **Workflow**

1. A pet owner takes their pet to a veterinarian.
2. The veterinarian determines that the pet needs a procedure.
3. The veterinarian's office staff uses Cohere Pets' portal to submit a prior-authorization request, uploads supporting documentation and answers clinical questions.
4. Cohere Pets' backend rule engine automatically approves some authorizations based on the answers to the clinical questions. If an authorization is not auto-approved, it goes through human review.

5. Once approved, the veterinarian performs the procedure and submits the claim to the insurance company for reimbursement.

**Datasets** – attached to email as a .xlsx file

- **Prior Authorization Data:** Historical data on prior authorization requests, including decision outcomes.
- **Claims Data:** Historical data on medical procedures received by pets, sourced from insurance companies.

### **Exercise**

1. Develop a quick prototype of a model that auto-approves prior authorizations.
2. Be able to defend decisions you made with data cleaning and model architecture.
3. Provide a recommendation to the business in terms of using this predictive model or not and why.
4. Next, you find out that Cohere Pets now has access to unstructured free-text clinical notes written by veterinarians and their care teams. A team has developed a chatbot for the human review team that uses LLMs to extract and summarize the clinical notes with the aim of making it easier for human reviewers to make a decision about any authorizations that are not auto-approved. However, it is unclear whether the chatbot produces valid and reliable output. Please design an approach for evaluating the output of the chatbot, explain where the evaluation approach is strong and what it may miss, and explain why you would recommend this approach. **Note: You do not have to actually build the evaluation, we are interested in how you think about LLM evaluation.**
5. **Presentation:** Prepare to present your project, your modeling process and results and your LLM evaluation design. Create the presentation as if your audience were a moderately technical stakeholder.

**Evaluation Criteria:** We'll assess your knowledge of data analysis and visualization, feature engineering, cross-validation, business sense, and communication through this exercise. Your presentation should walk us through your thought process on how you chose to solve this problem.

**Please submit both:**

1. A Jupyter notebook running Python code with outputs displaying your results
2. A 20–30 min slideshow