MICHIGAN STATE UNIVERSITY

Project Plan Presentation
Fraud Transaction Monitoring Dashboard

The Capstone Experience

Team Ally

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From Students…
…to Professionals

Project Sponsor Overview

- Ally was founded in 1919 as GMAC
- Rebranded as Ally in 2010
- Provide auto finance, digital banking, and consumer lending
- Technology-driven financial institution
- Ally is the official banking partner of the WNBA



Project Functional Specifications

- Problem: Banking fraud is common and tedious to detect
- Solution: An interactive fraud detection dashboard that identifies suspicious transactions and explains why they were flagged
- Enables analysts to investigate flags with context (device metadata, merchant info, location, account history, etc.)

Project Design Specifications

Transaction Dashboard

- Home view displaying fraud alerts
- Table displaying key data: amount, merchant, timestamp, risk level, etc

AI integration

- Explains why transactions were flagged
- Retrieves relevant data and context

Project Design Specifications

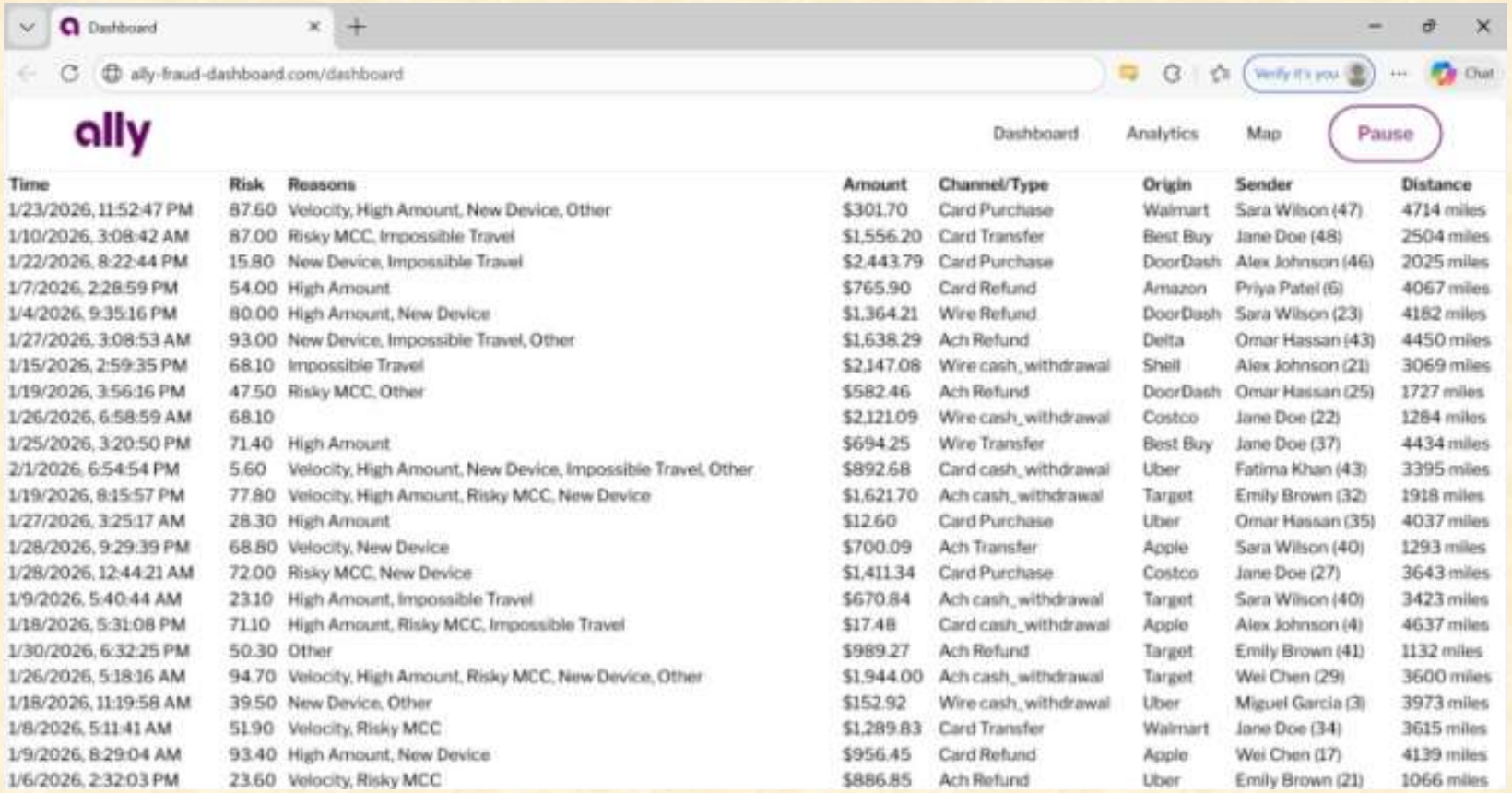
Quick Action

- Allows analyst to immediately respond to flag
- Could use AI or access transaction via the table
- Analyst can leave comments on transaction

Analytics Page

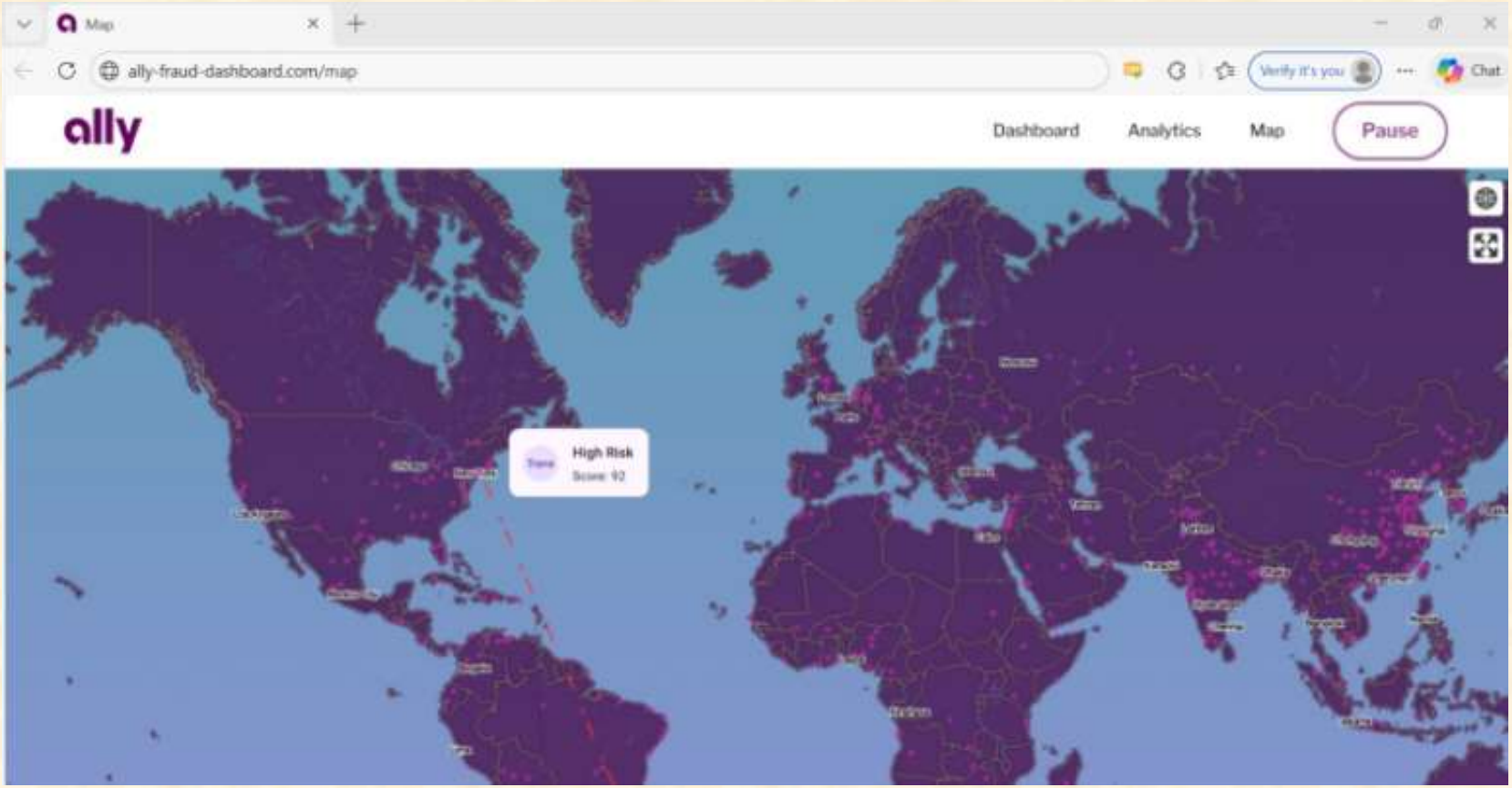
- Allows for overall monitoring of progress/activity
- Review case outcomes
- Helps identify recurring issues

Screen Mockup: Dashboard

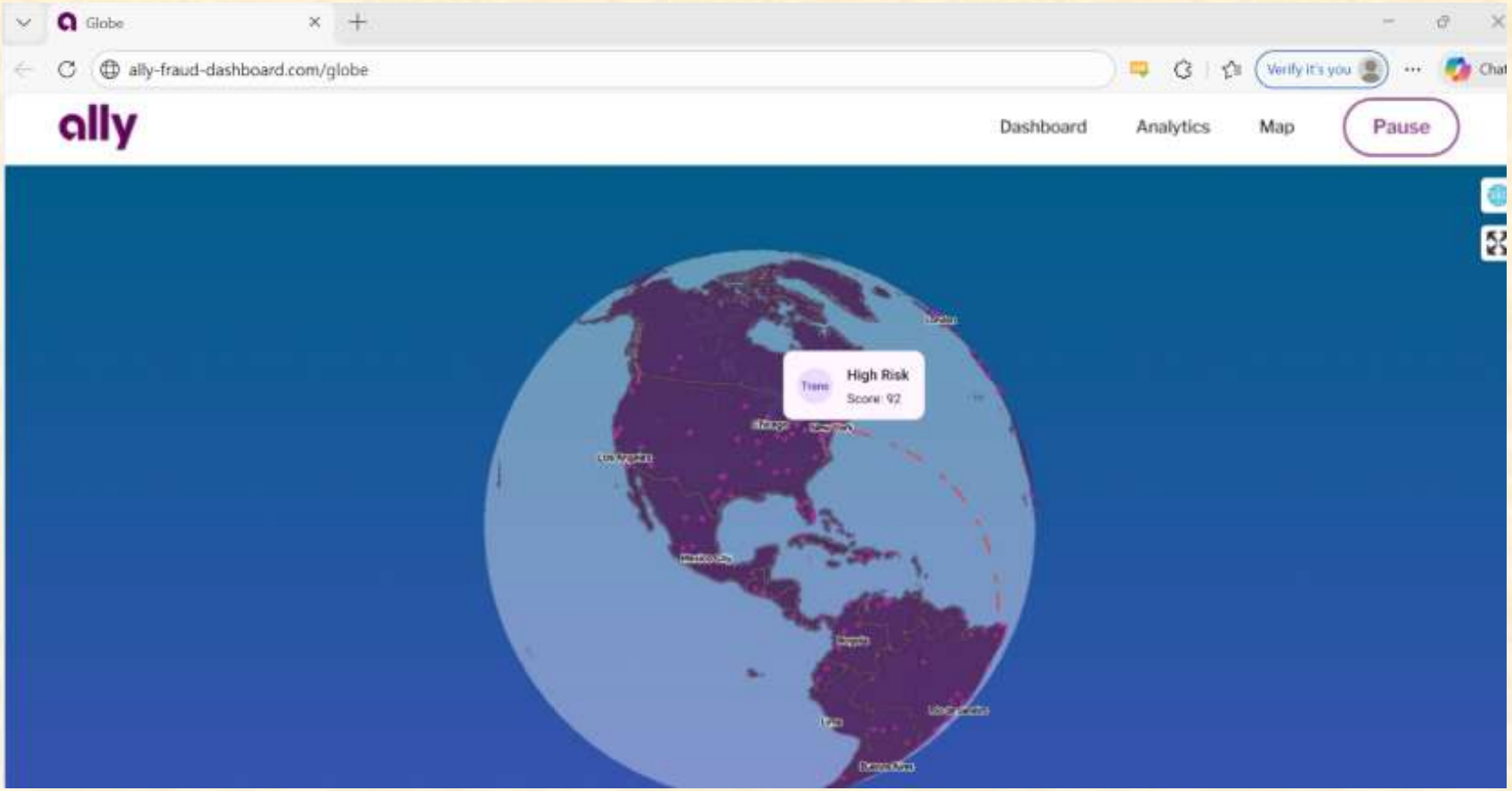


Time	Risk	Reasons	Amount	Channel/Type	Origin	Sender	Distance
1/23/2026, 11:52:47 PM	87.60	Velocity, High Amount, New Device, Other	$301.70	Card Purchase	Walmart	Sara Wilson (47)	4714 miles
1/10/2026, 3:08:42 AM	87.00	Risky MCC, Impossible Travel	$1,556.20	Card Transfer	Best Buy	Jane Doe (48)	2504 miles
1/22/2026, 8:22:44 PM	15.80	New Device, Impossible Travel	$2,443.79	Card Purchase	DoorDash	Alex Johnson (46)	2025 miles
1/7/2026, 2:28:59 PM	54.00	High Amount	$765.90	Card Refund	Amazon	Priya Patel (6)	4067 miles
1/4/2026, 9:35:16 PM	80.00	High Amount, New Device	$1,364.21	Wire Refund	DoorDash	Sara Wilson (23)	4182 miles
1/27/2026, 3:08:53 AM	93.00	New Device, Impossible Travel, Other	$1,638.29	Ach Refund	Delta	Omar Hassan (43)	4450 miles
1/15/2026, 2:59:35 PM	68.10	Impossible Travel	$2,147.08	Wire cash_withdrawal	Shell	Alex Johnson (21)	3069 miles
1/19/2026, 3:56:16 PM	47.50	Risky MCC, Other	$582.46	Ach Refund	DoorDash	Omar Hassan (25)	1727 miles
1/26/2026, 6:58:59 AM	68.10		$2,121.09	Wire cash_withdrawal	Costco	Jane Doe (22)	1284 miles
1/25/2026, 3:20:50 PM	71.40	High Amount	$694.25	Wire Transfer	Best Buy	Jane Doe (37)	4434 miles
2/1/2026, 6:54:54 PM	5.60	Velocity, High Amount, New Device, Impossible Travel, Other	$892.68	Card cash_withdrawal	Uber	Fatima Khan (43)	3395 miles
1/19/2026, 8:15:57 PM	77.80	Velocity, High Amount, Risky MCC, New Device	$1,621.70	Ach cash_withdrawal	Target	Emily Brown (32)	1918 miles
1/27/2026, 3:25:17 AM	28.30	High Amount	$12.60	Card Purchase	Uber	Omar Hassan (35)	4037 miles
1/28/2026, 9:29:39 PM	68.80	Velocity, New Device	$700.09	Ach Transfer	Apple	Sara Wilson (40)	1293 miles
1/28/2026, 12:44:21 AM	72.00	Risky MCC, New Device	$1,411.34	Card Purchase	Costco	Jane Doe (27)	3643 miles
1/9/2026, 5:40:44 AM	23.10	High Amount, Impossible Travel	$670.84	Ach cash_withdrawal	Target	Sara Wilson (40)	3423 miles
1/18/2026, 5:31:08 PM	71.10	High Amount, Risky MCC, Impossible Travel	$17.48	Card cash_withdrawal	Apple	Alex Johnson (4)	4637 miles
1/30/2026, 6:32:25 PM	50.30	Other	$989.27	Ach Refund	Target	Emily Brown (41)	1132 miles
1/26/2026, 5:18:16 AM	94.70	Velocity, High Amount, Risky MCC, New Device, Other	$1,944.00	Ach cash_withdrawal	Target	Wei Chen (29)	3600 miles
1/18/2026, 11:19:58 AM	39.50	New Device, Other	$152.92	Wire cash_withdrawal	Uber	Miguel Garcia (3)	3973 miles
1/8/2026, 5:11:41 AM	51.90	Velocity, Risky MCC	$1,289.83	Card Transfer	Walmart	Jane Doe (34)	3615 miles
1/9/2026, 8:29:04 AM	93.40	High Amount, New Device	$956.45	Card Refund	Apple	Wei Chen (17)	4139 miles
1/6/2026, 2:32:03 PM	23.60	Velocity, Risky MCC	$886.85	Ach Refund	Uber	Emily Brown (21)	1066 miles

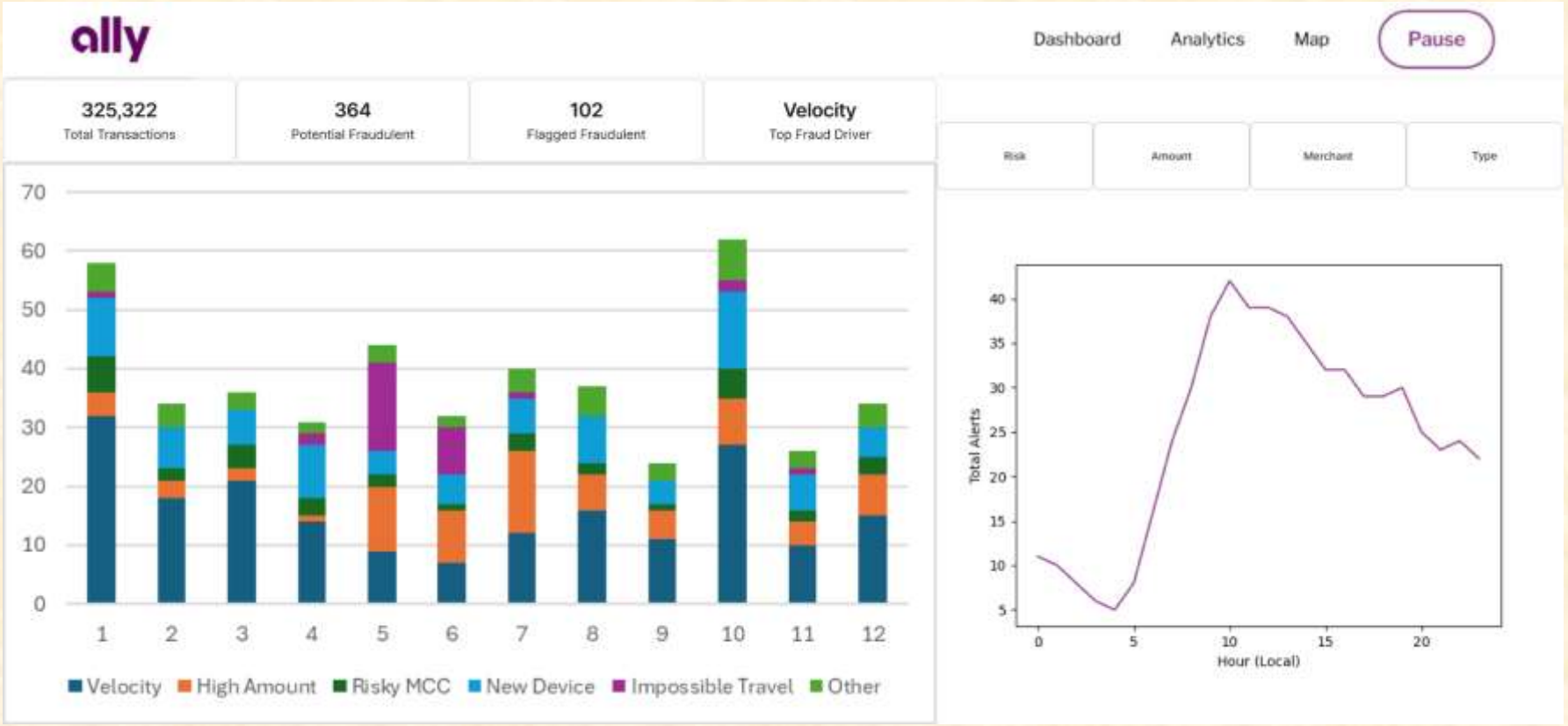
Screen Mockup: Map View



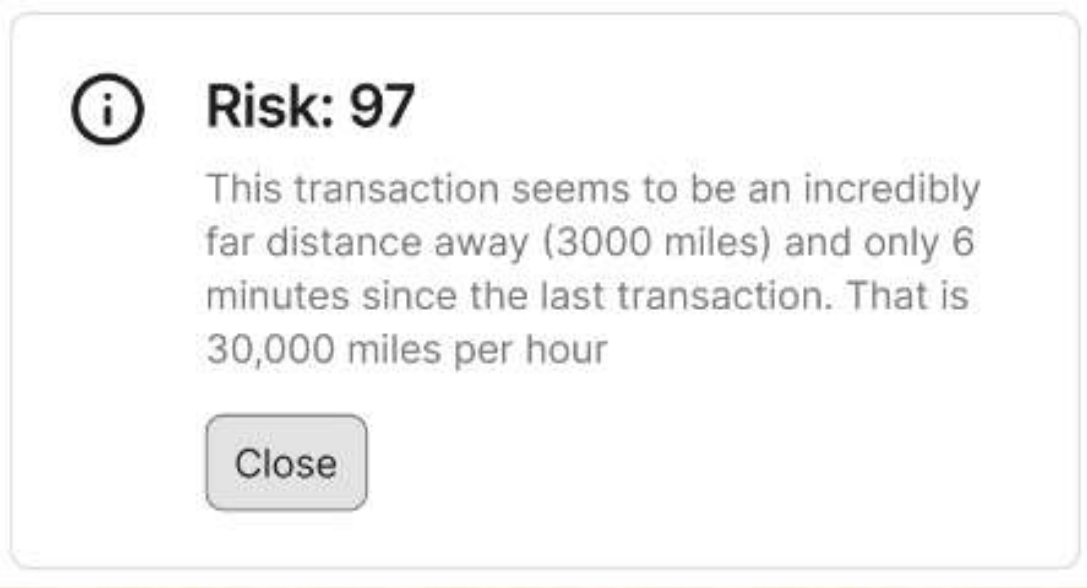
Screen Mockup: Globe View



Screen Mockup: Analytics



Screen Mockup: AI Summary



Project Technical Specifications

Backend

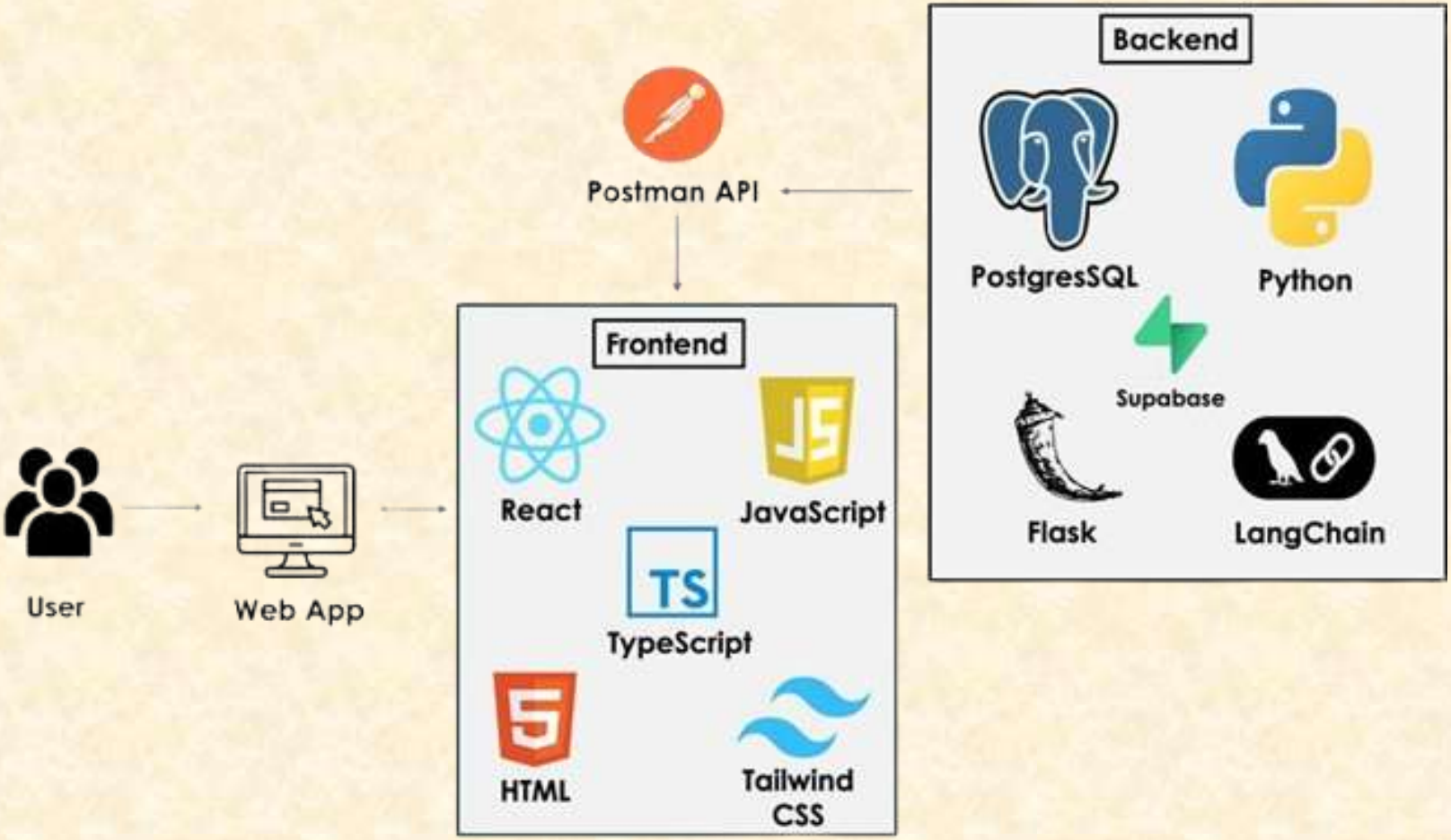
- Python and Flask
  - Low hardware requirements and well integrated
- PostgreSQL via Supabase
  - Simplifies database schema visualization, data access, and secure connectivity across devices
- LangChain
  - Powers the AI summary
- Postman
  - API communication

Project Technical Specifications

Frontend

- These following were used for creation of interactive tables and a global map to visualize transaction data
  - React
  - Typescript
  - HTML
  - JavaScript
  - Tailwind CSS

Project System Architecture



Project System Components

- Supabase

A backend service that provides a database, authentication, and storage all in one place

- Langchain

A backend library for building applications that use large language models and tools together

- Postman API

A tool for testing and sending requests to APIs to see how they respond



Project System Components

Development Environments

- React

A front-end library for building interactive user interfaces in the browser

- Flask

A Python web framework for building backend servers and APIs

- Python

Python is a programming language that lets you work quickly and integrate systems more effectively



Project Risks

Data Realism (Medium Difficulty)

- No access to real Ally transaction data
- Using data generator to create realistic bank accounts

AI Response Accuracy (Hard Difficulty)

- AI assistant may hallucinate data or provide inaccurate explanations
- Implementing strict response guidelines and templates for each situation

Map Rendering Performance (Hard Difficulty)

- Map visualization with hundreds of transaction instances may cause lag on lower-end systems
- Server-side pre-rendering with completed drawings sent to client, OR selective rendering

LangChain API Costs (Medium Difficulty)

- Extensive testing requires API credits; free models unreliable for fraud detection accuracy
- Explored client funding (declined); currently seeking affordable credit packages or evaluating free alternatives

Questions?

