Project: "Are Space Missions Necessary?"
Team Members:
1. Abbhijit Venkatachalam (avenka97@asu.edu)
2. Sakshi Agarwal (Sagar149@asu.edu)
3. Dheeraj Kumar (dkumar70@asu.edu)
4. Isha Kaushik (ikaushi4@asu.edu)
5. Sanyam Jain (sjain300@asu.edu)
6. Amaan Mohamed Kalemullah (akalemul@asu.edu)

Completed Tasks (since prior checkpoint)

• **Abbhijit Venkatachalam:** Ingested all four Kaggle datasets; parsed datum to ISO; normalized company_name variants (63→58); coerced rocket (cost, USD M) to numeric with missing flags; created location hierarchy (Country → Site).
• **Sakshi Agarwal**: Bootstrapped React + Vite app; implemented D3 overview timeline (missions/year) with success-rate overlay; added brush that emits a global filter; baseline keyboard navigation for the chart.
• **Dheeraj Kumar:** Set up FastAPI service; built /missions/annual, /missions/org, /neo/annual endpoints with server-side caching; CI pipeline and health checks; CORS configured for frontend.
• **Isha Kaushik:** Encoded status_mission as ordinal {Success, Partial Failure, Failure, Prelaunch Failure}; computed yearly success rates and org-level small multiples.
• **Sanyam Jain:** Cleaned NASA NEO dataset (1900–2021); derived yearly close-approach counts and hazardous-NEO counts; validated ranges and aligned mission/NEO years.
• **Amaan Mohamed Kalemullah:** Integrated Water & Air Quality dataset stub; drafted "necessity" framing copy and data-caveat notes; ran first accessibility pass (focus rings, tab order, ARIA roles for tooltips).

Current Tasks

• **Abbhijit Venkatachalam:** Harmonizing destination taxonomy (LEO/MEO/GEO/Deep Space/Interplanetary); building Great Expectations tests for datum, company_name, rocket; preparing parquet pre-aggregations by year/org/dest.
• **Sakshi Agarwal:** Linked highlighting across views; tooltips with values + source badges; high-contrast theme and non-color encodings for outcomes.
• **Dheeraj Kumar:** Parameterized filters on all endpoints (time range, org, destination); caching strategy for brushed queries; /missions/cost-scatter endpoint (cost vs success probability).
• **Isha Kaushik:** Destination-level reliability trends with 3-yr moving averages; preliminary cost–outcome scatter with censoring flags; drafting methods note on uncertainty.
• **Sanyam Jain:** Syncing NEO panel to timeline brush; computing annual hazardous-NEO share; exploring relative-velocity/distance quantiles for tooltip context.
• **Amaan Mohamed Kalemullah:** Accessibility QA (screen reader labels, tooltip announce on focus); copy for onboarding "How to read this" panel; performance budget & telemetry events for user interactions.

Remaining Tasks for Project Completion

• Map view of launch sites with clustering and outcome encoding.
• Compare toggle to pin two eras/orgs side-by-side across all panels.
• Web Worker/progressive rendering for brushed re-aggregations; CDN caching config.
• Join/validate "All Space Missions from 1957" with "Space Missions Dataset" for costs/destinations; publish versioned data snapshot.
• Great Expectations suite expansion + data quality report surface in UI.
• Cost normalization audit (currency/year adjustments where possible) + missingness analysis.
• Reliability deltas by organization & era; destination-adjusted success estimates with Cis.
• Hazardous-NEO narrative + limitations (post-2021 gap, observation bias) and optional velocity/distance toggles.
• Water/Air quality context panel finalization with clear "no-causality" framing and source badges.
• Endpoint hardening, pagination, and analytics logging; rate-limit/backoff policies.
• Pilot usability test (n=5), synthesize findings, prioritize fixes for alpha.
• Deployment for alpha demo with release notes and dataset licenses/attribution.