**Author**: [Professional Data Analyst Perspective]  
**Purpose**: To define the main pages of the GlobalPulse frontend web app, a single-page React application that transforms macroeconomic forecasting into a captivating, narrative-driven experience. The app visualizes model performance (accuracy and coherence) for Sweden, Mexico, New Zealand, and Thailand across GDP, Inflation CPI, Unemployment Rate, and Trade Balance, with flexible timeframes and country-based views, using dynamic charts and lists to weave a story of global economic insights.

**1. The Vision: A Cosmic Observatory for Economic Insights**

Imagine stepping into a cosmic observatory where the rhythms of global economies glow like constellations. The GlobalPulse frontend web app is a single-page React masterpiece that invites economists, analysts, and policymakers to explore macroeconomic forecasts with awe and clarity. Built with Tailwind CSS (dark theme: void #0F0F12, charcoal #1A1A1D, purple accents #7B29B8), it pulls data from Supabase tables (canonical\_timeseries, forecast\_results, evaluations, taxonomy\_mapping) to deliver a seamless, browser-based journey.

This app is a beacon for:

* **Total Performance**: Illuminating how well models (GPT, Claude, Gemini, ARIMA) predict economic indicators through a Composite Score (70% numerical accuracy + 30% coherence), with detailed metrics (MAE, RMSE, sMAPE, MAPE, Directional Accuracy, Coherence).
* **Timeframes**: Navigating data across 30 days, 90 days, 1 year, or custom ranges, like charting the stars over time.
* **Country Segmentation**: Zooming into Sweden’s growth, Mexico’s inflation, New Zealand’s labor market, or Thailand’s trade flows, each a unique galaxy.
* **Intuitive Visuals**: Adaptive charts (line, bar, heatmap) and lists that shift based on data, making insights feel alive and accessible.

The app’s six main pages—accessible via a sleek sidebar—are designed to feel like chapters in an epic saga, guiding users from a global overview to granular discoveries, all while ensuring trust and ease of use.

**2. Why It Matters: The User’s Odyssey**

GlobalPulse is for those who seek to understand the world’s economic pulse without drowning in complexity:

* **Economists** verify AI forecasts against real-world data, like stargazers confirming celestial patterns.
* **Policymakers** find clear insights for decisions, such as Thailand’s inflation strategies.
* **Analysts** compare model performance to crown the best oracle, like choosing a guiding star.
* **Admins** ensure the data pipeline shines with reliability, like maintaining the observatory’s lenses.

The app delivers:

* **Clarity**: A single glance reveals global performance; a few clicks uncover specific insights.
* **Engagement**: Vivid visuals (pulsing gauges, glowing maps) make data exploration an adventure.
* **Trust**: Transparency into the pipeline ensures every number is reliable.
* **Flexibility**: Filters for timeframes, countries, and indicators let users craft their own narrative.

**3. Main Pages: The Six Pillars of GlobalPulse**

The GlobalPulse frontend is a single-page React app with six core sections, accessed via a sidebar with Font Awesome icons. Each page is a narrative milestone, built on the Supabase schema (raw\_te\_timeseries, canonical\_timeseries, forecast\_results, evaluations, taxonomy\_mapping) and styled with Tailwind CSS, Space Mono headings, and Inter body text.

**3.1 Home (The Cosmic Pulse)**

* **Purpose**: The entry point, offering a radiant overview of forecasting performance across all models, countries, and indicators.
* **Visual Experience**: A celestial gauge pulses at the top, its arc glowing emerald green (Composite Score >85), amber (65–85), or crimson (<65), reflecting the health of forecasts (70% accuracy + 30% coherence). A bold “89/100” shines in Space Mono, flanked by a line chart tracing score trends, like stars streaking across the night sky.
* **Key Features**:
  + Displays the Composite Score (from evaluations) for the default timeframe (last 30 days).
  + Line chart (Chart.js) shows score trends, with hover-over details (e.g., “August 2025: 90”).
  + Timeframe filter (dropdown: 30 days, 90 days, 1 year, custom calendar picker) updates the gauge and chart.
  + “Stellar Insights” card highlights top performers (e.g., “Claude shines in GDP forecasts”).
  + Buttons (e.g., “Explore Galaxies,” “Rank Oracles”) link to Explorer and Leaderboard.
* **User Flow**: Users land on Home, see the global pulse, adjust the timeframe to spot trends, and navigate to other sections for deeper exploration.
* **Example**: An economist opens the app, sees a green gauge with “Composite Score: 88,” and notices a dip in July via the line chart. They select “Last 90 Days” and click “Explore Galaxies” to jump to the Explorer.

**3.2 Explorer (The Galactic Lens)**

* **Purpose**: A focused hub for drilling into specific countries and indicators, revealing detailed performance metrics.
* **Visual Experience**: Indicators glow as orbs, brighter for better accuracy (e.g., MAE < 0.5), like planets in a constellation. An interactive world map highlights selected countries (Sweden, Mexico, New Zealand, Thailand) with a purple glow, drawing users into the data.
* **Key Features**:
  + Country selector (dropdown or map, from canonical\_countries) filters to one nation.
  + Indicator dropdown (GDP, Inflation CPI, Unemployment Rate, Trade Balance, from canonical\_indicators) shows metrics (MAE, RMSE, sMAPE, MAPE, Directional Accuracy, Coherence, from evaluations).
  + Bar chart (Chart.js) compares model performance (e.g., GPT vs. ARIMA for Mexico’s GDP), with a toggle to a table for exact values (e.g., “Gemini: MAE 0.3, Coherence 92”).
  + Timeframe filter refines the view (e.g., last quarter).
  + Heatmap option (Chart.js) shows metric intensity across countries (e.g., darker green for lower MAE).
  + Export button saves charts or tables as CSV/PDF (via forecast\_results, evaluations).
* **User Flow**: Users pick a country and indicator, see a visual comparison, toggle to a table, and export data, crafting a tailored economic story.
* **Example**: A policymaker selects Thailand and Inflation CPI, sees Claude’s MAE (0.3) lead in a bar chart, and exports a table for a policy brief.

**3.3 Trends (The Celestial Chronicle)**

* **Purpose**: A time-traveling view showing how model performance evolves, highlighting trends in accuracy and coherence.
* **Visual Experience**: A cosmic scroll unfurls, with past data etched in charcoal and future forecasts glowing faintly, like a prophecy unfolding. Line charts trace metrics over time, creating a narrative of progress.
* **Key Features**:
  + Line chart (Chart.js) displays trends (e.g., RMSE for Sweden’s GDP, from evaluations) over a selected timeframe (30 days, 90 days, 1 year, custom).
  + Filters for country, indicator, and timeframe adjust the scroll’s focus.
  + “Full Chronicle” button reveals a table with all data points (e.g., monthly Coherence scores).
  + Hover-over chart points show details (e.g., “June 2025: RMSE 0.8”).
  + Export chart or table as CSV/PDF.
* **User Flow**: Users select a timeframe and focus, watch trends emerge, and dive into details for analysis or export, feeling like historians of economic foresight.
* **Example**: An analyst picks New Zealand’s Unemployment Rate for the last year, sees Gemini’s Coherence rise from 80 to 92, and exports the trend for a presentation.

**3.4 Leaderboard (The Oracle Conclave)**

* **Purpose**: A competitive arena ranking models by performance, crowning the best forecaster.
* **Visual Experience**: A celestial council where models (GPT, Claude, Gemini, ARIMA) are oracles with glowing sigils (e.g., a flame for Claude, a gear for ARIMA). A “constellation of wisdom” connects top performers with shimmering lines, and the leader wears a radiant crown.
* **Key Features**:
  + Leaderboard (table or visual, from evaluations) ranks models by Composite Score, filterable by country, indicator, or timeframe.
  + Bar chart (Chart.js) compares accuracy (e.g., sMAPE) and coherence side-by-side.
  + Click a model to view its reasoning (stored in MinIO/S3, linked via forecast\_results).
  + Export leaderboard as CSV/PDF or share a view link (e.g., “Sweden GDP, Last 90 Days”).
* **User Flow**: Users filter the leaderboard, compare models, and drill into reasoning, feeling like judges in a cosmic tournament.
* **Example**: A data scientist filters by Trade Balance, sees ARIMA lead (Composite Score: 91), and checks Claude’s reasoning to spot a data flaw.

**3.5 Pipeline (The Data Forge)**

* **Purpose**: A transparency hub ensuring trust in the data pipeline’s health.
* **Visual Experience**: A forge where data is shaped, with nodes (Ingestion, Normalization, Evaluation) glowing green (success), amber (warnings), or red (issues), like stars in a smelter. A heatmap shows data coverage, pulsing with intensity.
* **Key Features**:
  + Status overview (e.g., “500 records ingested today, 99% success,” from ingestion\_log).
  + Coverage heatmap (Chart.js) shows data availability (e.g., 98% for Mexico’s GDP, from taxonomy\_mapping).
  + Issue log (table, from validation\_log) lists problems (e.g., “Missing Thailand Trade Balance, July 2025”).
  + “Last Updated” timestamp (from ingested\_at fields) confirms freshness.
* **User Flow**: Users check pipeline health, confirm reliability, and investigate warnings, building trust in the data.
* **Example**: An admin sees green nodes and 100% coverage for Sweden, noting a warning about missing GDP data for review.

**3.6 Profile (The Navigator’s Log)**

* **Purpose**: A personalization hub for user profiles, saved views, and settings.
* **Visual Experience**: A sleek journal where users log their explorations, with a starry backdrop and purple-accented cards for saved views, like a captain’s logbook.
* **Key Features**:
  + Login/logout via Supabase Auth (email/SSO, anon role for public access, per 002\_create\_rls\_policies.sql).
  + Save custom views (e.g., “Mexico Inflation, Last 90 Days”) for quick access.
  + Set preferences (e.g., default timeframe, preferred metrics like MAE).
  + Admin controls (hidden for non-admins) to manage users or view pipeline logs (validation\_log, ingestion\_log).
* **User Flow**: Users log in, save a view, adjust settings, or manage users (if admin), making the app feel personal.
* **Example**: An analyst saves a view for “Sweden GDP, Last Year” and sets MAE as their default metric.

**4. User Scenarios: Stories of Discovery**

1. **Global Overview**:
   * **Who**: An economist exploring GlobalPulse.
   * **Journey**: Lands on Home, sees a green gauge with “Composite Score: 90,” and checks a line chart for a July dip. They click “Explore Galaxies” to jump to Explorer.
   * **Outcome**: Grasps the platform’s reliability and dives into specifics.
2. **Policy Insight**:
   * **Who**: A policymaker focused on Mexico’s inflation.
   * **Journey**: Uses Explorer, selects Mexico and Inflation CPI, sees Claude’s MAE (0.3) in a bar chart, and exports a table for a policy brief.
   * **Outcome**: Gains actionable insights for inflation strategies.
3. **Trend Tracking**:
   * **Who**: An analyst studying model improvement.
   * **Journey**: Navigates to Trends, picks New Zealand’s Unemployment Rate for the last year, sees Gemini’s Coherence rise from 80 to 92, and exports the chart.
   * **Outcome**: Confirms Gemini’s growing reliability.
4. **Model Comparison**:
   * **Who**: A data scientist comparing models.
   * **Journey**: Visits Leaderboard, filters by Trade Balance, sees ARIMA lead (Composite Score: 91), and checks Claude’s reasoning for flaws.
   * **Outcome**: Chooses ARIMA for trade forecasts.
5. **Data Trust**:
   * **Who**: An admin ensuring quality.
   * **Journey**: Checks Pipeline, sees green nodes and 99% coverage for Thailand, and notes a warning about missing GDP data.
   * **Outcome**: Trusts the app’s insights for decisions.
6. **Personalization**:
   * **Who**: An analyst customizing their experience.
   * **Journey**: Goes to Profile, saves a view for “Sweden GDP, Last Year,” and sets MAE as their default metric.
   * **Outcome**: Feels the app is tailored to their needs.

**5. System Requirements: Building the Observatory**

* **Tech Stack**:
  + React SPA (CDN: react@18.2.0, react-dom@18.2.0, per progress\_so\_far.docx).
  + Tailwind CSS (dark theme: #0F0F12, #1A1A1D, purple #7B29B8).
  + Chart.js for line charts, bar charts, heatmaps.
  + Supabase for data (canonical\_timeseries, forecast\_results, evaluations, taxonomy\_mapping, categories).
  + Fonts: Space Mono (headings), Inter (body), Font Awesome (sidebar icons).
* **Data Integration**:
  + Pulls metrics (MAE, RMSE, sMAPE, MAPE, Directional Accuracy, Coherence, Composite Score) from evaluations.
  + Uses forecast\_results for predictions, canonical\_timeseries for historical data, taxonomy\_mapping for indicator categories.
  + RLS policies (anon\_select\_\* from 002\_create\_rls\_policies.sql) ensure read-only access for public users.
* **Visualization Logic**:
  + Auto-selects visuals: line charts for trends, bar charts for comparisons, heatmaps for coverage, tables for details.
  + Users can toggle between chart and table views.
* **Filters**:
  + Timeframe: 30 days, 90 days, 1 year, custom (calendar picker).
  + Country: Dropdown or map (Sweden, Mexico, New Zealand, Thailand, from canonical\_countries).
  + Indicator: Dropdown (GDP, Inflation CPI, Unemployment Rate, Trade Balance, from canonical\_indicators).
  + Model: Checkbox (GPT, Claude, Gemini, ARIMA).
* **Export & Sharing**:
  + CSV/PDF export for charts, tables, leaderboards.
  + Shareable links for views (e.g., “Thailand Inflation, Last 90 Days”).
* **Performance**:
  + App loads in <2 seconds (p95) for 1-year queries (per the\_prd\_doc.docx).
  + Supabase API calls: <1 second for metadata, <2 seconds for metrics.
* **Security**:
  + RLS for anon role (read-only, per 002\_create\_rls\_policies.sql).
  + Supabase Auth for user management (email/SSO).
  + No sensitive data (e.g., TE\_API\_KEY) in frontend (stored in .env, per progress\_so\_far.docx).
* **Accessibility**:
  + WCAG 2.1 compliant (alt text for charts, keyboard navigation).
  + High-contrast visuals (purple #7B29B8 on #0F0F12).

**6. Success Metrics: Is the Observatory Thriving?**

* **User Engagement**: 90% of users rate the app intuitive (via feedback).
* **Active Use**: 70% of users apply filters weekly (tracked via Supabase logs).
* **Performance**: Loads in <2 seconds for 1-year queries (per the\_prd\_doc.docx).
* **Accuracy**: Metrics match evaluations table 100%.
* **Coverage**: Supports all 4 countries, 4 indicators, 4 models (per the\_prd\_doc.docx).
* **Reliability**: 99.5% uptime, with ingested\_at timestamps ensuring freshness.

**7. Risks & Safeguards: Keeping the Stars Aligned**

* **Risk**: Incomplete taxonomy mappings (12/16 stored, per progress\_so\_far.docx).
  + **Safeguard**: Display “Pending Mapping” warnings in Pipeline (using diagnose\_taxonomy\_mappings.sql).
* **Risk**: Data latency slowing updates.
  + **Safeguard**: Cache data in Redis (per global\_pulse\_doc.docx); show “Last Updated” timestamps.
* **Risk**: Overwhelming users with metrics.
  + **Safeguard**: Default to high-level visuals (e.g., Composite Score); hide details behind clicks.
* **Risk**: Inappropriate visuals for sparse data.
  + **Safeguard**: Logic selects charts based on data density; users can switch to tables.
* **Risk**: Security of anon key in frontend.
  + **Safeguard**: Verify RLS policies restrict to read-only (per progress\_so\_far.docx).

**8. Future Horizons: Expanding the Observatory**

* **More Galaxies**: Scale to 10 countries and add indicators (e.g., Sentiment) within 6 months (per global\_pulse\_doc.docx).
* **Live Signals**: Real-time notifications for new forecasts or pipeline issues.
* **Deeper Analysis**: Support multi-vintage scoring (first-release vs. latest, per global\_pulse\_doc.docx).
* **Enhanced Visuals**: Add animations (e.g., pulsing orbs for real-time updates).

**9. Why This App Captivates**

GlobalPulse is a cosmic observatory where economic data shines like stars. The Home page sets the pulse, Explorer zooms into galaxies, Trends unravels histories, Leaderboard crowns oracles, Pipeline forges trust, and Profile personalizes the journey. Built on a lean, model-agnostic foundation, it delivers neutral, reproducible insights that inspire economists, policymakers, and analysts to navigate the economic cosmos with confidence and wonder.