Track 2 – Climate and Compass

1. AI-Driven Destination Management & Invisible Crowd Control Platform

Explanation:

Provide tourism authorities and destination management organizations with an AI-driven platform that predicts and mitigates over-tourism without intrusive controls. The system forecasts crowd surges days in advance by analyzing historical footfall, weather patterns, seasonal trends, and public holidays, enabling proactive load balancing across attractions and preservation of heritage sites.

Scenario:

Popular tourist destinations experience unpredictable crowd spikes that degrade visitor experience and accelerate environmental and cultural damage. The AI platform continuously analyzes multi-source data to anticipate congestion at key locations and dynamically recommends optimal visit windows or alternative routes and lesser-known attractions to stakeholders, tour operators, and digital information channels—without restricting visitor movement.

Example Output:

Input:

Historical visitor footfall data across 120 tourist sites, real-time weather feeds, seasonal calendars, and public holiday schedules.

Output:

- "Attraction-ID 17: Predicted crowd saturation at 92% capacity on Saturday between 11 AM–3 PM."
- "Load Redistribution Recommendation: Redirect 28% of visitors to nearby Site-ID 44 and Site-ID 51."
- "Hidden Route Insight: Alternative heritage trail projected to remain under 45% capacity."
- "Preservation Alert: Repeated overcapacity detected—temporary demand throttling advised."

2. AI-Driven Tourism Agent Planner & Dynamic Itinerary Management Platform

Explanation:

Provide tourism service providers and travel platforms with an AI-driven Tourism Agent Planner that generates **day-wise, time-aware, and bookable itineraries** tailored to each traveler. The system analyzes user-provided inputs such as travel dates, preferred stay type, daily timing constraints, budget range, and interests to determine **when to go, where to go, how long to stay, and what to book**—optimizing the entire travel plan at a granular level.

Scenario:

Travelers plan trips with vague preferences but face fragmented decisions around accommodation, daily schedules, attractions, and bookings. The AI platform consolidates these inputs into a unified itinerary, allocating optimal time slots for travel, sightseeing, rest, and stays. The system dynamically adjusts the plan based on real-world factors such as weather changes, delays, or availability, ensuring the itinerary remains practical and executable for each day of the trip.

Example Output:

Input:

User travel inputs including destination, trip duration (5 days), daily availability windows, accommodation preference, budget limits, and interest categories.

Output:

- "Day 2 Plan: 9:00–11:30 AM — Heritage site visit (low crowd window); 12:00 PM — lunch near stay location."
- "Stay Optimization: Hotel selected within 1.2 km of major attractions—travel time reduced by 35%."
- "Booking Insight: Best price window detected for Day 4 activity—booking recommended within next 6 hours."
- "Schedule Adjustment: Rain forecast detected—outdoor activity shifted to Day 5; museum visit scheduled for Day 3 afternoon."

3. Sustainable Travel Carbon Tracking & Green Decision Intelligence Platform

Explanation:

Provide travelers, travel platforms, and tourism stakeholders with a carbon impact intelligence system that calculates the **granular carbon footprint** of travel-related decisions—including transportation, accommodation, and food choices—at the time of planning or booking. The platform enables users to understand environmental impact in real time and supports informed, lower-carbon alternatives with verified offset options.

Scenario:

Travelers plan trips without clear visibility into the environmental consequences of flights, hotel stays, or daily activities. The system integrates into booking workflows via a browser extension or API, analyzing each item in a travel cart to compute carbon emissions. It then presents greener alternatives—such as lower-emission transport modes or eco-certified stays—allowing sustainability-aware choices without disrupting the booking experience.

Example Output:

Input:

Travel booking cart containing flight selection, hotel reservation, and daily meal/activity plans.

Output:

- "Flight Emissions: Route emits 320 kg CO_2—alternative train option emits 74 kg CO_2."
- "Stay Impact: Selected hotel rated high carbon intensity; eco-certified alternative reduces footprint by 28%."
- "Daily Footprint Summary: Estimated trip emissions—1.12 tons CO_2 over 6 days."
- "Offset Recommendation: Verified offset option available to neutralize 100% of trip emissions."

4. AI-Based Urban Flood Nowcasting & Rapid Risk Intelligence Platform

Explanation:

Provide city authorities and disaster management agencies with an AI-driven flood nowcasting platform designed for dense urban environments. The system combines real-time satellite radar data (SAR) with social media–based distress signal analysis to generate **street-level flood risk maps** and short-term flood predictions with a **15-minute lead time**, enabling faster and more localized emergency response.

Scenario:

Urban areas experience sudden flash floods where traditional hydrological models fail due to latency and coarse spatial resolution. The platform continuously ingests SAR satellite feeds to detect surface water expansion while simultaneously analyzing social media streams for flood-related SOS keywords and geotagged distress signals. AI models fuse these signals to produce near real-time flood intensity maps and trigger automated alerts for affected zones.

Example Output:

Input:

- Live SAR satellite imagery over metropolitan areas
- Real-time social media posts containing flood-related keywords and geolocation metadata

Output:

- "Zone C – Street-Level Alert: High flood probability (>85%) predicted within next 15 minutes."
- "SOS Signal Spike: 47 flood-related distress posts detected within 1.2 km radius."
- "Risk Map Update: Water accumulation expanding along low-lying road corridors."
- "Emergency Alert Triggered: SMS notifications dispatched to 3,200 residents in affected blocks."

5. Scope 3 Emissions Auto-Accounting & ESG Intelligence Platform

Explanation:

Provide enterprises with an AI-driven Scope 3 emissions accounting platform that automatically extracts, standardizes, and aggregates indirect emissions data from supplier documents. The system uses NLP-based document parsing to analyze invoices, sustainability disclosures, and annual reports, transforming unstructured data into a unified, auditable dataset for ESG reporting and compliance.

Scenario:

Large organizations rely on hundreds of suppliers, making Scope 3 emissions tracking fragmented, manual, and error-prone. The platform ingests supplier documents across formats (PDFs, scans, spreadsheets), extracts relevant emissions and activity metrics, normalizes them against reporting standards, and consolidates the results into a centralized ESG dashboard—enabling continuous Scope 3 visibility without manual data collection.

Example Output:

Input:

Supplier invoices, procurement records, and sustainability reports from 300 vendors across multiple regions.

Output:

- "Supplier-ID 118: Estimated Scope 3 emissions—1,420 tCO_2e (logistics and raw materials)."
- "Data Standardization Alert: Emissions units normalized from kg CO_2 to tCO_2e for reporting."
- "Coverage Insight: 74% of supplier emissions data auto-extracted without manual intervention."
- "ESG Dashboard Update: Scope 3 emissions contribute 62% of total corporate carbon footprint."

6. Automated Post-Disaster Infrastructure Damage Assessment Platform

Explanation:

Provide disaster management authorities and emergency response agencies with an AI-driven damage assessment platform that rapidly evaluates infrastructure safety after natural disasters. The system compares pre- and post-event satellite or drone imagery to detect structural changes and classify buildings and roads by damage severity—enabling faster situational awareness and prioritized rescue planning.

Scenario:

Following earthquakes, hurricanes, or floods, first responders struggle to identify safe routes and assess structural damage due to delayed manual inspections. The AI platform ingests recent post-disaster imagery and aligns it with historical baseline data to automatically detect changes in infrastructure integrity. Damage classifications are visualized on geospatial maps to guide rescue teams, logistics planning, and recovery operations.

Example Output:

Input:

Pre-disaster and post-disaster satellite/drone imagery covering 250 sq. km of affected urban and semi-urban regions.

Output:

- "Building-ID 771 classified as Destroyed—roof collapse and structural displacement detected."
- "Road Segment R-204 marked Damaged—surface deformation detected; avoid heavy vehicle routing."
- "Rescue Route Priority: 3 intact corridors identified for emergency vehicle access."
- "Damage Summary: 18% infrastructure destroyed, 27% damaged, 55% intact within assessed zone."

7. AI-Based Shipping Route Fuel Optimization & Emissions Reduction Platform

Explanation:

Provide maritime operators and logistics companies with an AI-driven route optimization platform that minimizes fuel consumption and carbon emissions. The system uses optimization algorithms to evaluate real-time ocean currents, wind speed, and wave height, generating **fuel-efficient shipping routes** that outperform traditional shortest-distance navigation—directly reducing operational costs and environmental impact.

Scenario:

Cargo vessels typically follow distance-optimized routes without accounting for dynamic ocean conditions, leading to unnecessary fuel burn and higher emissions. The AI platform continuously ingests live oceanographic and weather data to compute optimal voyage paths that balance safety, time, and fuel efficiency. These recommendations integrate into fleet management and navigation systems, enabling shipping operators to cut emissions without disrupting delivery schedules.

Example Output:

Input:

- Planned voyage route between two ports
- Real-time ocean current data, wind forecasts, and wave height measurements

Output:

- "Optimized Route Generated: Fuel consumption reduced by 8.2% compared to shortest-path navigation."
- "Weather Impact Adjustment: Strong headwinds avoided by rerouting 120 nautical miles south."
- "Emissions Report: Estimated CO_2 reduction—142 tons for this voyage."
- "Operational Insight: Arrival time maintained within ±1.5 hours while improving fuel efficiency."

8. Automated Coral Reef Health Monitoring & Bleaching Detection Platform

Explanation:

Provide marine conservation agencies and environmental researchers with an AI-driven reef monitoring platform that uses underwater computer vision to assess coral health at scale. The system analyzes video feeds from Autonomous Underwater Vehicles (AUVs) to identify coral species and detect early signs of **coral bleaching**, enabling continuous, data-driven reef conservation.

Scenario:

Marine ecosystems span vast underwater regions that cannot be monitored effectively by human divers alone. The platform processes underwater video streams captured by AUVs, automatically classifying coral types and detecting visual stress indicators such as color loss and tissue degradation. Over time, the system aggregates these observations into spatial and temporal reef health maps, helping conservation teams identify high-risk zones and measure the impact of climate stressors.

Example Output:

Input:

Underwater video feeds from AUV surveys across 40 sq. km of coral reef regions collected over multiple months.

Output:

- "Reef-Zone 12: Bleaching probability increased to 68% over last 30 days."
- "Species Detection: Acropora coral identified with visible color degradation."
- "Health Trend Map: 22% of monitored reef area classified as high-stress zone."
- "Conservation Alert: Early bleaching indicators detected—field inspection recommended."