AI Co-Innovation Program برنامج الابتكار المشترك للذكاء الاصطناعي

Roads & Ports Traffic Flow Optimization

1. **Challenge Description**: How on country-level we can leverage artificial intelligence and real-time data to optimize inbound and outbound traffic flow to and from ports and logistics zones (e.g. in airports), in order to maximize capacity utilization, reduce wait times, and eliminate operational bottlenecks?

   Context: Traffic congestion at key logistics nodes — particularly ports, dry ports, and surrounding industrial zones — could result in delayed shipments, and underutilized infrastructure. By leverage AI and applying predictive modeling, AI-based traffic control, and dynamic rerouting considering each logistic zone capacity and real-time status, we can build smarter logistics corridors.

2. **Available Data Types**:
   - **Logisti Platform** provides multiple logistics services including a navigation traffic map and information that is important for investors about shipping lines for import and export, port details, businesses, shipping costs, and other services that help the investor journey be more convenient (Link)
   - **GASTAT:** reports regarding the inbound and outbound for international trade (Link)
   - **GACA:** air traffic report by the General Authority for Civil Aviation (Link)
   - **Saudi Open Data Platform :** contains datasets that are relevant to the challenge such as roads traffic, import and exports data. Example can be found here: (Link).
   - **Daleel platform:** centralized digital gateway designed to support investors, entrepreneurs, and stakeholders across strategic sectors including **logistics**, while provides an “industrial map (Link)” to showcase key information per logistic hub/zone. (Link)

3. **Expected Outcomes**:
   a) **Operational efficiency:** reduction in average wait time at ports and logistics zones (e.g truck turnaround times, vessel unloading time, container handling time) and cargo processing.
   b) **Capacity Utilization and Infrastructure ROI:** *Increased utilization rate* of available yard, gate, and road infrastructure. *Better asset allocation* across peak and off-peak hours using demand forecasting. *Defer costly expansions* by extracting more value from existing infrastructure.
   c) **Predictive and Proactive Traffic Management:** *Accurate traffic prediction* (inbound trucks, cargo load, vessel arrival clustering). *Providing dynamic rerouting* and scheduling based on real-time port & dry port capacities.
   d) **Continuous tracking of the cargo**

4. **Constraints & Requirements**:
   - **Key Constraint:**
     - Capacity per logistic zone/port. (link 1) (link 2) (Link 3) (Link 4) (Link 5)
     - **Truck ban by MOI:** The Transport General Authority in partnership with stakeholders has launched a service to regulate and organize the flow of trucks, to reduce congestion of trucks at entrances during the ban time from entering cities to prevent their quantity at city entrances. Certain cargo can take exception: pay certain fees to enter the city despite truck ban.\lb

   Targets:
   - Seaports:
     - 40 million standard containers for goods handling across Saudi ports by 2030.
     - 70% ports utilization
   - Airports:
     - Increase air cargo volume to 4.5 million tons by 2030.
   - Logistics:
     - Improving the Kingdom's ranking in the Logistics Performance Index (LPI) from 55th to the top 10.

   Info - reading materials: National Aviation Strategy Brief, National Transport and Logistics Strategy Brief, NIDLP Annual Report 2023

5. **Potential Impact**:
    - Position the Kingdom as a global logistics hub through faster, smarter cargo handling, and contribute to advance its LPI index ranking.
    - Attract more international shipping lines, investors, and trade due to efficient port operations.
    - Increase efficiency and capacity utilization
    - Reduce wait times and congestion through optimized scheduling, handling and routing
    - Enhanced supply chain reliability through proactively predicting congestion or disruptions.