Abstract
Customs processes are of critical interest to governments due to their trade and national security significance. However, current manual processes overseeing customs operations can miss risky trade and declaration profiles potentially putting nations and their trade apparatus at huge risk. Continuously learning Intelligent Customs Solutions powered by AI/ML can help customs experts zero in on the high risk profiles while continuously managing all trade movements without fail and getting better with their predictions over time.
Understanding the Unique Challenges Faced by the Customs World

Revenue Leakages

- Undervaluation of goods
- Wrong tariff classification
- Smuggling high tax goods
- Falsify documents

In 2017, one of the Asian countries alone lost $205 million in uncollected taxes, while goods worth $180 million were smuggled, which impacts country GDP.

National security & threats

- Narcotics and drug trafficking
- Static risk profiling
- Security threats & illegal activities
- Cooperation between stakeholders

As goods are exchanged as part of the trade between nations, the growing cargo traffic almost always involves several issues and challenges related to customs duties, norms, and processes. The processes have become more intricate as different countries have different customs thresholds and structures while many have specific agreements with their top trading partners. Monitoring cargo movement and the associated documents manually is no longer feasible if the departments want to reduce leakage and stem illegal movement.

Traders sometimes adopt questionable practices with regard to their documents, tariff classification or goods valuation in order to reduce the duty and tax assessments, or escape inspections by the government of restricted items that require licenses and additional supporting information.

With growing global trade, it’s not practical for customs authorities to constantly monitor the accuracy of commodity declarations to predict risky profiles for further examination.

As per the existing manual systems, risk profiling is static where customs experts spend most of their time on adding/updating business rules, identifying classifications by reviewing, verifying user requests, and charge calculations and collections, instead of focusing on challenging classifications that carry the maximum risk.
Intelligent Systems Make a Huge Difference in Improving Decision-making

Machine Learning helps create intelligent machines that work and react like humans at higher accuracy and efficiency than humans themselves. Intelligent customs solutions powered by AI-Machine Learning offer consistency, efficiency, and accuracy and are being embraced by the customs organizations around the world. These intelligent solutions play a significant role in evaluating risks, monitoring commodity declarations, shrinking the customs cycle and identifying the fraudulent cases intelligently. They continue to learn and their predictions get better with time.

Phase 1: Learning

- **TRAINING DATA**
  - Normalization
  - Dimension reduction
  - Image processing etc.

- **LEARNING**
  - Supervised
  - Unsupervised

- **ERROR ANALYSIS**
  - Precision/recall
  - Over fitting
  - Test/cross validation data, etc.

Phase 2: Prediction

- **Model**
- **Now Data**
- **Prediction**
- **Predicted Data**

Machine Learning Process Flow

**SOURCES**
- Historical data
- Media input
- Legacy systems
- 3rd Party subs
- International law enforcement

Feed from various systems

**Intelligent Customs**
- Customers experts or authorities
- Feedback to existing business rules

**Output**
- New business rules

**POSITIVE EXTERNALITIES**
- PORT AUTHORITIES
- SHIPPING AGENTS

Functional Architecture
**Scope of an Intelligent Customs (IC) Solution**

IC solutions are dynamic risk profiling solutions powered by Artificial Intelligence/Machine learning capabilities and pinpoint risky declarations by using intelligent algorithms and predictive modeling based on target data elements, feeds, patterns and historical data with declared HS codes. IC solutions also help organizations in supplementing existing business rules with newer rules to validate the declarations better. Implementing intelligent solutions for customs authorities can minimize their routine tasks and help them prioritize the most critical work instead. They assist authorities in improving process efficiency based on dynamic risk profiling, generating higher revenue and assisting the customs experts to focus on red indicator profiles which require their attention.

The Declaration Management module, for example, provides a mechanism to fill and upload transactions, gathers necessary documents based on world customs organization standard format, and facilitates exchange of trade-related documents, where duties and taxes are recorded, and calculated based on pre-defined rules, while functioning in all modes of shipment. Filling incorrect harmonized system (HS) classifications intentionally or unintentionally by any entity, in some countries may subject them to criminal punishment.
Learn the system by dynamic risk profiling and auto adding of business rules. Classifying the declarations by indicators with three color flags (RED, AMBER, GREEN).

- **Green Flag** (Low category) requires no attention and is not liable for more duties and taxes, and doesn’t require any more explanations.
- **AMBER** (Medium category) may or may not require any attention
- **RED** (High category) requires attention, chances of rejection is high

**Assumptions**

- We have taken a basic use case of identifying risky profiles after declaration of goods from shipper/agency/importer/exporter based on our understanding of various challenges from the customs domain.
- System efficiency improves as systems mature over a specific time period.

**Indicative Patterns for Identifying Risky Profiles**

1. Use existing business rules, historical data, matching of declarations with similar declarations, and how indicators are handled in the past, feed from various systems (Social media like twitter, Facebook, Instagram, News channels or apps, legacy systems, Lords of London, WCO, watch lists, and various international drug agencies partners like CARICC, EMCDDA, INCB, etc.).

2. Other pre-defined predictions
   - New agency user trust level
   - Route-based predictions
   - For existing users, historical preferences from past transactions
   - Goods or shipper rejected earlier with reason codes

**Business Benefits**

- Increase operational efficiency saving authority time
- Eliminates human error
- Increase Govt. revenue
- Increase accuracy of risky declarations
- Accelerate validation process
The NIIT Technologies Thought Board:
Transforming Processes for Customs through Smart Digitization

What are the unique challenges affecting the Customs world?

- Falsified Documents
- Illegal trade and Smuggling
- National Security Threats
- Trade Tariff Exceptions
- Revenue Leakage

What are the top issues with current solutions?

- Continuous Monitoring
- Accurate Risk Profile Prediction
- Continuous Learning
- Assisting Experts with Critical Issues
- Managing all declarations

How does 3-D Test and QA framework stand out?

- Increase Operational Efficiency
- Eliminate Human Error
- Accelerate Validation
- Increase Declaration Accuracy
- Enhance Government Revenue
Intelligent Customs Solutions Completely Change the Equation for Customs Agents

Typically, government systems exhibit the most inertia in the face of even the strongest winds of change. However, ironically, any transformation of their processes and systems can have the maximum return. Customs processes and tariffs assume critical significance as global trade grows whose norms are not always straightforward. It is especially so in light of exceptions due to several multi-lateral agreements that exist to minimize the costs of trade through favorable tariffs. In such an environment, manual monitoring of trade borders to flawlessly identify and address risky or illegal trade is just not going to be enough. Intelligent Customs Solutions powered by AI/ML can systematically collate, analyze and identify riskier profiles more efficiently than any human agent can. This leaves the agents more time to focus on issues that require their maximum attention while enhancing government revenue, enhancing efficiency and reducing errors.

About the Author

Mohit Kumar is a Business Solution Specialist working within NIIT Technologies’ Travel & Transportation domain. With over 10 years relevant experience as a business analyst and product manager in diversified domains, SaaS and cloud-based technologies, he has helped customers in their digital transformational journey by providing integrated vertical-specific solutions and developing domain-specific business use cases by analyzing upcoming technology and trends.