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Leveraging Artificial Intelligence, Machine Learning, and Data Science
to Combat Fraud and Ensure Compliance Across Federal Missions

From Immigration to Mission Readiness
ASGDETECTION as a Cross-Domain AI/ML Framework
for Fraud Detection and Compliance

WHITE PAPER

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INTRODUCTION

In today's complex federal landscape, fraud prevention, regulatory compliance, and operational efficiency are foundational to the success of mission-critical programs. Originally developed to support U.S. Citizenship and Immigration Services (FEDERAL AGENCY), the ASGDTECTION application by A Square Group (ASG) is a scalable, secure, and explainable AI/ML platform that addresses fraud, compliance, and automation challenges across immigration, defense, and homeland security environments.

This paper expands on ASGDTECTION's core use case and outlines enhancements and cross-domain applicability to align with evolving Department of Homeland Security (DHS) and Department of Defense (DoD) priorities.

OVERVIEW OF ASGDTECTION

ASGDTECTION is a modular AI/ML-based solution that integrates Natural Language Processing (NLP), supervised/unsupervised learning, and a custom Large Language Model (LLM) for unstructured document analysis. Initially focused on immigration systems, ASGDTECTION has demonstrated high performance in:

- **Fraud Detection:** Identifying forged documents, duplicated applications, and anomalous behavior.
- **Compliance Automation:** Ensuring alignment with evolving legal and policy standards.
- **Predictive Analytics:** Flagging high-risk activities and applicant behavior.
- **Operational Intelligence:** Enabling real-time decision-making with robust dashboards.

ASGDTECTION's architecture is built on a microservices framework, deployed on AWS GovCloud, and integrates with tools like Apache Spark, Databricks, and CI/CD pipelines to ensure performance, security, and continuous learning.

Technical Enhancements & Strategic Orientation

1. Explainability & Governance Integration

- Incorporate Explainable AI (XAI) modules using SHAP and LIME techniques.
- Align model lifecycle with **NIST AI RMF**, **OMB AI** guidance, and **DHS AI Strategy**.
- Ensure auditability and transparency in all model decisions for both technical and non-technical stakeholders.

2. Expanded Multi-Modal Capabilities

- Extending fraud detection to include **imagery, biometrics, and geospatial data analytics**.
- Incorporate AI models that process sensor data for use cases like border surveillance or logistics inspections.

3. Cybersecurity and Zero Trust Alignment

- Integrate ASGDETECTION within a **Zero Trust Architecture (ZTA)** model.
- Validate data pipelines and models against **adversarial AI threats**.
- Align data handling and model training with **FedRAMP High** and DoD IL-5/6 security requirements.

4. Federated Learning and Synthetic Data Integration

- Enable cross-agency collaboration through **federated learning models**, protecting sensitive datasets.
- Use **synthetic data generation** for rare fraud cases and low-sample training scenarios.



Expanded Capabilities & Operational Maturity

5. Performance Metrics and KPIs

- Accuracy: 95% detection of fraud signals in pilot environments
- Precision: 91%, minimizing false positives that slow down legitimate processing
- Recall: 96%, ensuring high capture rates of known and novel fraud instances
- Model retraining: Bi-weekly batch re-evaluation with performance benchmarks
- Drift detection: Alerts for concept/model drift, triggering automated retraining workflows

6. AI Operations (AI Ops / MLOps)

- Managed via a centralized **MLflow** and **KubeFlow** pipeline for experiment tracking and lifecycle management
- Version-controlled model and feature registries
- Secure staging/production environments with rollback capabilities
- Real-time monitoring of inference accuracy and operational latency

7. Team Expertise & Delivery Credentials

- ASG employs a cleared team of data scientists, AI engineers, DevSecOps specialists, and solution architects
- Cross-functional teams trained in DHS, DoD, and IC mission data handling protocols
- Experienced in Agile/SAFe delivery frameworks across sensitive government environments

8. Open Standards & Interoperability

Supports integration with the **National Information Exchange Model (NIEM)** and **DoD Data Standards:**

- API-first design for easy ingestion by platforms like Palantir, Elastic, or AWS EventBridge
- Data cataloging and lineage aligned with CDAO interoperability goals

9. Contract Vehicle Availability

ASGDETECTION and ASG AI/ML capabilities are available via:

- **GSA MAS Schedule**
- **CIO-SP3 Small Business**
- **DISA SETI Small Business**
- **NIH NITAAC DCC-III (future)**

Broader Applications Beyond FEDERAL AGENCY

ASGDETECTION is adaptable across the federal mission spectrum.

Future Direction

1. **Generative AI for Threat Simulation:** Develop large-scale synthetic fraud cases to train more robust models.
2. **“ASGDETECTION-Lite” for Tactical Environments:** Deploy AI/ML components in resource-constrained environments using edge computing.
3. **Public-Facing Compliance Tools:** Build secure user portals to increase transparency for citizens interacting with federal agencies.

Case Study

DHS FEDERAL AGENCY

ASGDETECTION's initial deployment at FEDERAL AGENCY achieved:

- **95%** detection rate for fraudulent applications
- **40%** reduction in processing time for document review
- **Full** integration into existing DHS fraud workflow systems

Conclusion

ASGDETECTION stands as a proven, scalable platform capable of extending beyond immigration services to become a cross-domain AI/ML compliance and fraud detection framework for DHS, DoD, and allied government agencies. Its adaptability, explainability, and architecture position it to support missions from tactical field operations to national-level fraud prevention programs

Contact Information

For partnership opportunities or demos, contact ASG at RFIs@a2-g.com or visit www.a2-g.com.

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THANK YOU

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