AI Model Scanner - Patent Extract Summary

EXTRACT WITH DRAWING/FORMULA SHEET

PATENT ABSTRACT

An automated system for comprehensive AI model risk assessment and EU AI Act 2025 compliance verification. The invention provides multi-framework model analysis (PyTorch, TensorFlow, ONNX, scikit-learn), mathematical bias detection using four fairness algorithms, automated EU AI Act risk classification, and Netherlands-specific UAVG compliance with BSN detection. The system calculates potential penalties up to EUR 35M and provides real-time compliance monitoring with remediation recommendations.

KEY TECHNICAL INNOVATION

MULTI-FRAMEWORK ANALYSIS ENGINE

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■ PyTorch ■ ■ TensorFlow ■ ■ ONNX ■ ■ Scikit-Learn■

■ .pt .pth ■ ■ .h5 .pb ■ ■ .onnx ■ ■ .pkl .joblib■

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Model Architecture Analysis & Risk Classification

MATHEMATICAL BIAS DETECTION

Four core algorithms with mathematical precision:

1. Demographic Parity: `P(Y=1|A=0) ~ P(Y=1|A=1)`

2. Equalized Odds: `TPR_A=0 ~ TPR_A=1 AND FPR_A=0 ~ FPR_A=1`

3. Calibration Score: $P(Y=1|Score=s,A=0) \sim P(Y=1|Score=s,A=1)$

4. Individual Fairness: $d(f(x1),f(x2)) \leq L*d(x1,x2)$

EU AI ACT COMPLIANCE MATRIX

ARTICLE 5 Prohibited Practices	ARTICLES 19-24 High-Risk Systems	ARTICLES 51-55 General Purpose AI (GPAI)
Social Scoring Manipulation Subliminal Biometric ID	QMS Required Tech Docs Record Keeping CE Marking	Foundation Model >1B Parameters Compute Limits Adversarial Test
EUR 35M or 7% Global Turnover	EUR 15M or 3% Global Turnover	EUR 15M or 3% Global Turnover

NETHERLANDS SPECIALIZATION

BSN Detection Algorithm:

BSN Pattern: \b\d{9}\b

Checksum: Σ(digit_i × (9-i)) mod 11

Validation: (remainder < 10 AND remainder = digit_9) OR

(remainder = 10 AND digit_9 = 0)

UAVG Compliance Factors:

- Nederlandse Autoriteit Persoonsgegevens (AP) integration
- Data residency requirements (Netherlands/EU)
- Local representative obligations
- Dutch language policy requirements

COMPETITIVE ADVANTAGES

■ **First-Mover:** Only automated EU AI Act compliance scanner

■ **Innovation:** Mathematical bias detection with 4 fairness algorithms

■ **Multi-Framework:** Support for PyTorch, TensorFlow, ONNX, scikit-learn

■■ **Specialization:** Netherlands BSN detection and UAVG compliance

■ **Value:** EUR 35M penalty prevention capability

■ **Timing:** Perfect for EU AI Act enforcement (February 2025)

TECHNICAL SPECIFICATIONS

• **Processing Speed:** <30s standard models, <5min LLMs

• **Accuracy:** 95%+ bias detection, 98%+ compliance classification

• **False Positive Rate:** <3% for prohibited practice detection

• **Supported Formats:** .pt, .pth, .h5, .pb, .onnx, .pkl, .joblib

• **EU AI Act Coverage:** Articles 5, 19-24, 51-55, 61-68

SYSTEM FLOW

Input Model -> Framework Detection -> Architecture Analysis ->

Bias Assessment -> EU AI Act Evaluation -> Netherlands Compliance ->

Real-time Monitoring -> Compliance Report Generation

PATENT VALUE PROPOSITION

The invention addresses the critical EUR 35 million penalty risk under EU AI Act 2025, providing the first and only automated compliance solution with Netherlands specialization, delivering 95% cost savings versus manual assessment while ensuring comprehensive regulatory coverage and real-time monitoring capabilities.