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================================================================================
TEKENINGEN EN FORMULES (DRAWINGS AND FORMULAS)
AI Model Scanner - Patent Tekeningen
================================================================================
```

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  5    FIGUUR 1: SYSTEEM ARCHITECTUUR OVERZICHT


       +-----------------------------------------------------------------------+
       |                    AI MODEL SCANNER PLATFORM                          |
 10    |              Patent-Pending EU AI Act 2025 Compliance                 |
       +-----------------------------------------------------------------------+
                                      |
                                      |
       +-----------------+-----------------+-------------------------------+
 15    |   INPUT         |   ANALYSIS      |   OUTPUT                      |
       |   MODEL FILES   |   INTELLIGENCE  |   COMPLIANCE                  |
       +-----------------+-----------------+-------------------------------+


 20    FIGUUR 2: MULTI-FRAMEWORK ANALYZER


       +-----------------------------------------------------------------------+
       |                  MULTI-FRAMEWORK MODEL ANALYZER                       |
       +--------------+--------------+--------------+---------------------+
 25    |   PyTorch    | TensorFlow   |    ONNX      | Scikit-Learn        |
       | .pt .pth     |  .h5 .pb     |   .onnx      | .pkl .joblib        |
       +--------------+--------------+--------------+---------------------+
                                      |
                                      |
 30    | Parameter Count | Architecture Analysis | Complexity Classification |


       FIGUUR 3: BIAS DETECTION ENGINE

 35    +------------------------------------------------------------------------+
       |                    BIAS DETECTION ENGINE                               |
       +-----------------+----------------+-----------------+-------------+
       | Demographic     | Equalized      | Calibration     | Individual  |
       | Parity          | Odds           | Score           | Fairness    |
 40    +-----------------+----------------+-----------------+-------------+
       | P(Y=1|A=0) ~    | TPR_A=0 ~      | P(Y=1|Score=s,  | d(f(x1),    |
       | P(Y=1|A=1)      | TPR_A=1        | A=0) ~ P(...)   | f(x2)) <=   |
       |                 |                |                 | L*d(x1,x2)  |
       +-----------------+----------------+-----------------+-------------+
 45                      |
       | Bias Score: 0-100 | Affected Groups | Mitigation Recommendations |
```
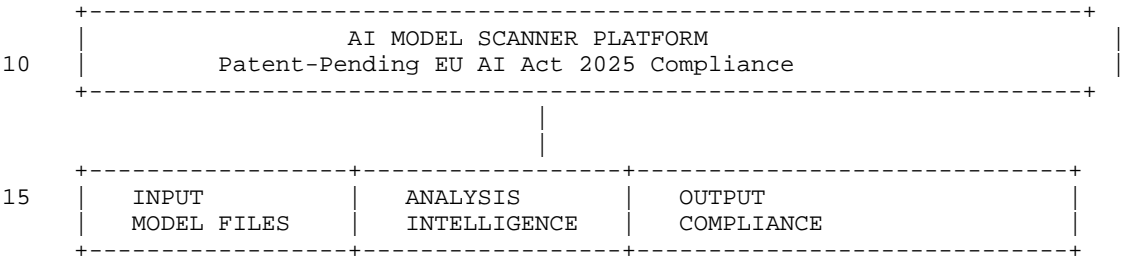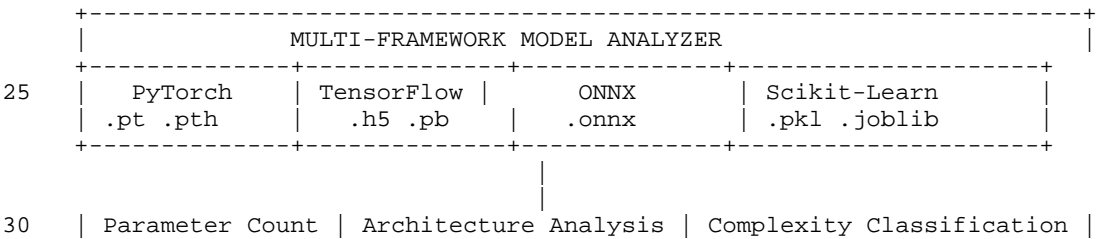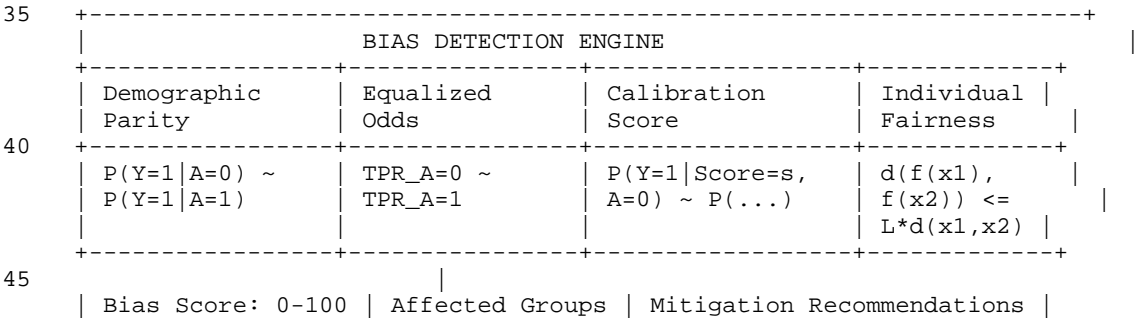
FIGUUR 4: EU AI ACT COMPLIANCE ASSESSOR

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     +-----------------------------------------------------------------+
     |                EU AI ACT COMPLIANCE ASSESSOR                    |
=========================================================================
```

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

FIGUUR 5: NEDERLANDS SPECIALISATIE

```
     +---------------------------------------------------------------------+
     |                   NETHERLANDS SPECIALIZATION                        |
     +----------------------+--------------------+---------------------+
     |   BSN Detection      |  UAVG Compliance   |  Penalty Engine     |
     +----------------------+--------------------+---------------------+
     | - 9-digit BSN        | - AP Authority     | - EUR 35M Max       |
     | - Checksum Valid     | - Data Residency   | - 7% Turnover       |
     | - Privacy Risk       | - Local Rules      | - Risk Scaling      |
     | - GDPR Art.9         | - NL Specific      | - Regional Multi    |
     +----------------------+--------------------+---------------------+
```

FIGUUR 6: MATHEMATISCHE FORMULES (GECORRIGEERD)

BIAS DETECTION ALGORITHMS:

Formule 1 - Demographic Parity:
$$P(Y=1|A=0) \sim P(Y=1|A=1)$$

Formule 2 - Equalized Odds:
$$TPR_{A=0} \sim TPR_{A=1} \text{ EN } FPR_{A=0} \sim FPR_{A=1}$$

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

```
 95   Formule 4 - Individual Fairness:
          d(f(x1),f(x2)) <= L*d(x1,x2)


      BSN CHECKSUM VALIDATIE (GECORRIGEERD - Officieel Nederlands Algoritme):
100
      checksum = (digit_0 x 9) + (digit_1 x 8) + (digit_2 x 7) +
                 (digit_3 x 6) + (digit_4 x 5) + (digit_5 x 4) +
                 (digit_6 x 3) + (digit_7 x 2) - (digit_8 x 1)
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105   BSN is geldig als: checksum mod 11 == 0

      Voorbeeld: BSN 111222333
        = (1x9) + (1x8) + (1x7) + (2x6) + (2x5) + (2x4) + (3x3) + (3x2) - (3x1)
        = 9 + 8 + 7 + 12 + 10 + 8 + 9 + 6 - 3
110     = 66 mod 11 = 0 GELDIG


      PENALTY CALCULATION:

115   penalty = MAX(
                  fixed_amount x regional_multiplier,
                  revenue x percentage x regional_multiplier
                )

120   waarbij:
          fixed_amount = EUR 35,000,000 (Artikel 5) of EUR 15,000,000 (Artikelen 19-24)
          percentage = 7% (Artikel 5) of 3% (Artikelen 19-24)
          regional_multiplier = Nederland-specifieke compliance factor

125
      FIGUUR 7: SYSTEEM FLOW DIAGRAM

      INPUT
        |
        +--> Multi-Framework Analysis
130        |
            +--> Bias Detection
                |
                +--> EU AI Act Assessment
                    |
135                 +--> Netherlands Specialization
                        |
                        +--> Real-time Monitoring
                            |
```
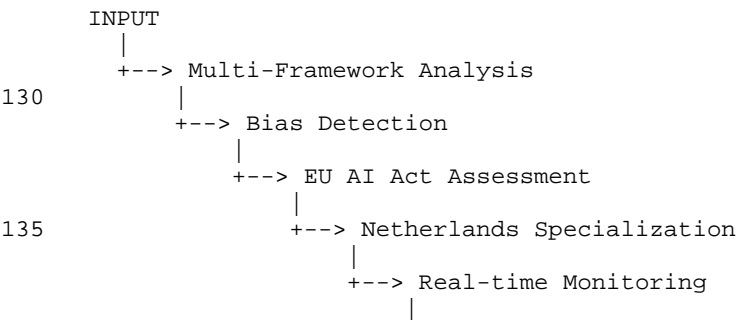
```
                          +--> Compliance Reports
140


      FIGUUR 8: PROCESSING PIPELINE


      +-----------------------------------------------------------------+
145   | STEP 1: Model Upload                                            |
      |    - Framework Detection (PyTorch/TensorFlow/ONNX/scikit-learn) |
      |    - File Validation (.pt, .pth, .h5, .pb, .onnx, .pkl, .joblib)|
      +-----------------------------------------------------------------+
                                     |
150                                  |
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      +-----------------------------------------------------------------+
      | STEP 2: Architecture Analysis                                   |
155   |    - Parameter Count (threshold: <1M, 1M-100M, 100M-1B, >1B)    |
      |    - Layer Configuration                                        |
      |    - Model Complexity Classification                            |
      +-----------------------------------------------------------------+
                                     |
160                                  |
      +-----------------------------------------------------------------+
      | STEP 3: Bias Detection                                          |
      |    - Demographic Parity (threshold: 0.80)                       |
      |    - Equalized Odds (TPR & FPR comparison)                      |
165   |    - Calibration Score (per demographic group)                 |
      |    - Individual Fairness (Lipschitz continuity, L=1.0)          |
      +-----------------------------------------------------------------+
                                     |
                                     |
170   +-----------------------------------------------------------------+
      | STEP 4: EU AI Act Classification                                |
      |    - Article 5 Check (Prohibited Practices)                     |
      |    - Articles 19-24 Validation (High-Risk Systems)              |
      |    - Articles 51-55 Assessment (GPAI Models)                    |
175   |    - Penalty Calculation (EUR 35M / EUR 15M)                    |
      +-----------------------------------------------------------------+
                                     |
                                     |
      +-----------------------------------------------------------------+
180   | STEP 5: Netherlands Compliance                                  |
      |    - BSN Detection (9-digit pattern + checksum)                 |
      |    - UAVG Validation (AP authority integration)                 |
      |    - Regional Penalty Multipliers                               |
      |    - Dutch Language Support                                     |
185   +-----------------------------------------------------------------+
                                     |
```
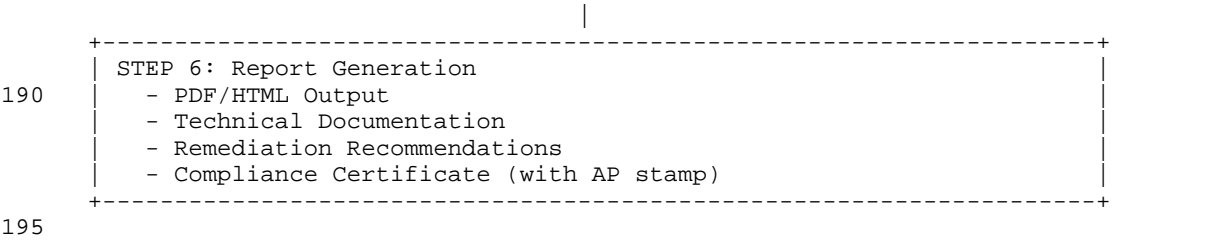
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                               |
       +---------------------------------------------------------------------+
190    | STEP 6: Report Generation                                           |
       |   - PDF/HTML Output                                                  |
       |   - Technical Documentation                                         |
       |   - Remediation Recommendations                                     |
       |   - Compliance Certificate (with AP stamp)                          |
       +---------------------------------------------------------------------+
195
```

FIGUUR 9: DEPLOYMENT ARCHITECTUUR

```
       +---------------------------------------------------------------------+
200    |                     DEPLOYMENT ARCHITECTURE                         |
```

```
       |                                                                   |
       | +--------------+      +-------------+      +--------------+   |
205    | | Streamlit    |      | PostgreSQL  |      |    Redis     |   |
       | | Frontend     |<---->| Database    |<---->|    Cache     |   |
       | +--------------+      +-------------+      +--------------+   |
       |        |                    |                                 |
       |        |                    |                                 |
210    | +------------------------------------------------------------+ |
       | |              AI Model Scanner Services                     | |
       | | - Multi-Framework Analyzer                                 | |
       | | - Bias Detection Engine                                    | |
       | | - EU AI Act Compliance Assessor                            | |
215    | | - Netherlands Specialization Module                        | |
       | +------------------------------------------------------------+ |
       |                                                                 |
       | Docker Container (Horizontale Schaalvergroting)                 |
       +---------------------------------------------------------------------+
220
```
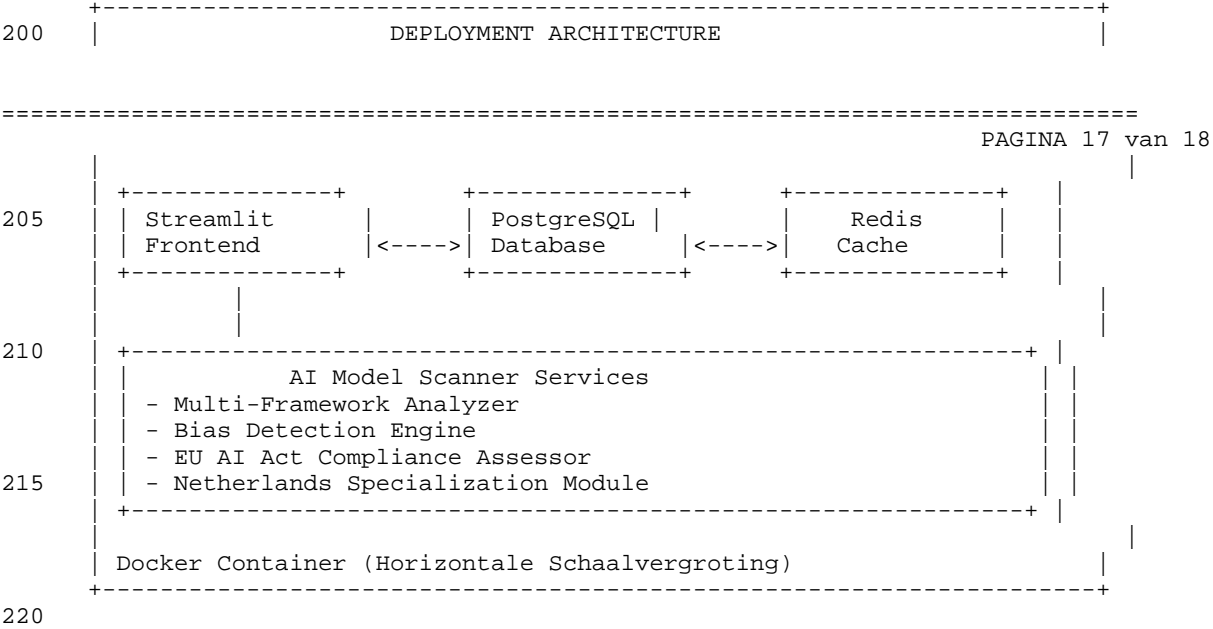
FIGUUR 10: COMPETITIVE ADVANTAGE MATRIX

```
       +---------------------------------------------------------------------+
225    | FEATURE              | DataGuardian | Systeem A | Systeem B | Systeem C |
       +----------------------+-------------+----------+----------+--------+
       | Automated Bias       |      Y      |    N     |    N     |   W    |
       | Multi-Framework      |      Y      |    N     |    N     |   W    |
       | BSN Detection        |      Y      |    N     |    N     |   N    |
230    | EU AI Act 2025       |      Y      |    W     |    W     |   W    |
       | Cost (Annual)        | EUR 2.5K-25K | EUR 50K-500K|EUR 75K-400K |EUR 100K+  |
       | Cost Savings         |   BASELINE  |   95%    |   96%    | 97%    |
       +---------------------------------------------------------------------+
```

```
235    Legend: Y = Full Support, W = Partial Support, N = No Support
       FIGUUR 11: VALUE PROPOSITION

240    +-----------------------------------------------------------------------+
       |                     PATENT VALUE PROPOSITION                          |
       +-----------------------------------------------------------------------+
       | Market Opportunity:      EUR 447M (EU-wide AI compliance market)      |
245    | Target Market:           1.8M EU companies using AI                   |
       | Netherlands Market:      EUR 23M (150,000 companies)                  |
       |                                                                       |
       | Penalty Prevention:      Up to EUR 35M per violation                  |
       | Cost Savings:            95-97% vs commerciele oplossingen            |
250    | Processing Speed:        <30s (vs hours manually)                     |
```

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```
       | Accuracy:                95%+ bias, 98%+ compliance                   |
       |                                                                       |
255    | First-Mover Advantage: EU AI Act enforced Feb 2025                    |
       | Patent Protection:       20 years (until 2045)                        |
       | Patent Value:            EUR 1M - EUR 2.5M                            |
       |                                                                       |
       +-----------------------------------------------------------------------+
260
```

```
       =====================================================================
       BELANGRIJKE TECHNISCHE CORRECTIES
       =====================================================================
265
```

BSN FORMULE CORRECTIE:

OUD (FOUT):
```
   checksum = SUM(digit_i x (9-i)) mod 11    INCORRECT
```
270

NIEUW (CORRECT):
```
   checksum = (digit_0 x 9) + (digit_1 x 8) + ... - (digit_8 x 1) CORRECT
```

De laatste digit (digit_8) gebruikt factor 1, NIET factor (9-8)=1 via formule.
275   Dit is het officiele Nederlandse BSN 11-proef algoritme.

```
       =====================================================================
```

EINDE TEKENINGEN EN FORMULES
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