

DUCALTUS.

AI ASSURANCE. GOVERNANCE. REAL-WORLD IMPACT.

Ducaltus | AI Assurance & Governance

Operational assurance infrastructure and governance-aware deployment evaluation for high-stakes AI systems.

Operational AI Assurance Infrastructure

Ducaltus is an operational AI assurance and governance organisation focused on evaluating deployment readiness, subgroup reliability, governance-sensitive deployment conditions, and operational risk in high-stakes AI systems.

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About Ducaltus

Ducaltus develops operational assurance infrastructure and governance-aware deployment evaluation approaches for high-stakes AI systems operating within sensitive, operational, or decision-critical environments.

As AI systems increasingly influence real-world decisions, traditional evaluation approaches based solely on aggregate accuracy may fail to identify hidden subgroup disparities, operational instability, and deployment risk.

Ducaltus develops governance-aware assurance approaches designed to evaluate operational deployment conditions, threshold instability, subgroup variation, remediation progression, and deployment-state reliability.

Ducaltus draws upon ongoing research in:

- Operational AI deployment assurance
- Governance-aware deployment evaluation
- Fairness metric disagreement
- Subgroup reliability analysis
- Intersectional fairness evaluation
- Threshold instability analysis
- Deployment-state risk assessment
- Remediation-aware assurance workflows

Ducaltus operates at the intersection of operational assurance infrastructure, deployment governance, subgroup reliability evaluation, and governance-aware AI deployment systems.

Why AI Assurance Matters

High overall model accuracy does not necessarily indicate reliable or responsible deployment behaviour.

AI systems operating in real-world environments may exhibit:

- Hidden subgroup performance disparities
- Inconsistent fairness outcomes across evaluation metrics
- Unequal false positive and false negative impacts
- Threshold-sensitive deployment instability
- Operational risks within high-impact decision environments

These risks become increasingly significant in domains where automated decisions may carry legal, ethical, operational, or public-impact consequences.

Core Capabilities

Operational Assurance Infrastructure

Structured operational assurance evaluation designed to assess deployment readiness, governance-sensitive risk exposure, threshold instability, and operational deployment conditions.

Subgroup Reliability Evaluation

Analysis of subgroup disparities, threshold-sensitive behaviour, intersectional variation, and unequal operational reliability across demographic and deployment conditions.

Deployment Readiness Evaluation

Governance-aware evaluation of whether AI systems remain operationally suitable for deployment within sensitive, high-impact, or decision-critical environments.

Subgroup Reliability Analysis

Assessment of model behaviour beyond aggregate accuracy to identify hidden performance failures affecting specific populations or operational conditions.

Threshold & Error Trade-off Assessment

Evaluation of threshold-sensitive behaviour, false positive and false negative trade-offs, and operational instability under varying deployment conditions.

Governance Orchestration & Assurance Support

Support for governance-aware deployment evaluation, operational assurance reporting, reassessment workflows, remediation progression, and deployment governance processes.

Research & Methodology

Ducaltus builds upon ongoing research exploring operational AI assurance, governance-aware deployment evaluation, subgroup reliability, threshold instability, deployment-state uncertainty, and high-stakes AI system behaviour.

Fairness Metric Disagreement & FDI

Development of the Fairness Disagreement Index (FDI), designed to quantify disagreement between fairness metrics and evaluate the stability and reliability of fairness assessment itself.

Decision-Aware Deployment Risk

Research examining how fairness disagreement, subgroup instability, and threshold-sensitive behaviour influence deployment uncertainty and governance-sensitive operational AI deployment conditions.

Intersectional Fairness Evaluation

Governance-aware evaluation approaches focused on analysing subgroup reliability, threshold-sensitive behaviour, and deployment-relevant instability across intersecting demographic conditions.

High-Stakes AI Assurance

Governance-aware operational assurance approaches designed to evaluate whether AI systems remain suitable for deployment under conditions of subgroup variation, deployment instability, remediation requirements, and elevated operational risk.

Selected Research

Operational AI Deployment Assurance

Research introducing governance-aware operational assurance infrastructure, deployment-state evaluation, reassessment workflows, remediation-aware progression, and operational governance orchestration for high-stakes AI systems.

arXiv:

<https://arxiv.org/abs/2605.27827v1>

When Fairness Metrics Disagree

Research introducing the Fairness Disagreement Index (FDI) for analysing disagreement between fairness metrics and its implications for AI reliability assessment.

arXiv:

<https://arxiv.org/abs/2604.15038>

FairRisk-FDI

Research extending fairness disagreement analysis into governance-aware deployment risk evaluation, subgroup instability assessment, threshold-sensitive deployment behaviour, and operational AI deployment conditions.

Paper coming soon.

IFEM: Intersectional Fairness Evaluation

Research focused on intersectional subgroup reliability, threshold-sensitive fairness behaviour, deployment-relevant subgroup instability, and governance-aware evaluation in face recognition systems.

Paper coming soon.

Reliability & Risk in AI-Assisted Medication Systems

Research exploring reliability, decision risk, and failure modes in AI-assisted systems operating in sensitive decision environments.

arXiv:

<https://arxiv.org/abs/2604.01449>

Fairness in Law Enforcement Facial Recognition

Research focused on fairness, deployment considerations, and subgroup performance analysis in high-impact facial recognition systems.

arXiv:

<https://arxiv.org/abs/2603.28675>

Current Research Direction

Operational AI Deployment Assurance & Governance

Current work focuses on operational AI deployment assurance, governance-aware deployment evaluation, FairRisk-FDI, intersectional subgroup reliability, remediation-aware assurance workflows, and deployment-state governance for high-stakes AI systems.

Founder

Khalid Adnan Alsayed

Founder of Ducaltus, focused on operational AI assurance infrastructure, deployment governance, and high-stakes AI systems, including:

- Operational AI deployment assurance
 - Governance-aware deployment systems
 - Fairness metric disagreement
 - Subgroup reliability evaluation
 - Intersectional deployment risk
 - Deployment-state governance
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Academic Background

- BSc (Hons) Artificial Intelligence (First-Class)
 - Teesside University
 - FdSc Software Engineering (Distinction)
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Contact

Ducaltus

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