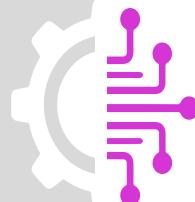


A3

SCIENCE and RESEARCH



A:CUBE



CONTENTS

WHO WE ARE

WHERE WE ARE

TEAM

WHY ACUBE

A3 RESEARCH

CROSS DOMAIN SCENTIFIC

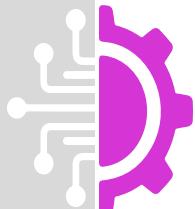
METHODS

DATA INFRASTRUCTURE

BENEFITS

SCIENTIFIC PARTNERS

WHO WE ARE



ACUBE (A³) IS AN AI COMPANY THAT DEVELOPs MATHEMATICALLY BASED AND RELIABLE MACHINE LEARNING SYSTEMS.

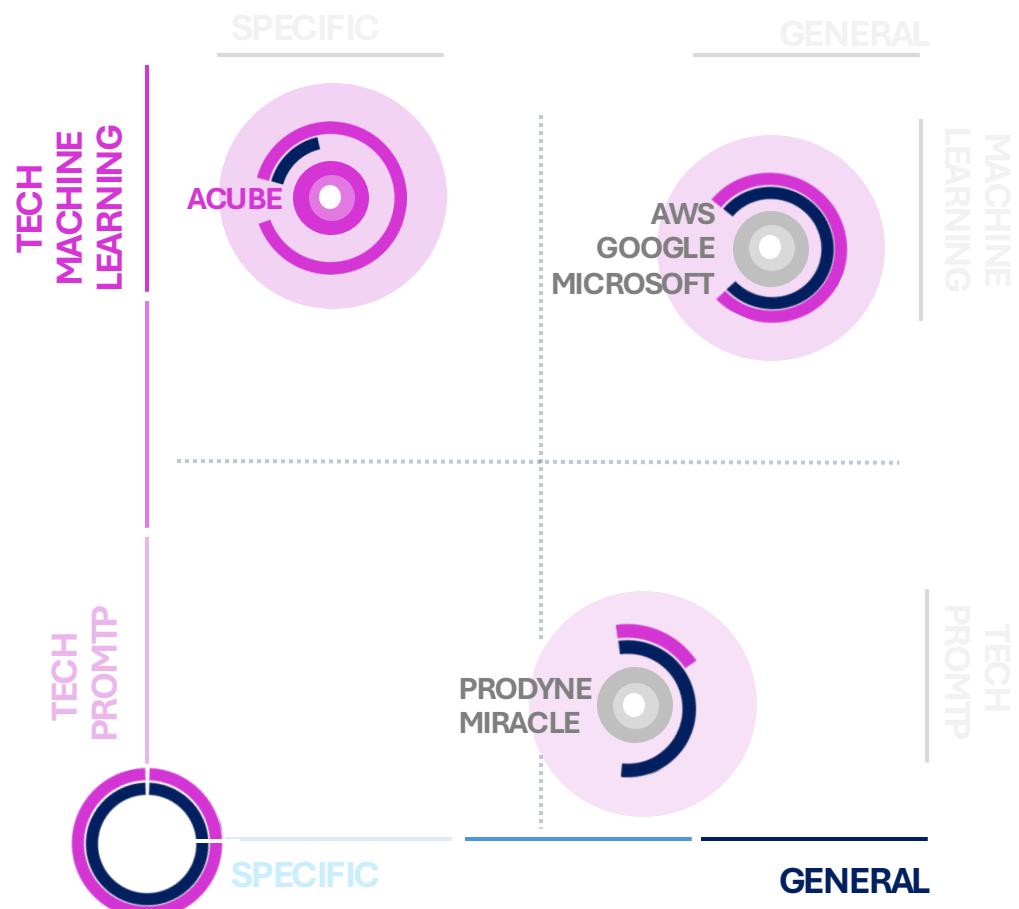
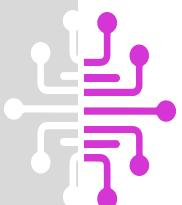
ACUBE (A³) TURN FRONTIER METHODS INTO VALIDATED PROTOTYPES AND READY TO MARKET SOLUTIONS



ACUBE (A³) IS ABLE TO DESIGN AND DEVELOP **NEW ARCHITECTURES** IN THE FIELD OF **MACHINE LEARNING** FOR SCIENCE AND RESEARCH PURPOSES BY CONTROLLING AND GOVERNING THE MATHEMATICAL LAYER.

ACUBE (A³) HAS TEAMS ACROSS ALGORITHMIC DESIGN, APPLIED ML, MLOPS, AND EVALUATION/ASSURANCE

«WHERE» WE ARE



CREATORS: COMPANIES THAT DESIGN AND DEVELOP PROPRIETARY ALGORITHMS AND CORE TECHNOLOGIES

SYSTEM INTEGRATORS: COMPANIES THAT ASSEMBLE AND COMBINE EXISTING TECHNOLOGIES INTO COMPLETE SOLUTIONS

TEAM AND COMPETENCE AREAS



TEAM

WHO YOU'LL WORK WITH



FOUNDATIONAL & THEORY
ML THEORIST / STATISTICAL LEARNING
OPTIMIZATION RESEARCHER
PROBABILISTIC ML / BAYESIAN
GEOMETRIC & TOPOLOGICAL ML
CAUSAL ML / COUNTERFACTUALS

MODELS & METHODS
REPRESENTATION & SELF-SUPERVISED LEARNING
FOUNDATION-MODEL RESEARCHER (FM/LMM)
REINFORCEMENT LEARNING / MULTI-AGENT
NEURO-SYMBOLIC / PROGRAM SYNTHESIS
MECHANISTIC INTERPRETABILITY

MAIN COMPETENCE AREAS

MAIN COMPETENCE AREAS

SYSTEMS, EFFICIENCY & DEPLOYMENT
ML SYSTEMS / COMPILERS - EFFICIENT ML
MLOPS RESEARCH ENGINEER

TRUST, SAFETY & GOVERNANCE
ROBUSTNESS & RELIABILITY
FAIRNESS, ETHICS & POLICY, PRIVACY &
SECURITY

**SAFETY & ALIGNMENT, VERIFICATION & FORMAL
METHODS**

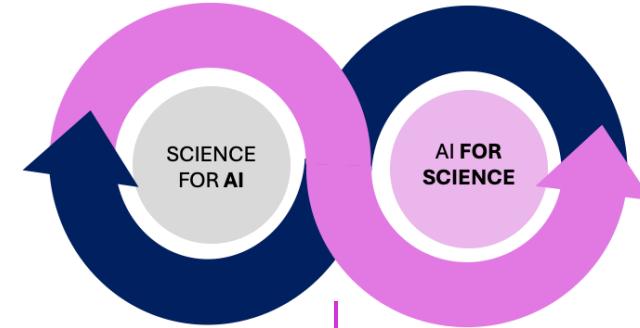
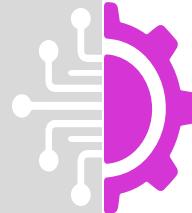
DATA, EVALUATION & INTERACTION
DATA-CENTRIC ML - BENCHMARKING &
EVALUATION SCIENCE
HUMAN-AI INTERACTION / XAI

TEAM

ACUBE HAS A HIGHLY QUALIFIED TEAM
OF **MATHEMATICAL MODELLERS,**
SOFTWARE ENGINEERS, DATA
SCIENTISTS, SOFTWARE ARCHITECTS,
DEVOPS ARCHITECTS, AND FULL-STACK
ENGINEERS.

WHY ACUBE?

UNLEASHING THE POTENTIAL OF SCIENCE



COLLABORATING WITH ACUBE MEANS PARTNERING WITH A TEAM THAT **TURNS CUTTING-EDGE SCIENCE INTO RELIABLE VALUE**. IN A WORLD WHERE ARTIFICIAL INTELLIGENCE IS REDEFINING HOW ORGANIZATIONS OPERATE, THE DIFFERENCE IS NOT JUST TECHNOLOGY — IT'S THE PEOPLE WHO DESIGN IT, INTEGRATE IT, AND USE IT RESPONSIBLY. WE PROVIDE USEFUL, SAFE, AND SUSTAINABLE **ARTIFICIAL INTELLIGENCE** THAT CREATES REAL IMPACT IN TERMS OF **SCIENTIFIC DISCOVERY**. WE **APPLY SCIENCE** THROUGH CONTINUOUS RESEARCH IN **ARTIFICIAL INTELLIGENCE**

ALGORITHMIC DEPTH (MATHEMATICAL LAYER) AND **ENGINEERING AT SCALE**, FROM PROOFS TO ROBUST SYSTEMS

EVALUATION FIRST: CALIBRATION, OOD, FAIRNESS, SAFETY-BUILT IN FROM DAY ONE

INTEROPERABILITY BY DESIGN, SCHEMAS/ONTOLOGIES, APIS, STANDARDS ALIGNMENT

OPEN SCIENCE MINDSET, REPRODUCIBLE CODE, MODEL/DATA CARDS AND LEAN COLLABORATION

A3 RESEARCH?

VISION & PILLARS



WE BELIEVE IN DOING SCIENTIFIC RESEARCH THAT UNDERPINS MACHINE LEARNING: THEORIES OF UNCERTAINTY AND CALIBRATION, GEOMETRY/OPTIMAL TRANSPORT, AND GRAPHICAL/CAUSAL STRUCTURES. MODELS THAT ARE PROVABLE, RELIABLE, AND GENERALIZABLE

MATHEMATICAL FOUNDATIONS FIRST, PROOFS AND GUARANTEES WHERE POSSIBLE; FORMALIZING UNCERTAINTY, ROBUSTNESS, AND EXPLAINABILITY AS MEASURABLE MATHEMATICAL OBJECTS

TRUSTWORTHY MULTIMODAL AI, INTEGRATE IMAGES, SIGNALS/TIME-SERIES, TEXT/DOCUMENTS, AND GRAPH/TABULAR CONTEXT INTO SHARED REPRESENTATIONS THAT TRANSFER ACROSS DOMAINS

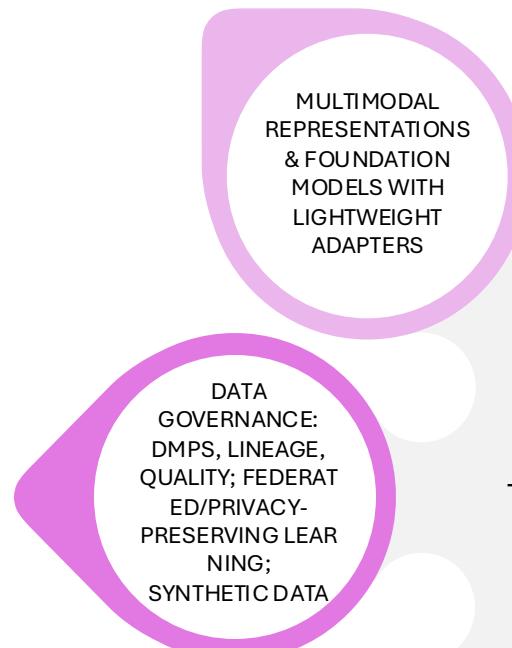
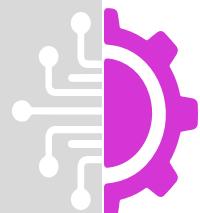
ASSURANCE-READY ML (DOMAIN-AGNOSTIC), QUANTIFIED UNCERTAINTY & CALIBRATION, ROBUSTNESS & SHIFT/OOD, FAIRNESS & SAFETY, HUMAN-INTERPRETABLE EXPLANATIONS, CONTINUOUS EVALUATION WITH HOOKS TO THE AI ACT AND ISO/IEC

DATA-CENTRIC & KNOWLEDGE-INFORMED LEARNING, DATA QUALITY AND GOVERNANCE, PRIVACY/FEDERATED PIPELINES, DOMAIN PRIORS AND CAUSAL STRUCTURE → BETTER GENERALIZATION AND REAL-WORLD PERFORMANCE

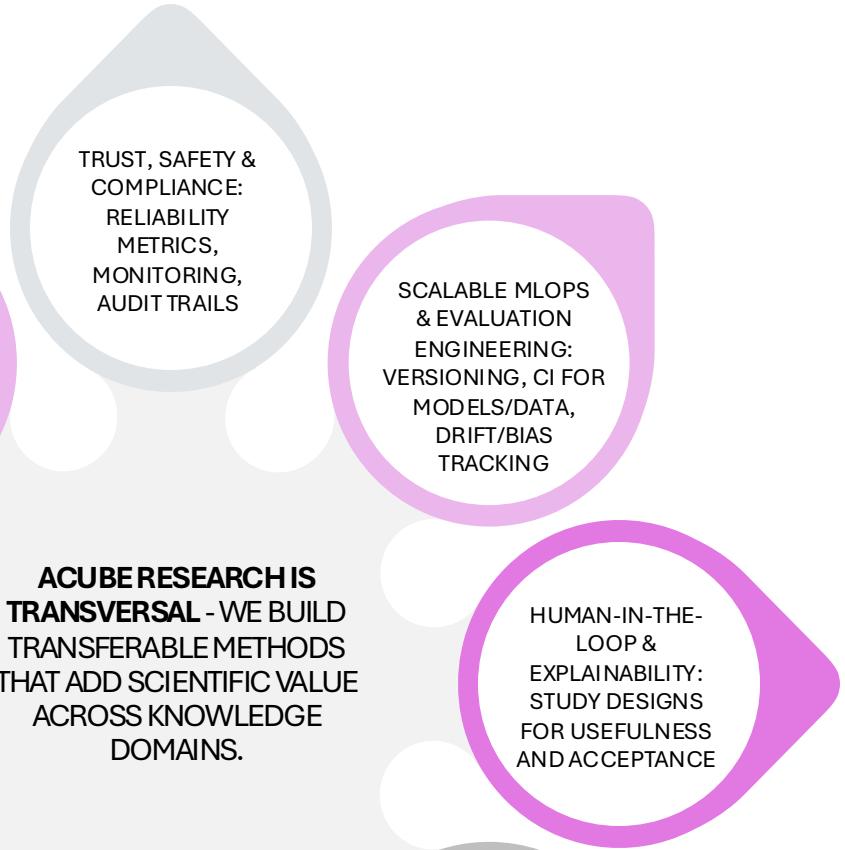
$$y = \phi(\langle \omega, x \rangle + \beta)$$

CROSS-DOMAIN SCIENTIFIC

CAPABILITIES

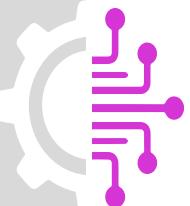


ACUBE RESEARCH IS TRANSVERSAL - WE BUILD TRANSFERABLE METHODS THAT ADD SCIENTIFIC VALUE ACROSS KNOWLEDGE DOMAINS.



A3 METHODS

& NOVELTY



UNCERTAINTY AND CALIBRATION (INCL. CONFORMAL PREDICTION) WITH PER-CASE GUARANTEES

CERTIFIED UNCERTAINTY & CALIBRATION

»
GEOMETRIC FOUNDATIONS FOR CROSS-MODAL CONSISTENCY

»
CAUSAL REASONING FOR ACTIONABLE EXPLANATIONS

»
GEOMETRY AND OPTIMAL TRANSPORT; GRAPH/SHEAF CONSTRAINTS FOR CROSS-MODAL CONSISTENCY

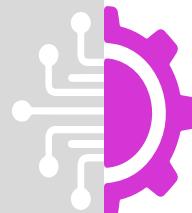
CAUSAL MODELING AND COUNTERFACTUALS, EFFECT ESTIMATION

»
PRIVACY-PRESERVING FEDERATED LEARNING

»
FEDERATED & PRIVACY-PRESERVING LEARNING ACROSS SITES

DATA INFRASTRUCTURE

AND SECURITY



WE OPERATE ON A **DOMAIN-AGNOSTIC, COMPLIANT, AND SCALABLE BACKBONE** THAT TURNS RESEARCH INTO **AUDITABLE, PRODUCTION-READY SYSTEMS**—COVERING COMPUTE, DATA GOVERNANCE, AND END-TO-END MLOPS

CLOUD/HPC-READY TRAINING

DATA GOVERNANCE

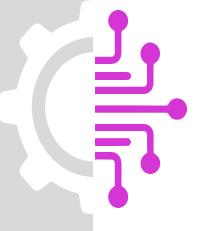
MLOPS

FEDERATED ORCHESTRATION WITH AUDIT TRAILS

DMPS, LINEAGE, ACCESS POLICIES; PSEUDONYMIZATION PIPELINES

VERSIONED DATASETS/MODELS, CONTINUOUS EVALUATION, DRIFT/BIAS MONITORING

BENEFITS



ADVANTAGES



- STRONGER HORIZON PROPOSALS**
SHARPER ALIGNMENT TO EU PRIORITIES, STANDARDS, AND IMPACT
- RESEARCH YOU CAN TRUST**
METHODS WITH MEASURABLE RELIABILITY (CALIBRATION, ROBUSTNESS, FAIRNESS)
- FASTER PROOF CYCLES**
REUSABLE PIPELINES PLUS CLOUD/HPC AND FEDERATED SETUPs TO COMPRESS TIME FROM IDEA TO POP
- ASSURANCE & COMPLIANCE BY DESIGN**
RISK MANAGEMENT ALIGNED WITH AI ACT/ISO/IEC, FULL AUDIT TRAILS AND GOVERNANCE
- REPRODUCIBILITY & OPEN SCIENCE**
BENCHMARKS, MODEL/DATA/RISK CARDS, AND OSS TOOLKITS FOR TRANSPARENT, VERIFIABLE RESULTS
- SEAMLESS INTEGRATION & INTEROPERABILITY**
STANDARDS-FIRST (SCHEMAS/APIS), PRODUCTION-GRADE MLOPS, AND CLEAN HAND-OFF TO PARTNERS
- PATH TO IMPACT & EXPLOITATION**
IPR STRATEGY, CONTRIBUTIONS TO STANDARDS, AND A CLEAR ROUTE TO TRANSITION/TECHNOLOGY TRANSFER

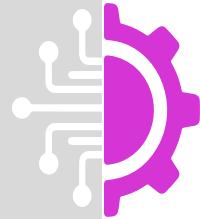


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