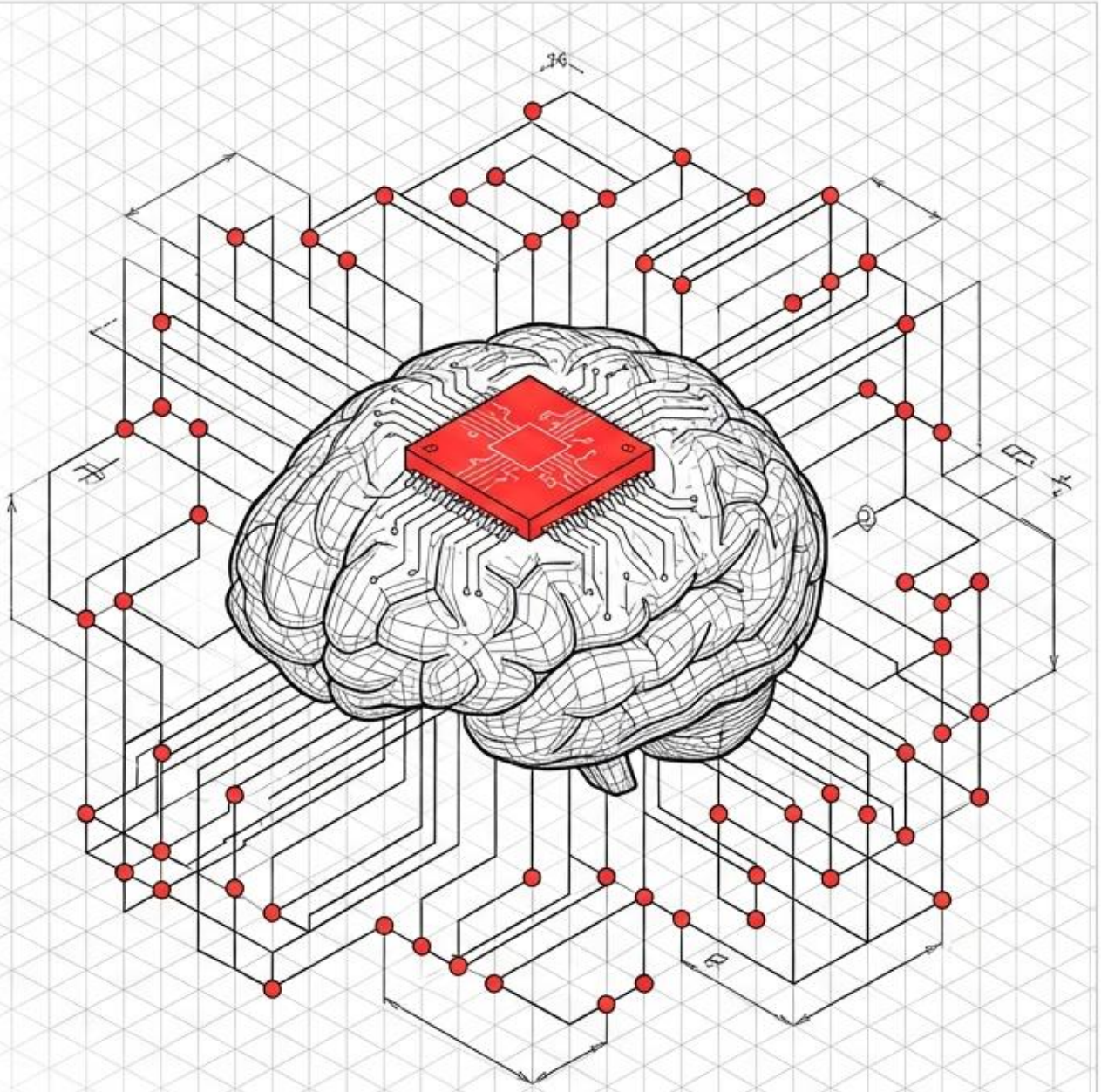
AI 101: BUILDING SUPERVISED MACHINE LEARNING MODELS

Operationalizing the 2026 Pivot to AI-Driven Acceleration.

A hands-on technical bootcamp for the Embers-to-Innovation Summit.



TRACK: TECHNICAL ENABLEMENT
SESSION: 01

THE 2026 MANDATE: SPEED AND PRECISION

THE HARD PIVOT

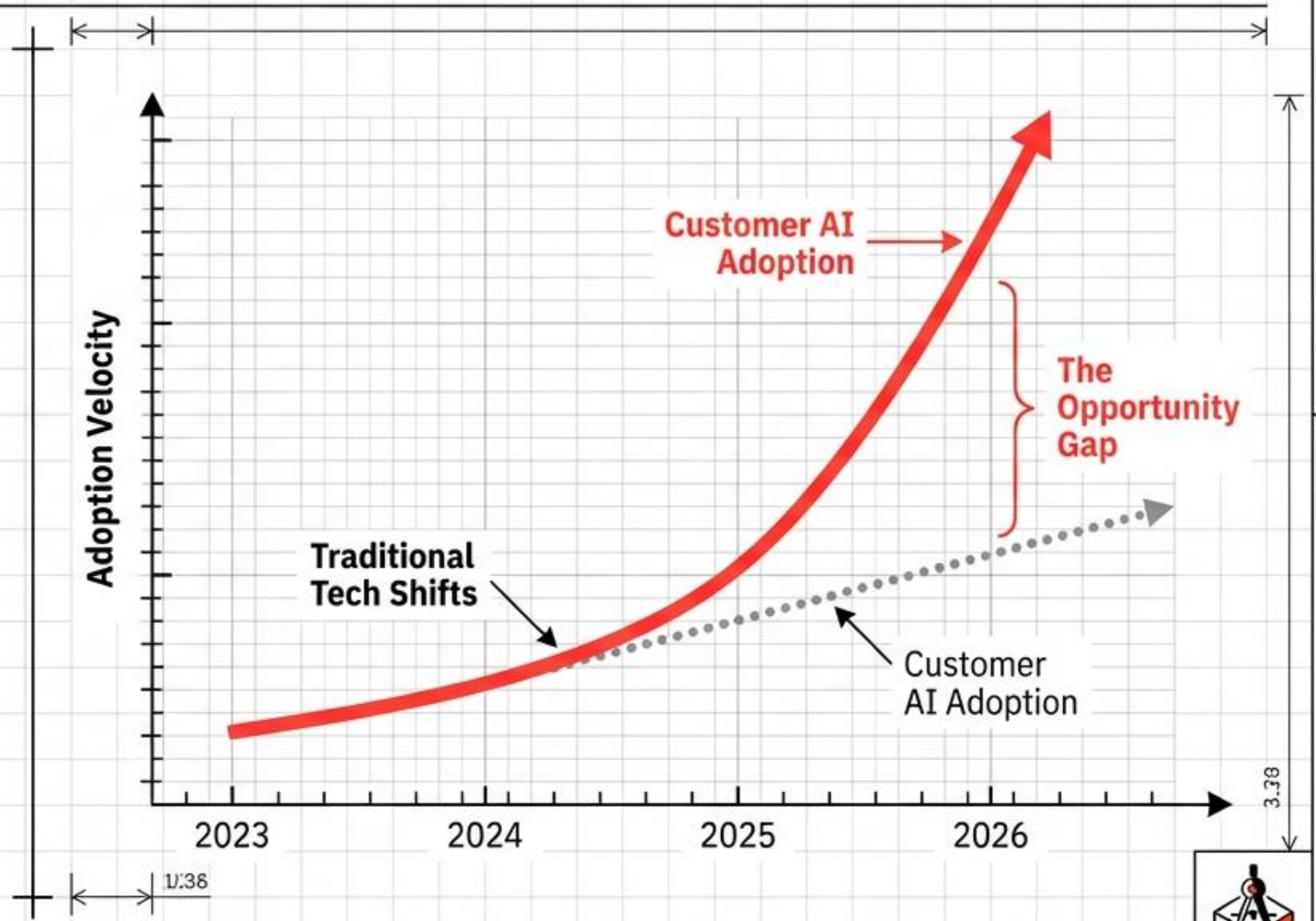
Moving from general “Energy Leadership” to demonstrable technical proficiency.

THE OBJECTIVE

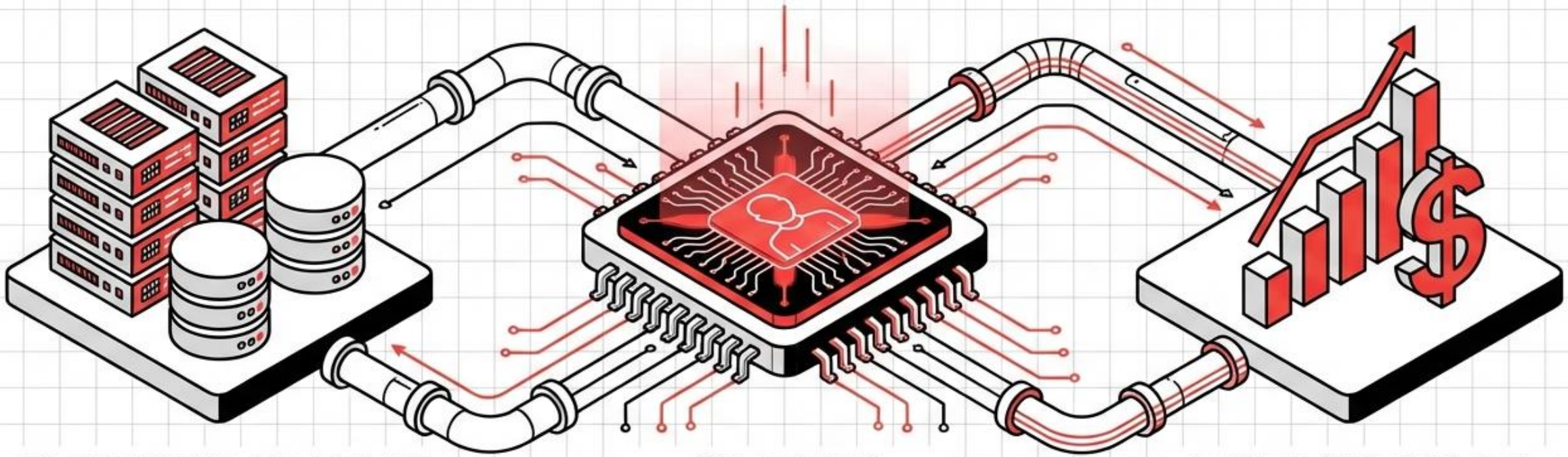
Operationalize internal mandates to improve sales targeting and marketing speed.

THE METRIC

Speed is the critical priority. We must enable the organization to move faster through AI adoption.



THE CSE TEAM ACTS AS THE NEURAL BRIDGE



TECHNICAL REALITY
Raw Model Architecture & Data

CSE TEAM
Proficiency & Translation

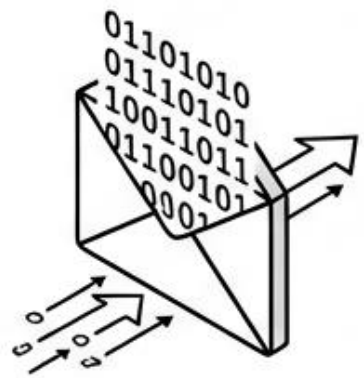
SALES OUTCOMES
Targeting Success & Revenue

Mission: You cannot sell or operationalize what you cannot build. Proficiency = Credibility.

LAB SCOPE: WHAT WE ARE BUILDING

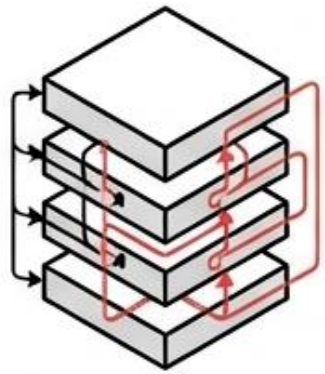
1.5 | 2.5 | 3.5 | 4.5

INPUT



Real-world email spam datasets.

MECHANISM



Transformer Encoder Block (Deep Learning).

OUTPUT

Binary Classification.

Class 0: Not Spam / Class 1: Spam

GOAL

High Accuracy (Deterministic).

NOT text generation.

3.35 | 3.38

ENGINEERING EDITORIAL // SWISS INT'L STYLE

SUPERVISED VS. GENERATIVE: THE GUARDRAILS

THIS LAB: SUPERVISED LEARNING

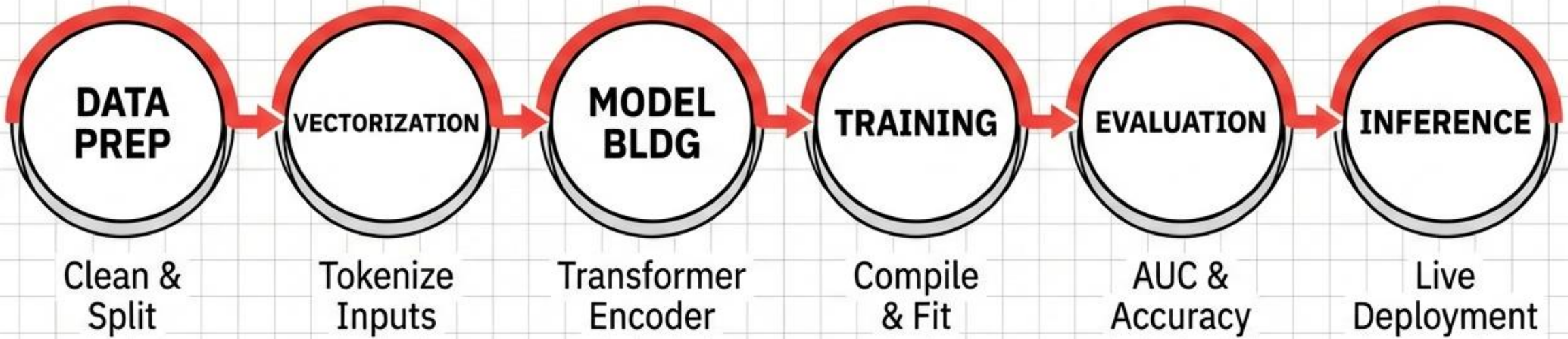
- **Deterministic** Predictions
- **Focus:** Classification Accuracy
- **Output:** Specific Categories (Spam/Not Spam)
- **Use Case:** Precise Sales Targeting

ADVANCED LAB: GENERATIVE AI

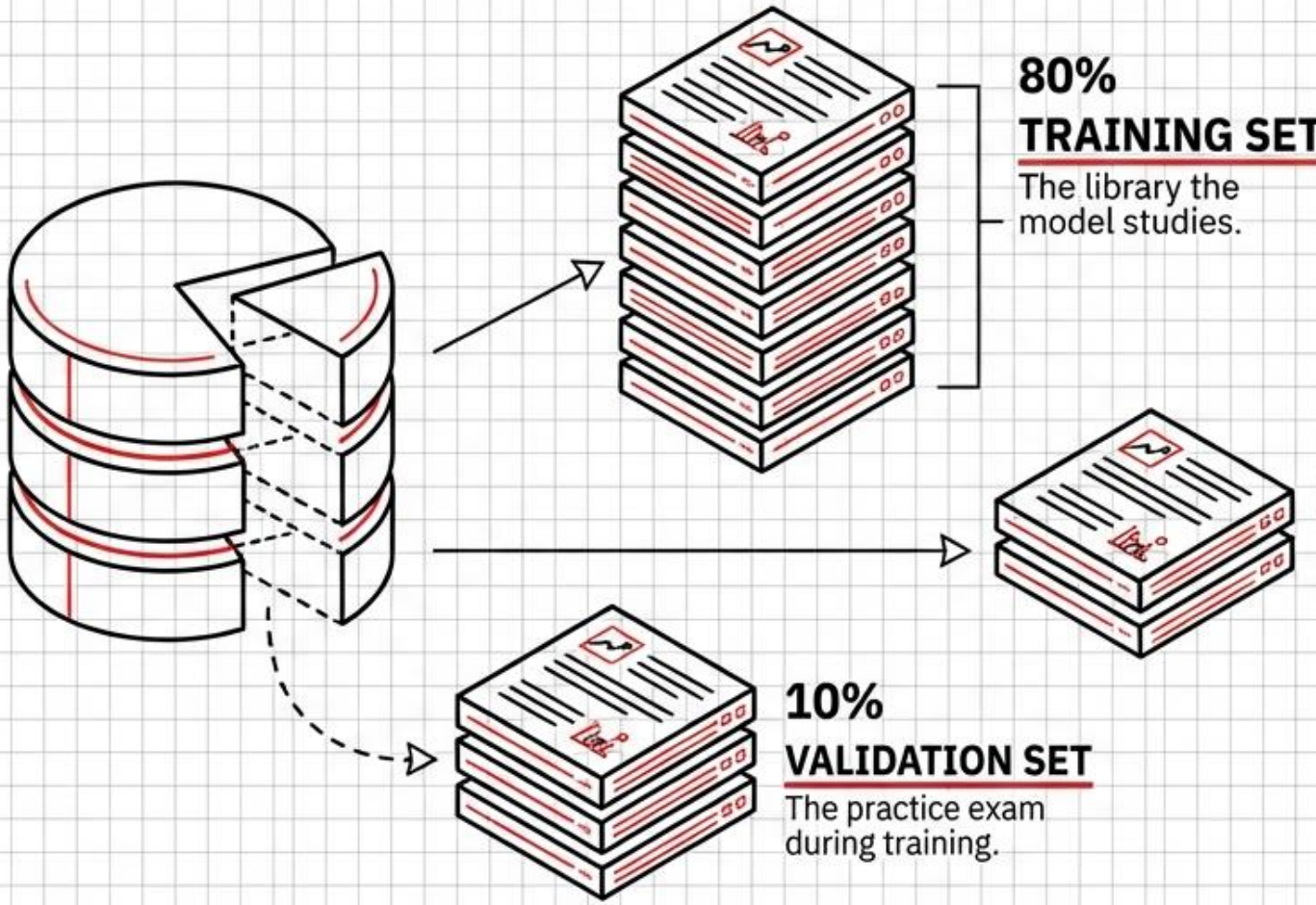
- **Creative** Output
- **Focus:** Text Generation
- **Output:** New Content (LLMs)
- **Use Case:** Content Creation

TAKEAWAY: WE MUST MASTER THE DETERMINISTIC PIPELINE BEFORE MOVING TO GENERATIVE MODELS.

THE MACHINE LEARNING PIPELINE



STEP 1: DATA PREPARATION AND OPT MIZATION



RAW DATA (EMAILS)
IBM Plex Mono

80%
TRAINING SET
The library the model studies.

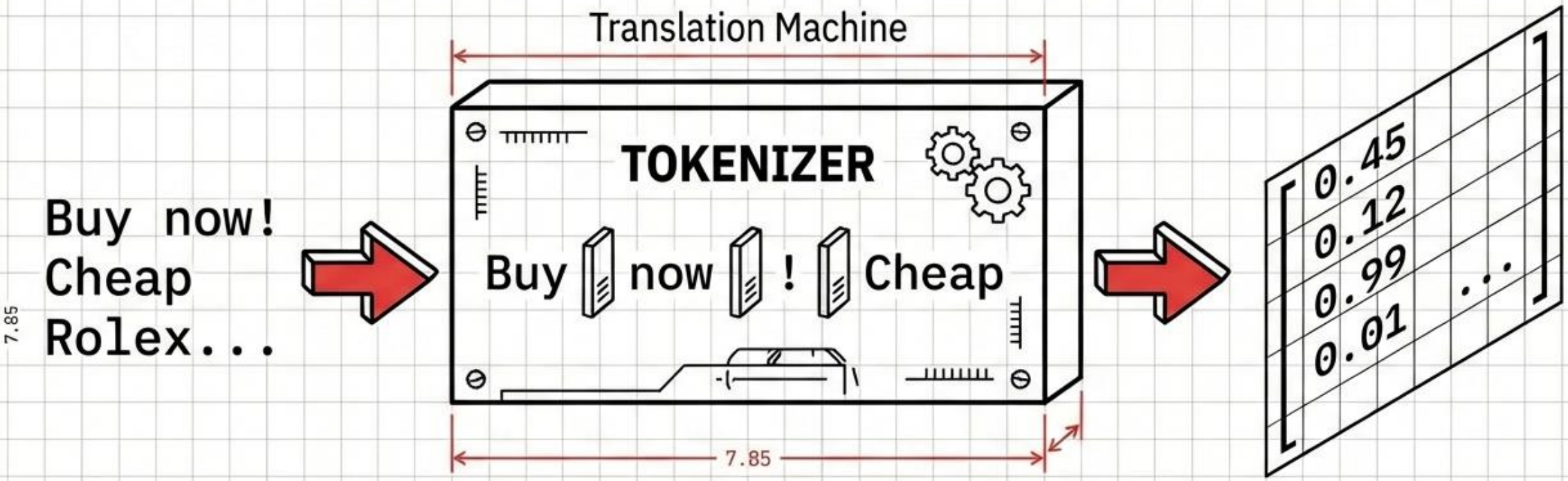
10%
TEST SET
The final exam (Unseen data)

10%
VALIDATION SET
The practice exam during training.

CRITICAL REQUIREMENT
IBM Plex Mono
Supervised learning requires structured, labeled data.
Garbage in, garbage out.

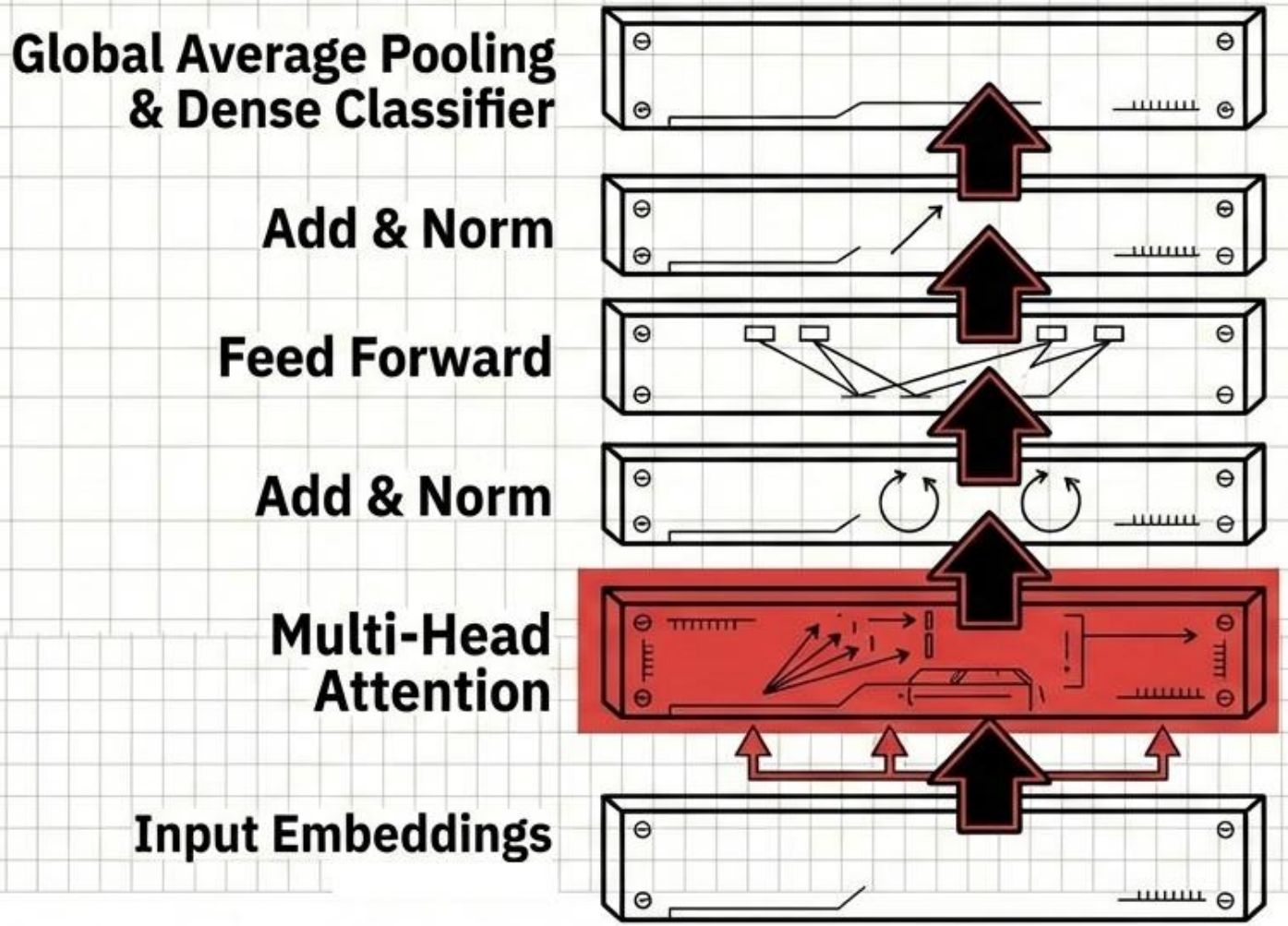
TAKEAWAY: PROPER DATA SPLITTING IS THE FOUNDATION FOR ACCURATE AND RELIABLE MODELING.

STEP 2: VECTORIZATION AND TOKENIZATION



Converting human language into machine mathematics.
The Transformer cannot read text; it only processes vectors.

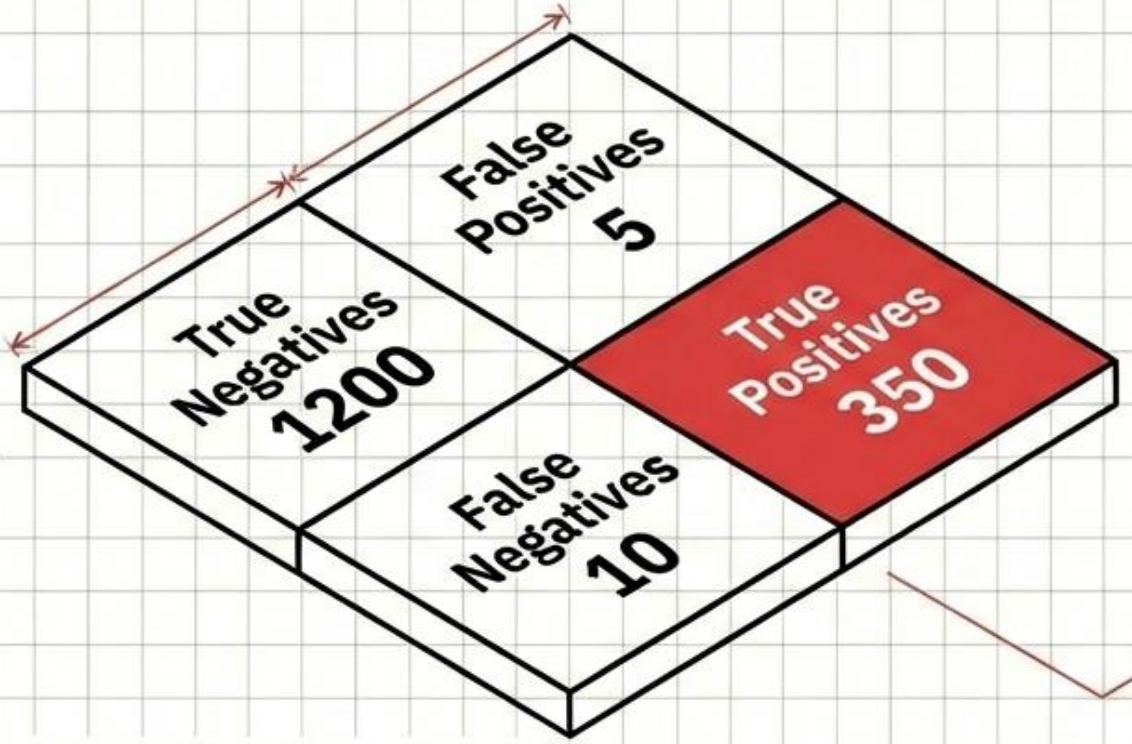
STEP 3: BUILDING THE TRANSFORMER ENCODER



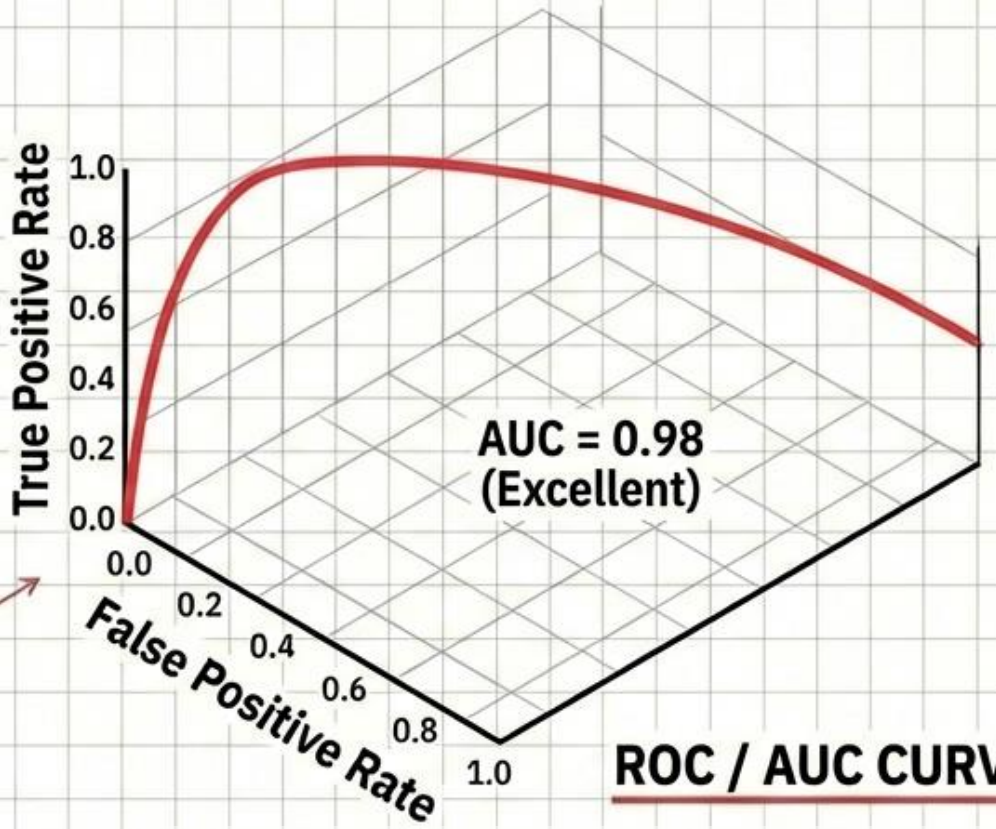
THE ENGINE

We are implementing a Deep Learning architecture. The Encoder understands context, while the Classifier makes the final binary decision.

STEP 4: TRAINING AND EVALUATION METRICS



CONFUSION MATRIX



ROC / AUC CURVE

Receiver Operating Characteristic
Area Under Curve

THE GOAL: PROVING DETERMINISTIC RELIABILITY.

We validate against the Test Set to ensure the tool is ready for sales deployment.

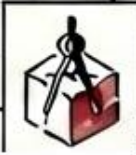
STEP 5: LIVE INFERENCE AND DEPLOYMENT

OPERATIONALIZING

1. Save trained artifacts.
2. Reload model.
3. Run real-time predictions on sales data.

Terminal

```
> LOAD_MODEL('spam_classifier_v1.h5')
> MODEL LOADED SUCCESSFULLY.
> INPUT: 'Urgent: Update your password
now for free gift'
> PROCESSING...
> PREDICTION: [SPAM]
> CONFIDENCE: 99.4%
```



CAPABILITY SUMMARY: FROM THEORY TO PROFICIENCY

1. DATA PREP

Can explain how text datasets are structured and split for ML.

2. TOKENIZATION

Can convert raw text into numerical vectors.

3. ARCHITECTURE

Can implement a Transformer Encoder block.

4. VALIDATION

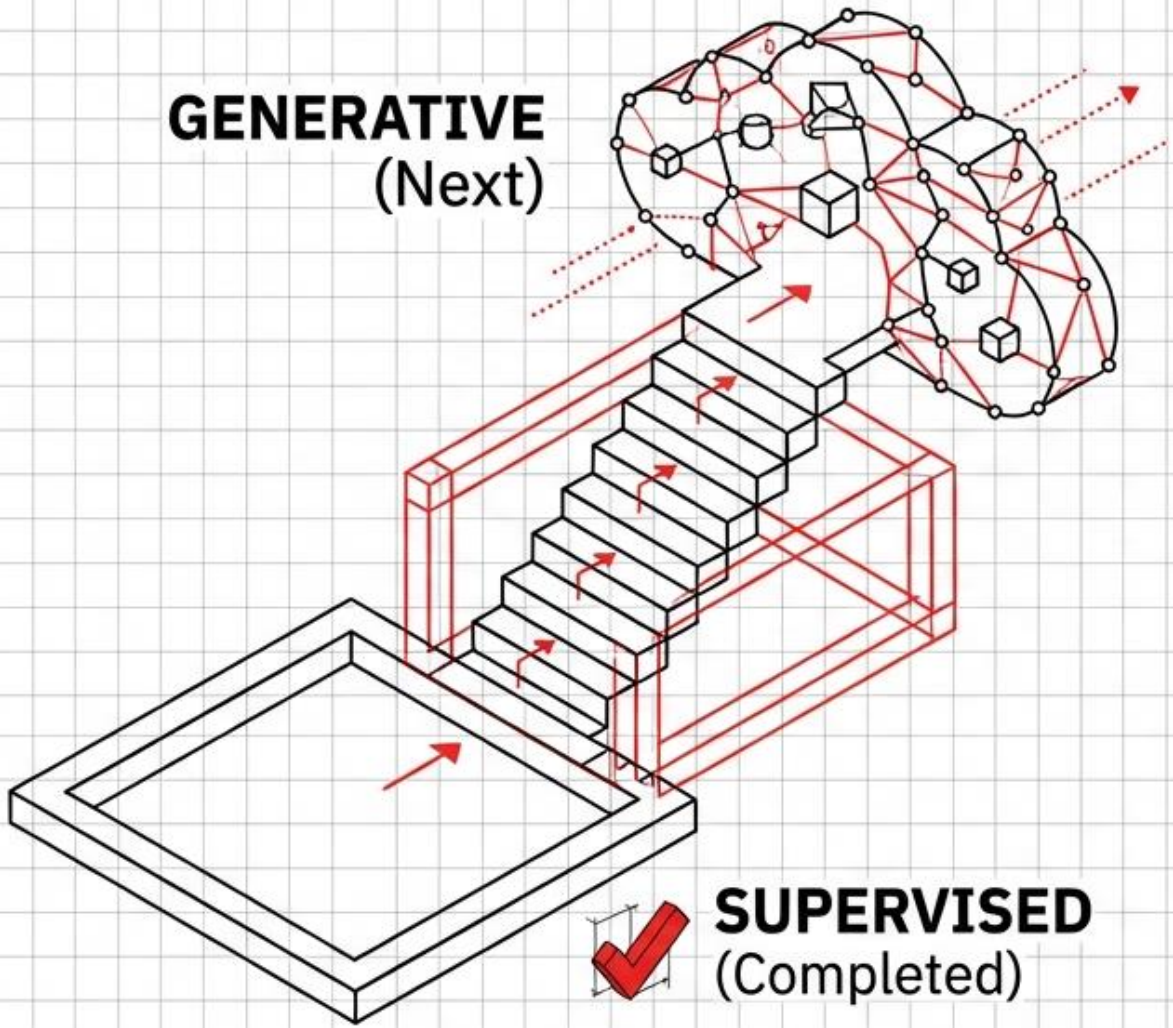
Can evaluate performance using AUC and Accuracy metrics.

5. DEPLOYMENT

Ready to build internal predictive tools for 2026.

THE ROAD AHEAD: ADVANCED GENERATIVE AI

GENERATIVE
(Next)



SUPERVISED
(Completed)

UPCOMING TOPICS:

- Large Language Models (LLMs)
- Generative Models (Creative vs. Deterministic)
- AI Red Teaming Training
- “AskTEC” Data Maturity Use Case

RESOURCES AND CALL TO ACTION

SOLUTION JUPYTER NOTEBOOK

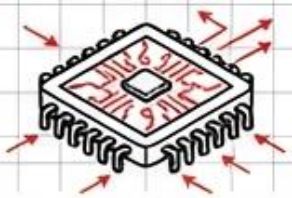
[Internal Repository Link Placeholder]

GOOGLE ML TRAININGS

Reference Materials

https://fortinetcloudcse.github.io/genai-creator-lab/

“Equipping the team to help Fortinet move faster through AI.”



Q&A / APPENDIX

DEEPER DIVE

$$\sigma(x) = \frac{1}{1 + e^{-x}}$$

discussion points:

- The Math of Transformers (Attention Mechanisms)
- Specific Sales Targeting Use Cases
- Handling Data Imbalance

$$C = A \times B$$

$$\sum = \sum_{i=1}^{n} x_i$$