

Learning from Data

AI and Machine Learning in the DNS Ecosystem

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Synergy of AI and DNS

Top-level domain *.COM* has around
1,500,000,000
queries per day



Huge amount of DNS data



Great opportunity for AI techniques

Agenda

- 1 Fundamentals of AI
- 2 AI in DNS Applications
- 3 Enabling a Learning Internet



1

Fundamentals of AI

Terminology

Artificial Intelligence (AI)

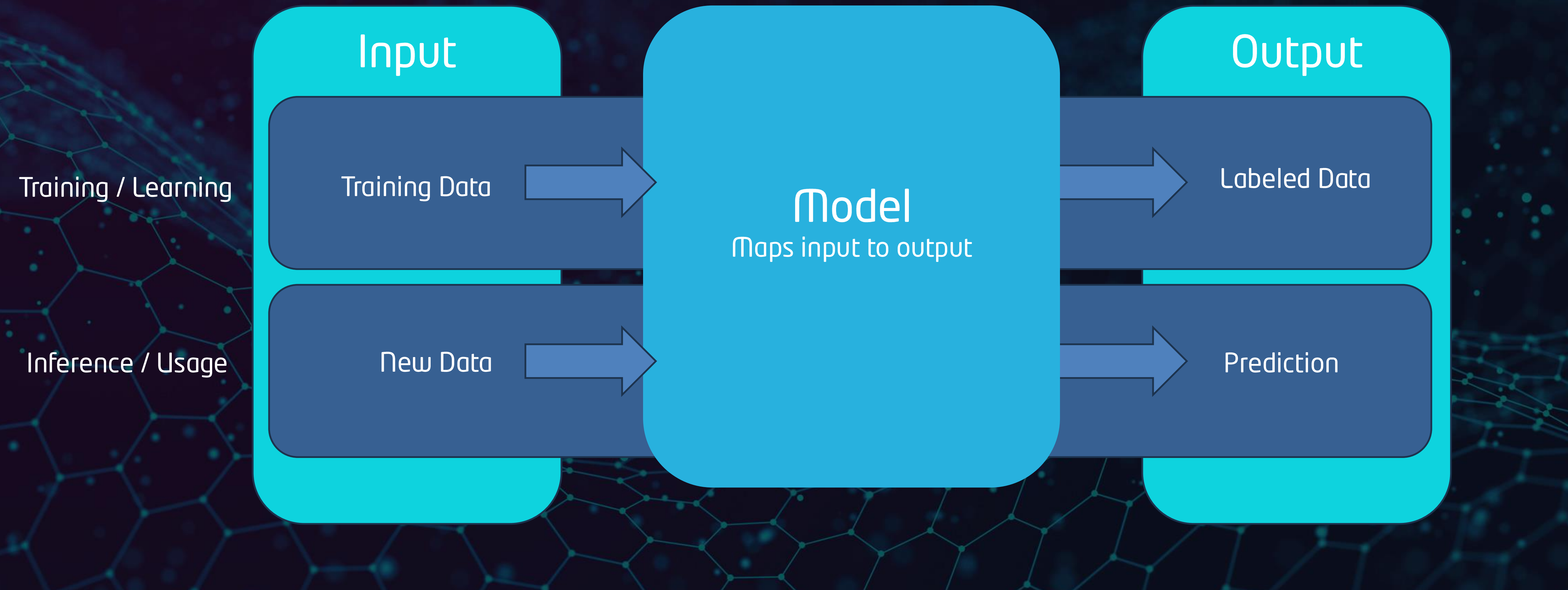
Machine Learning (ML)

Deep Learning (DL)

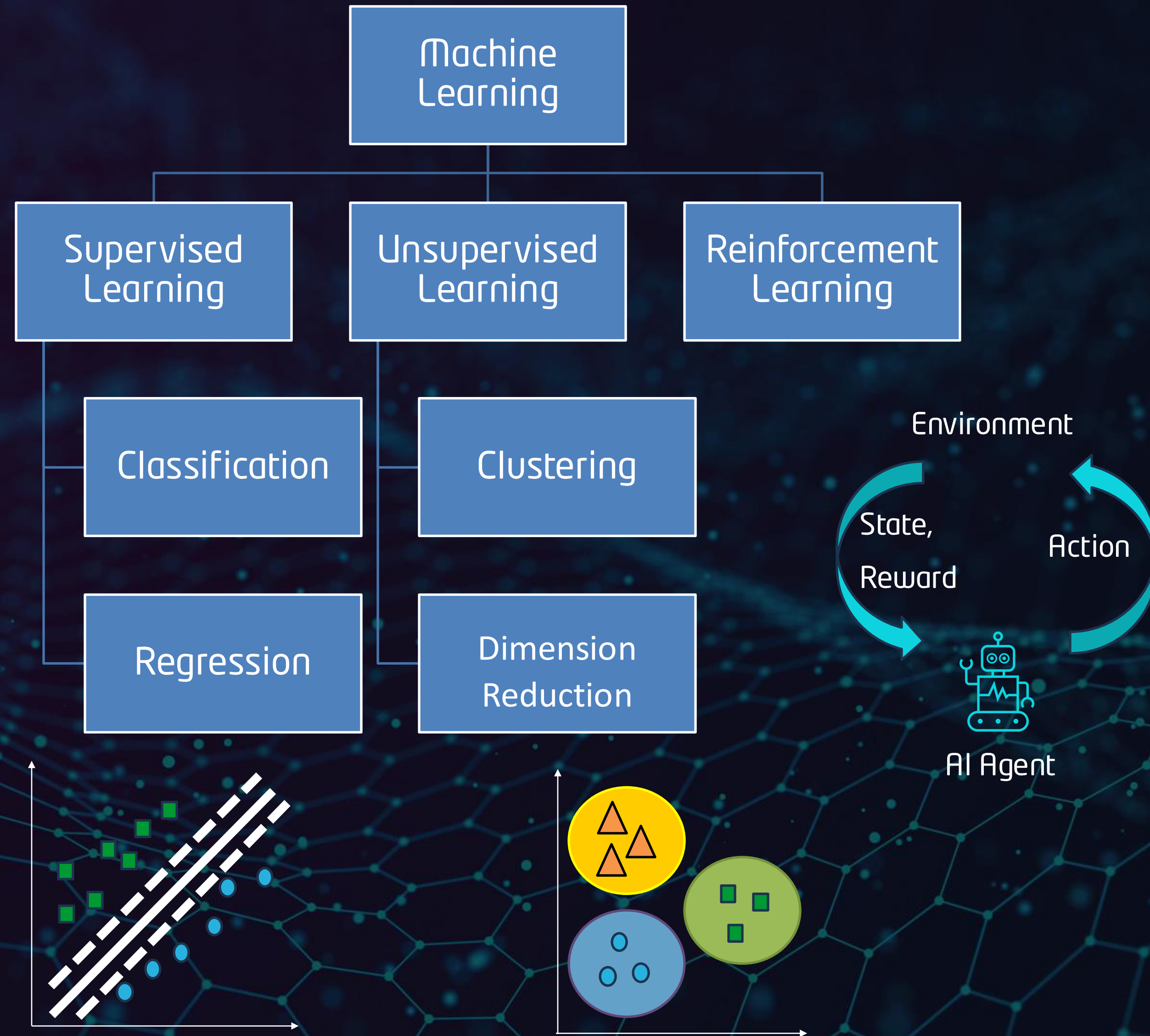
Generative AI
(GAI)

Machine Learning Process

Training vs. Inference



Types of Learning



Why DNS is Perfect for AI



2

AI in DNS Applications Usage Examples

Use Case 1

Classification & Clustering for DNS Security

Detecting risky patterns in DNS traffic

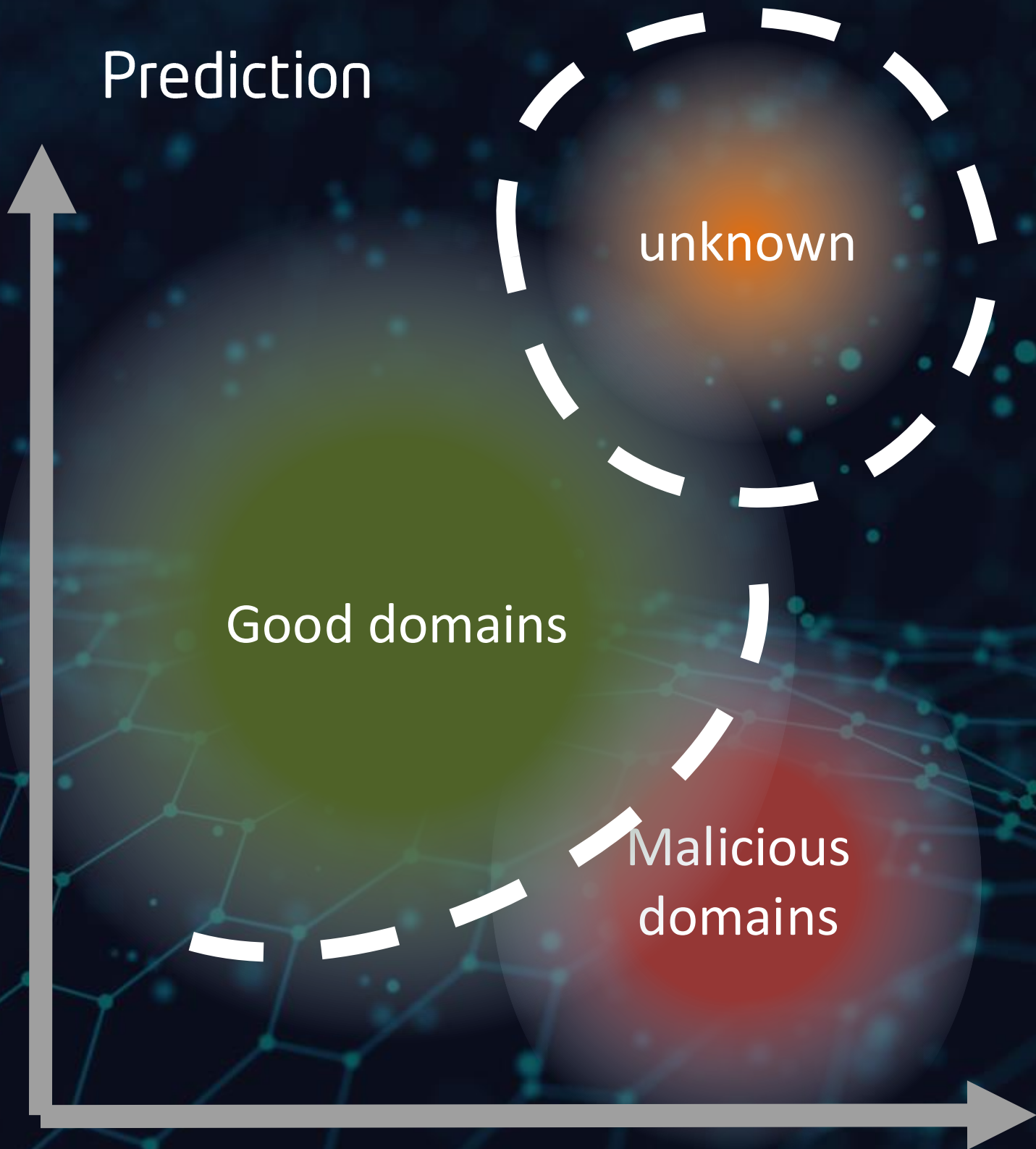
Historical Data

Domain	Query Rate	Length	Reputation	Label
example.com	normal	short	good	✓
asdkj23.com	bursty	random	unknown	✗
...	...	...	...	...

Model



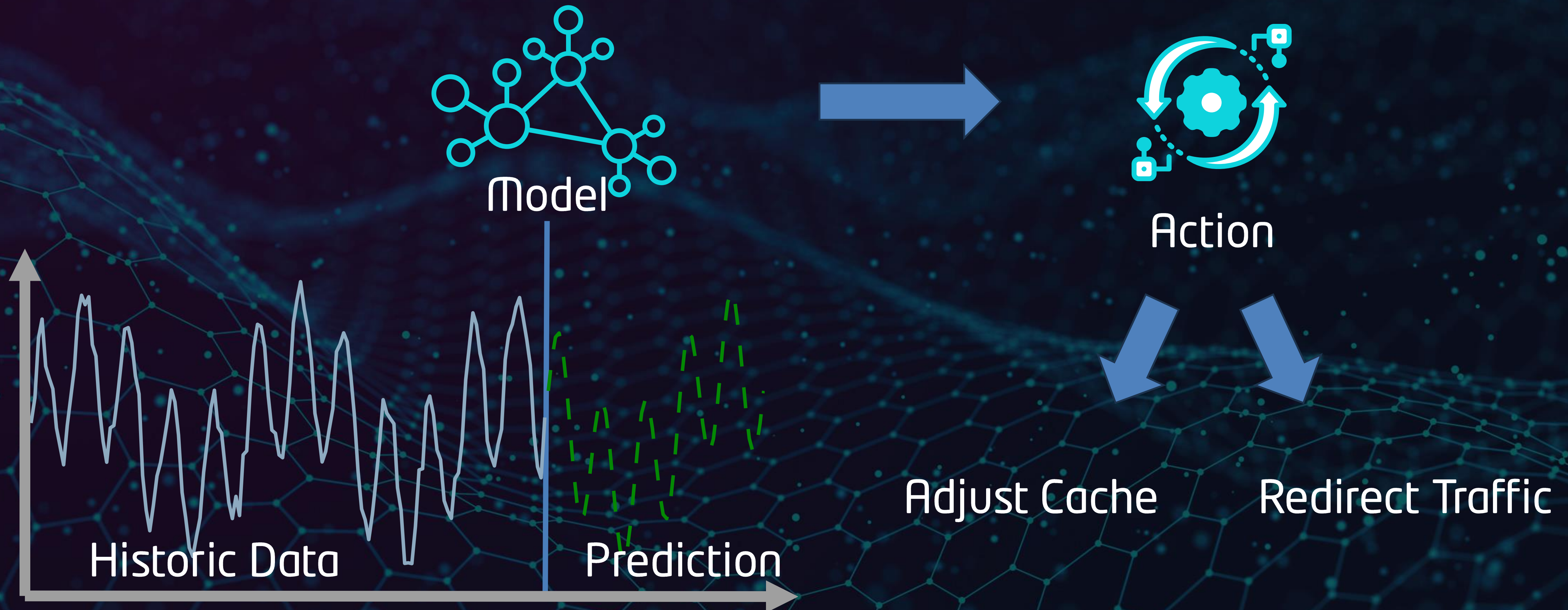
Prediction



Use Case 2

Regression for Traffic Prediction & Optimization

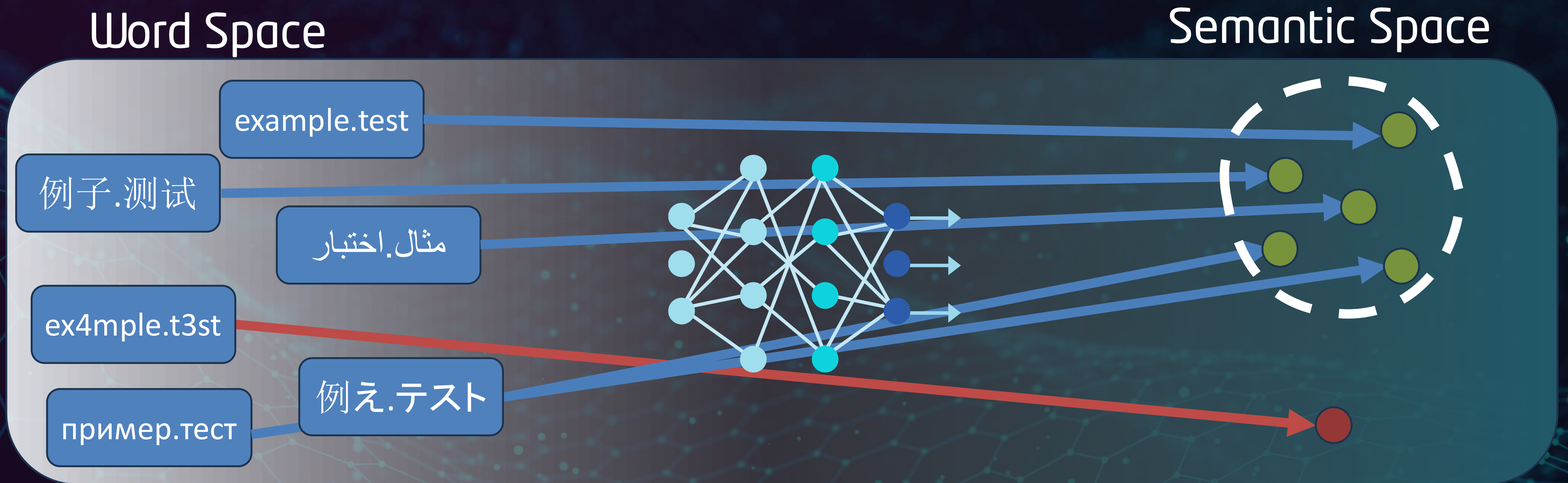
Learning from history to anticipate demand



Use Case 3

Deep Learning for Universal Acceptance

Understanding names across languages and scripts



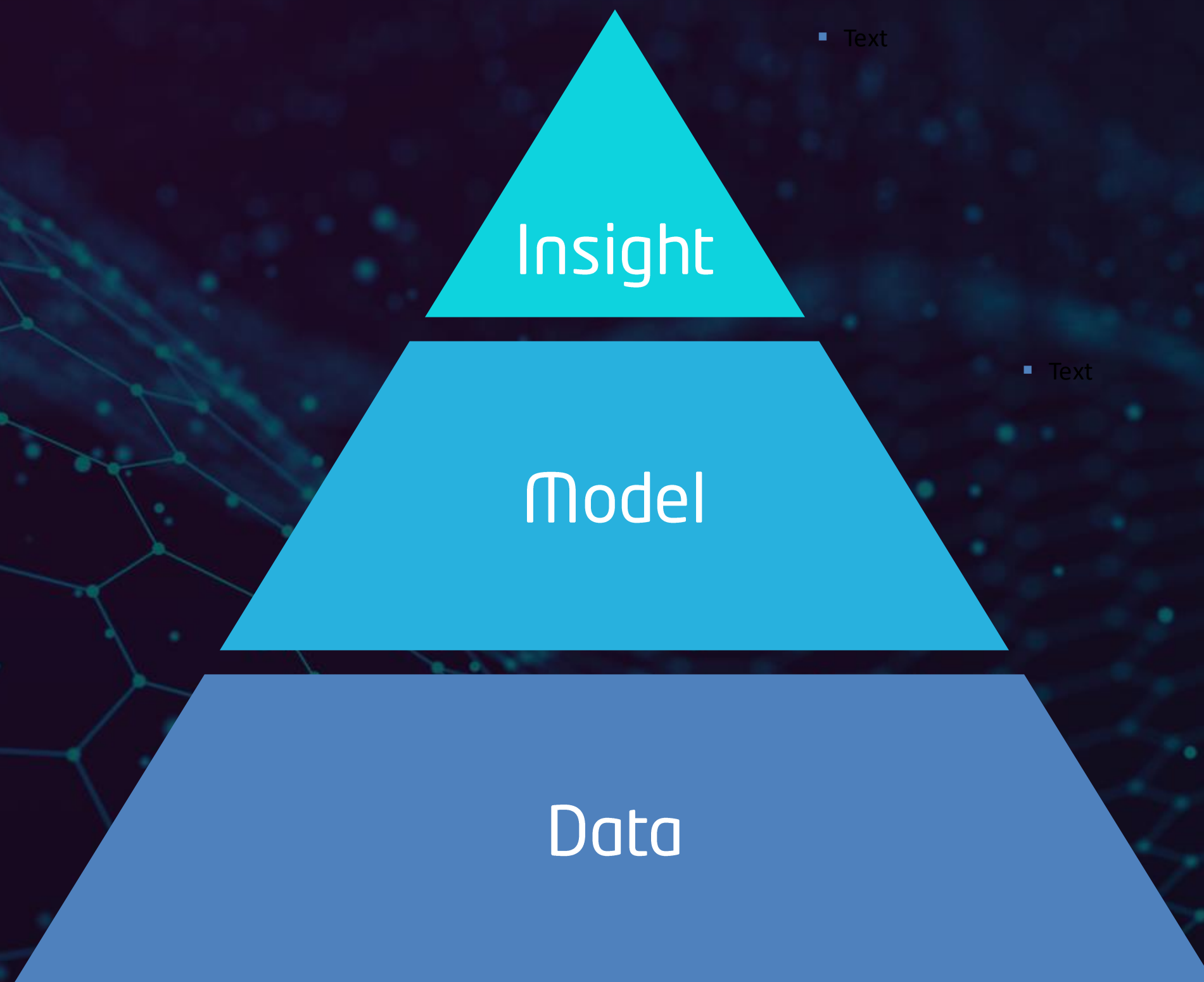
Domains that share the same concept or underlying intent cluster together in semantic space, even if their characters differ



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Enabling a Learning Internet

Quality Data: The foundation of Intelligent Systems



More Data

Better data



Higher Quality Model



More Valuable Insight

Building the Foundations for the Learning Internet



Stakeholder
Collaboration



Research and
Education



High-quality
Data



Shared
Responsibility



Thank you!
Q&A