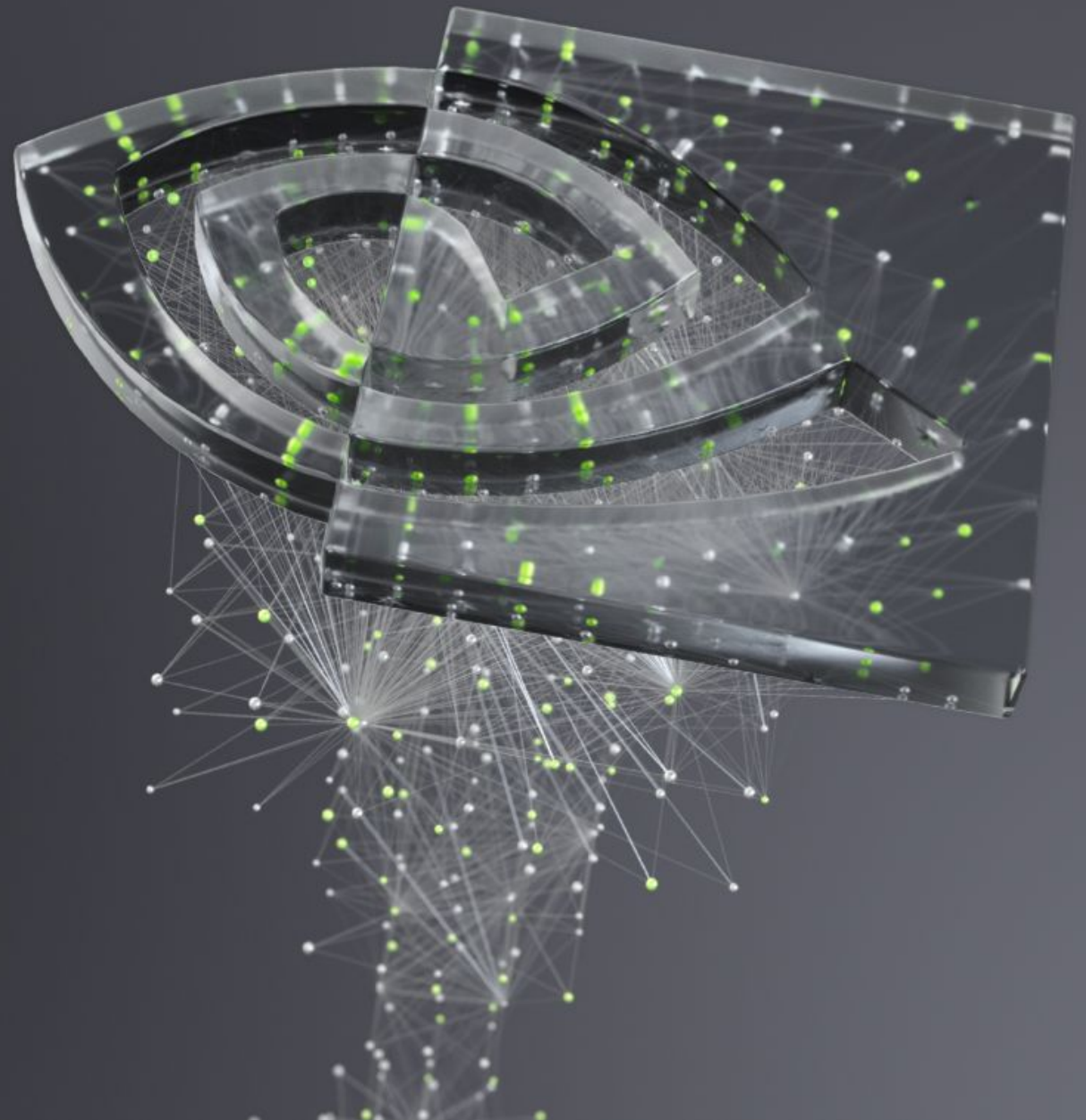


NVIDIA | DEEP LEARNING INSTITUTE

FUNDAMENTALS OF DEEP LEARNING

Part 6: Advanced Architectures

AGENDA

- Part 1: An Introduction to Deep Learning
- Part 2: How a Neural Network Trains
- Part 3: Convolutional Neural Networks
- Part 4: Data Augmentation and Deployment
- Part 5: Pre-trained Models
- Part 6: Advanced Architectures

AGENDA – PART 6

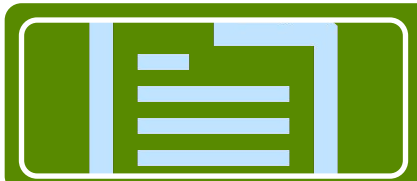
- Moving Forward
- Natural Language Processing
- Recurrent Neural Networks
- Other Architectures
- Closing Thoughts

MOVING FORWARD

FIELDS OF AI

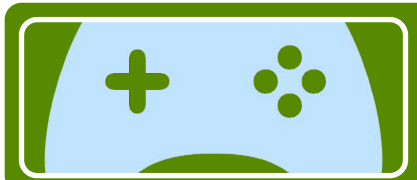
Computer Vision

- Optometry



Natural Language Processing

- Linguistics



Reinforcement Learning

- Game Theory
- Psychology

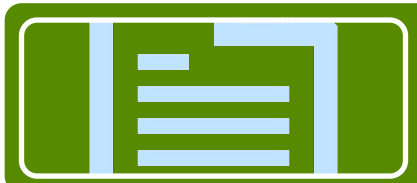
Anomaly Detection

- Security
- Medicine

FIELDS OF AI

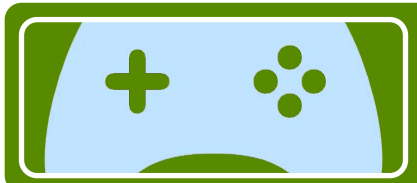
Computer Vision

- Optometry



Natural Language Processing

- Linguistics



Reinforcement Learning

- Game Theory
- Psychology

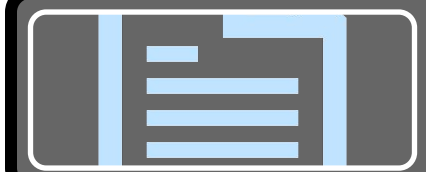
Anomaly Detection

- Security
- Medicine

FIELDS OF AI

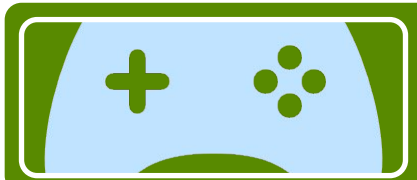
Computer Vision

- Optometry



Natural Language Processing

- Linguistics



Reinforcement Learning

- Game Theory
- Psychology

Anomaly Detection

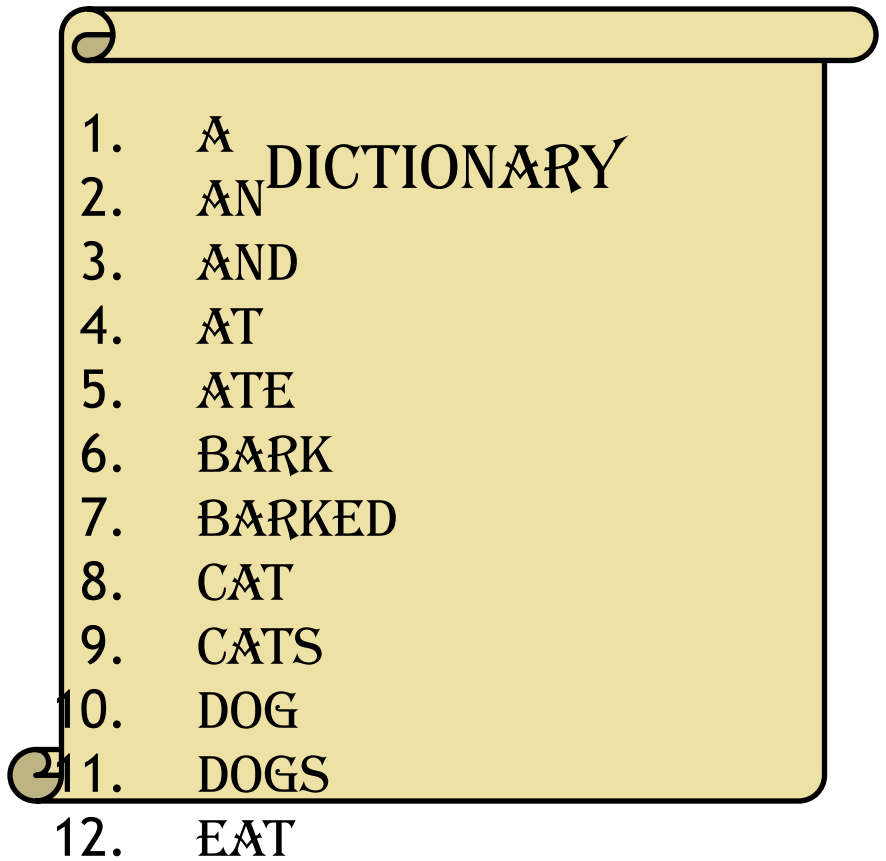
- Security
- Medicine

NATURAL LANGUAGE PROCESSING

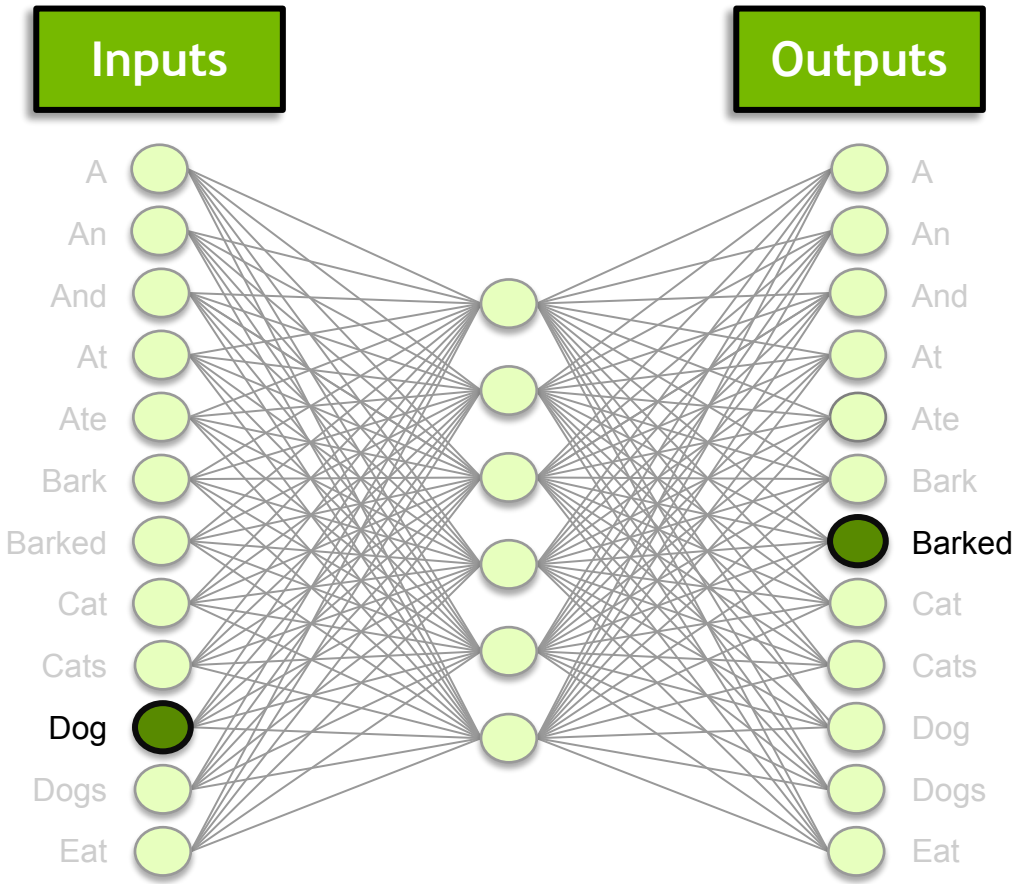
FROM WORDS TO NUMBERS

"A dog barked at a cat."

[1, 10, 7, 4, 1, 8]



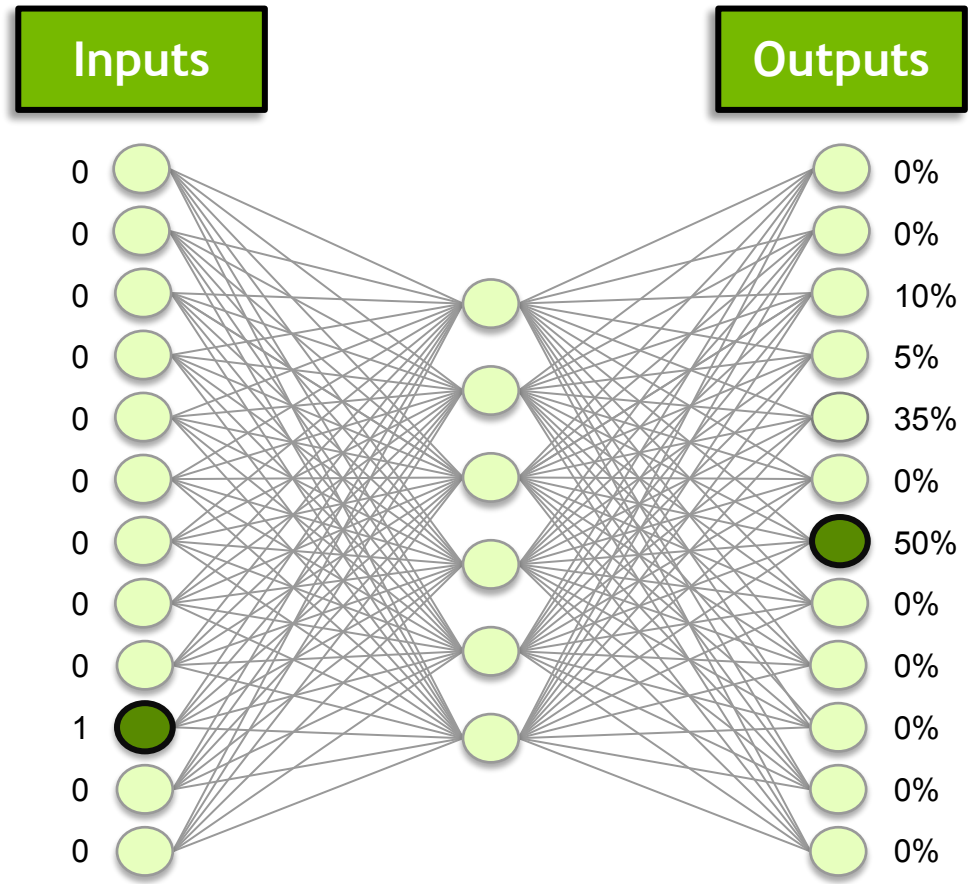
FROM WORDS TO NUMBERS



DICTIONARY

1. A
2. AN
3. AND
4. AT
5. ATE
6. BARK
7. BARKED
8. CAT
9. CATS
10. DOG
11. DOGS
12. EAT

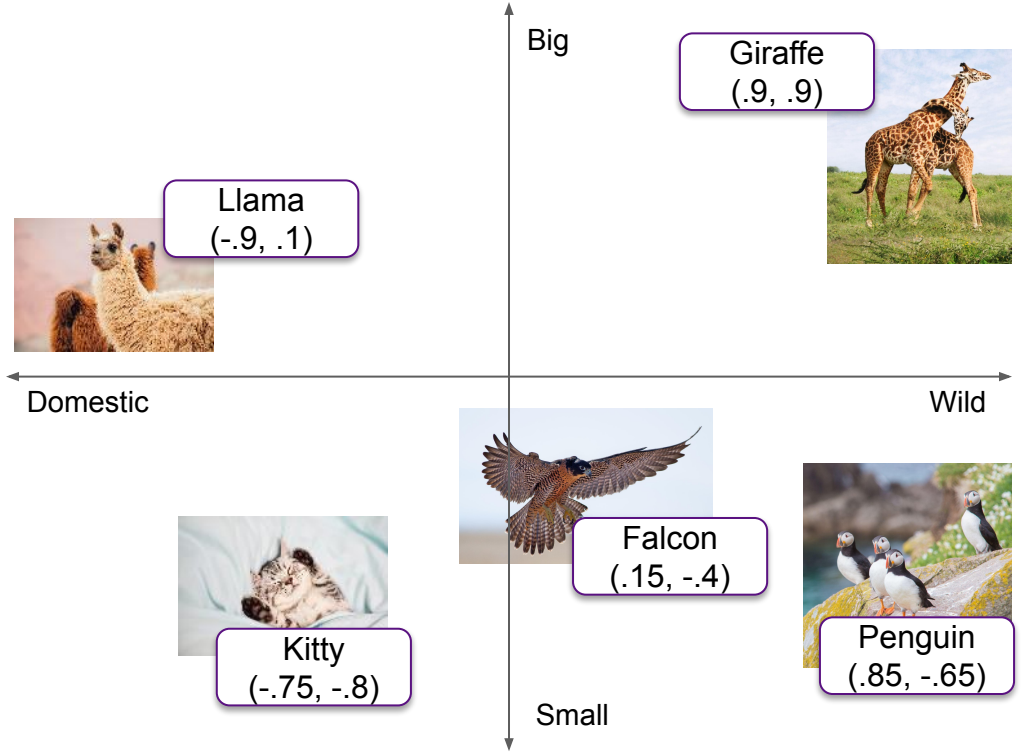
FROM WORDS TO NUMBERS



DICTIONARY

1. A
2. AN
3. AND
4. AT
5. ATE
6. BARK
7. BARKED
8. CAT
9. CATS
10. DOG
11. DOGS
12. EAT

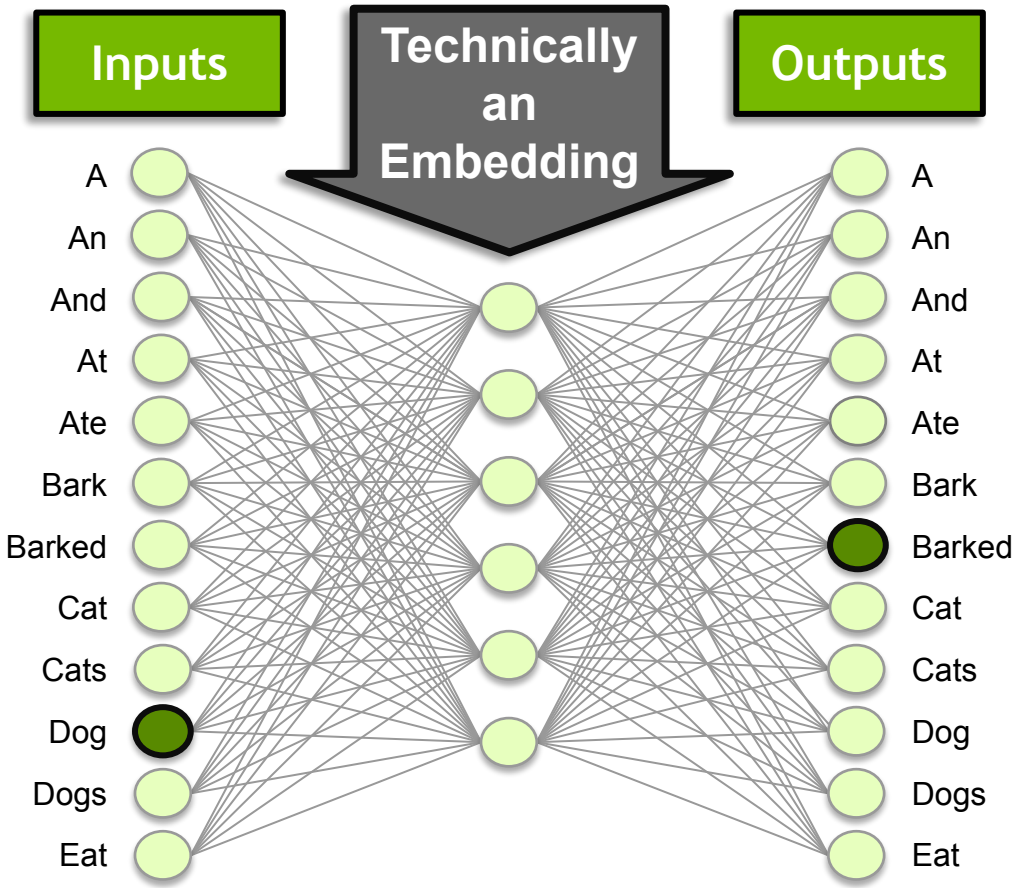
FROM WORDS TO NUMBERS

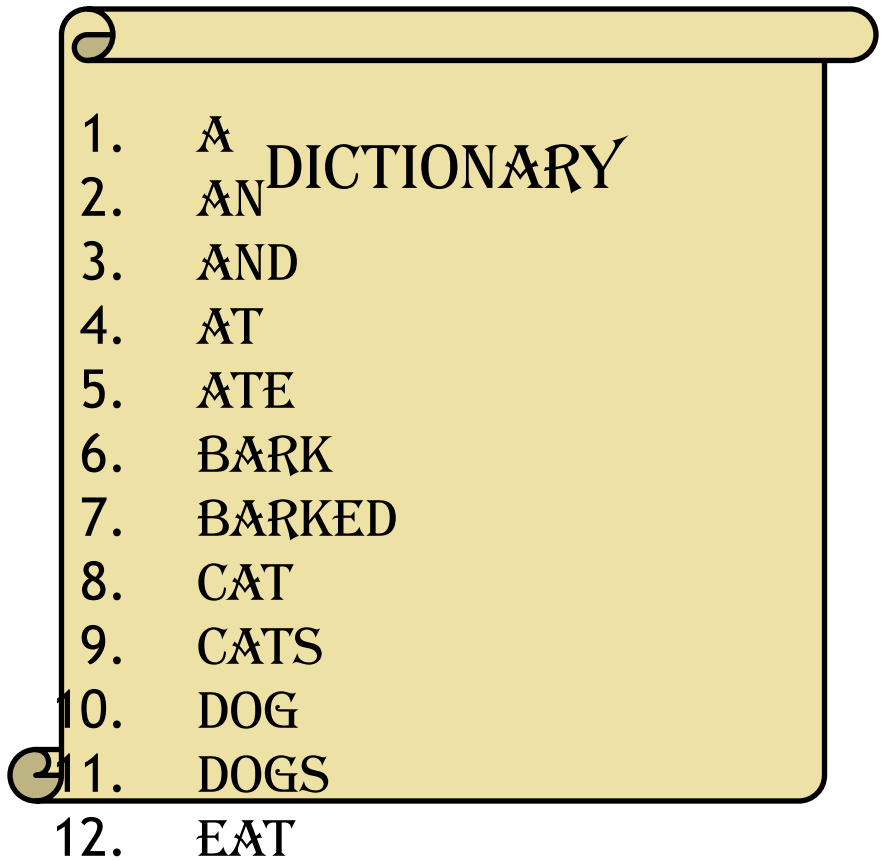


1. .
2. IN
3. AND
4. AT
5. ATE
6. BARK
7. BARKED
8. CAT
9. CATS
10. DOG
11. DOGS
12. EAT
13. EATEN
14. A
15. AN
16. AND
17. AT
18. ATE
19. BARK
20. BARKED
21. CAT
22. CATS
23. DOG
24. DOGS
25. EAT
26. EATEN
27. A
28. AN
29. AND
30. AT
31. ATE
32. BARK
33. BARKED
34. CAT
35. CATS
36. DOG
37. DOGS
38. EAT
39. EATEN
40. A
41. AN
42. AND
43. AT
44. ATE
45. BARK
46. BARKED
47. CAT
48. CATS
49. DOG
50. DOGS
51. EAT
52. EATEN
53. A
54. AN
55. AND
56. AT
57. ATE
58. BARK
59. BARKED
60. CAT
61. CATS
62. DOG
63. DOGS
64. EAT
65. EATEN
66. A
67. AN
68. AND
69. AT
70. ATE
71. BARK
72. BARKED

BIGGER DICTIONARY

FROM WORDS TO NUMBERS



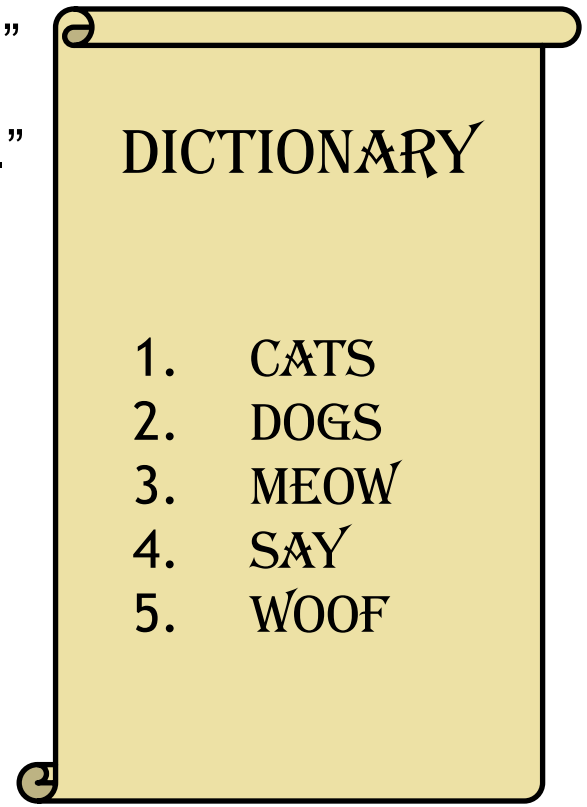


RECURRENT NEURAL NETWORKS

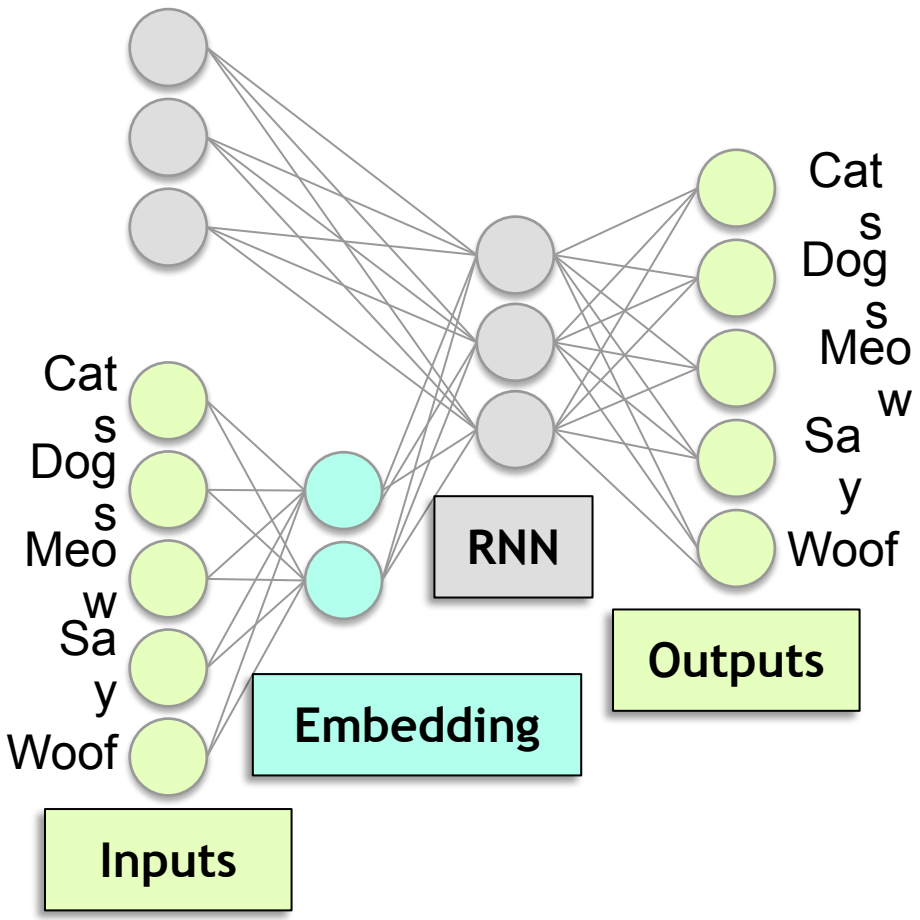
RECURRENT NEURAL NETWORKS

“Cats say ___.”

“Dogs say ___.”

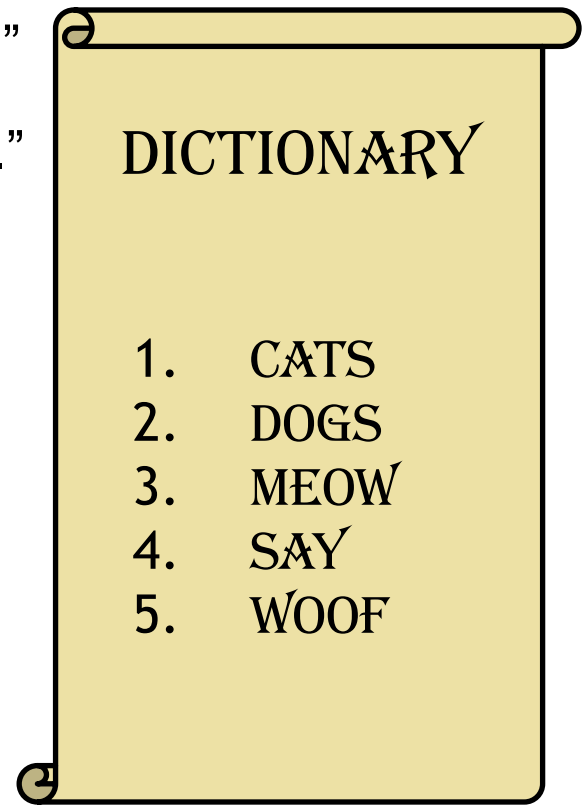


RECURRENT NEURAL NETWORKS

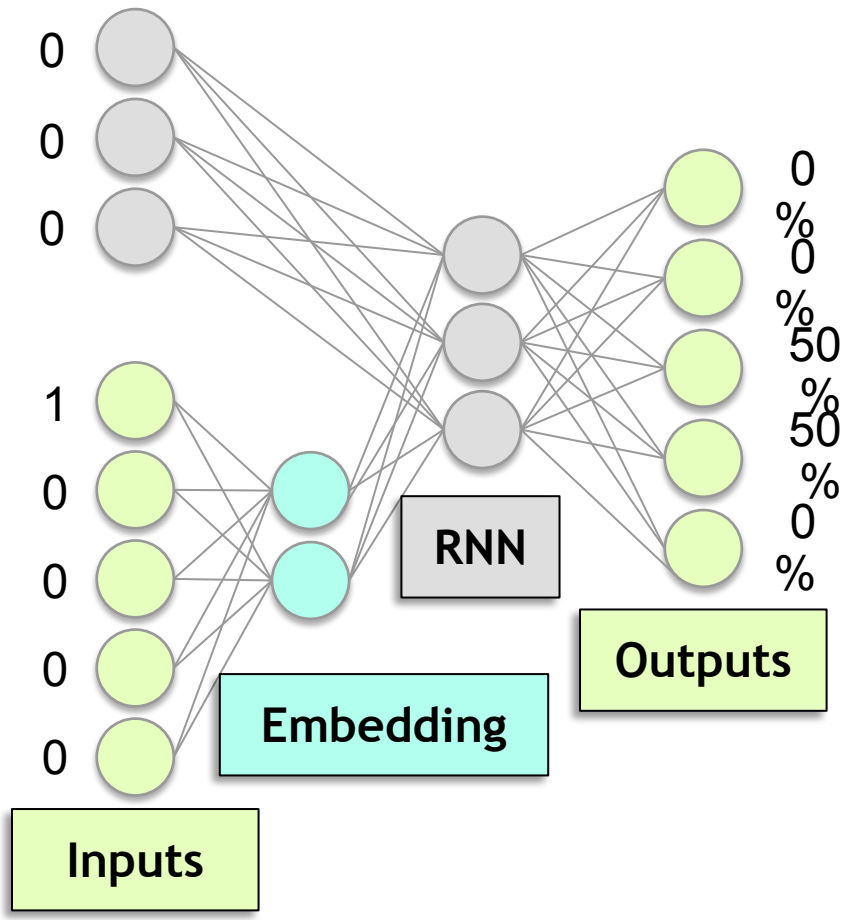


"Cats say ___."

"Dogs say ___."

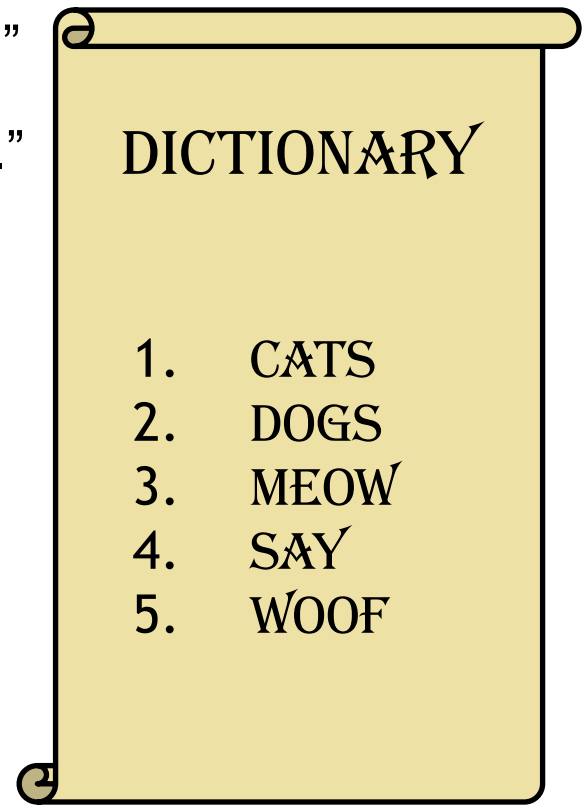


RECURRENT NEURAL NETWORKS

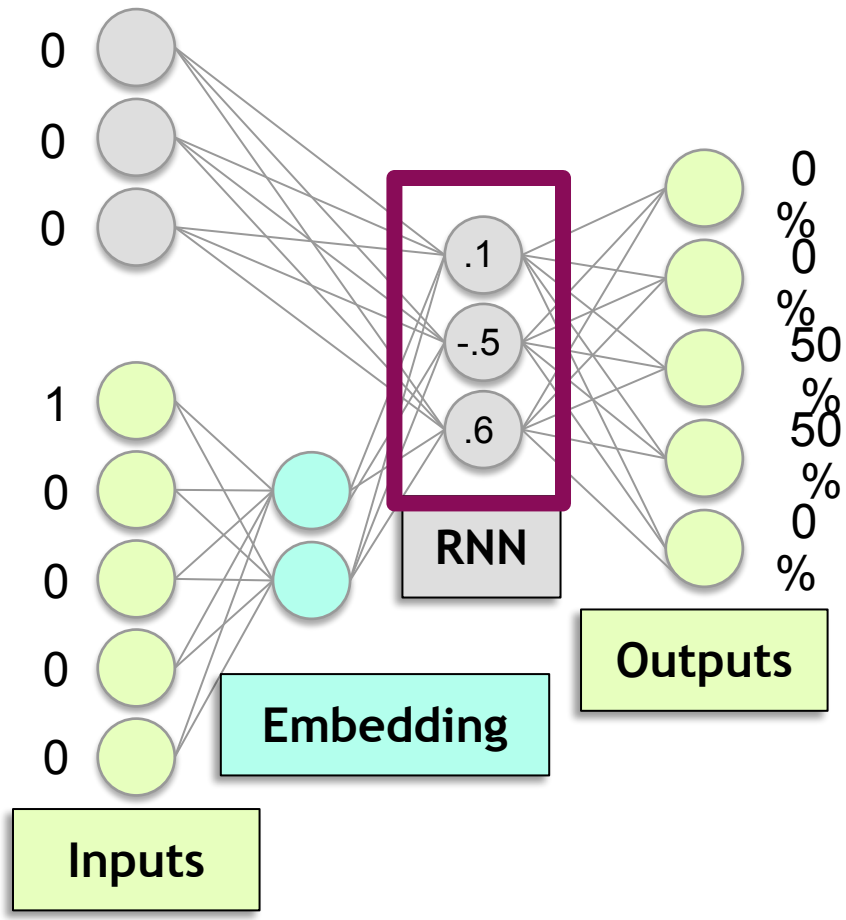


"Cats say ___."

"Dogs say ___."

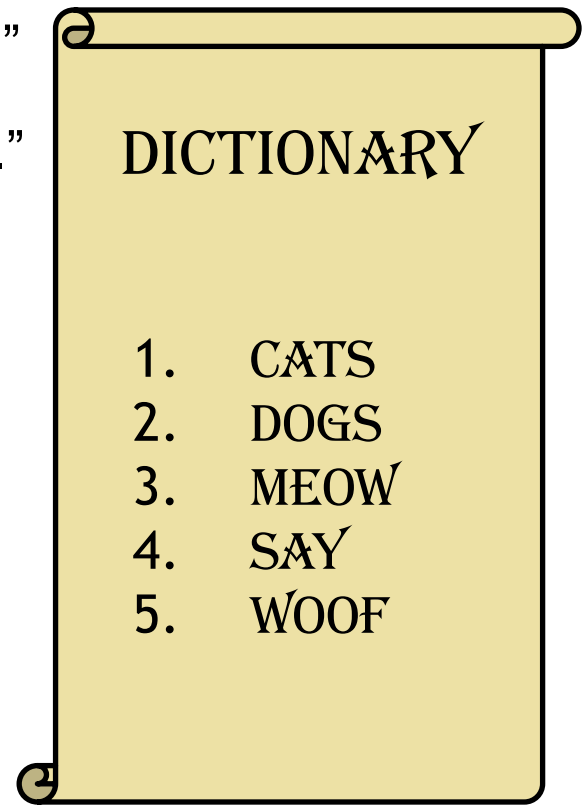


RECURRENT NEURAL NETWORKS

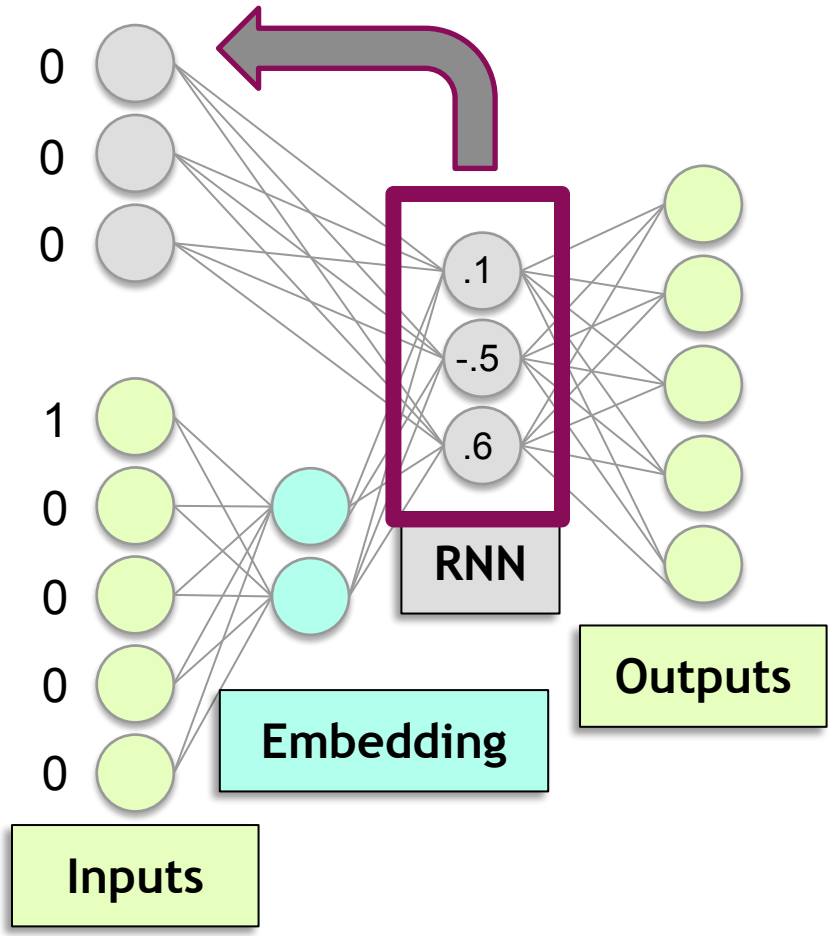


"Cats say ___."

"Dogs say ___."

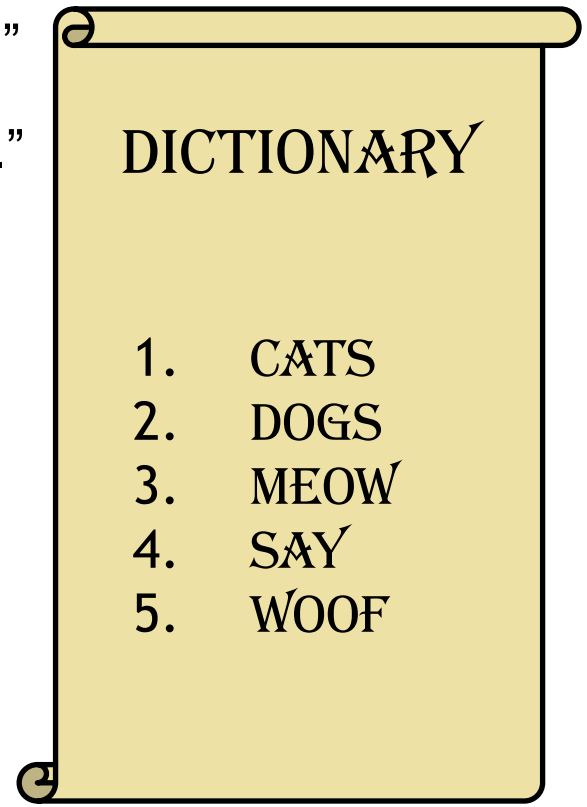


RECURRENT NEURAL NETWORKS

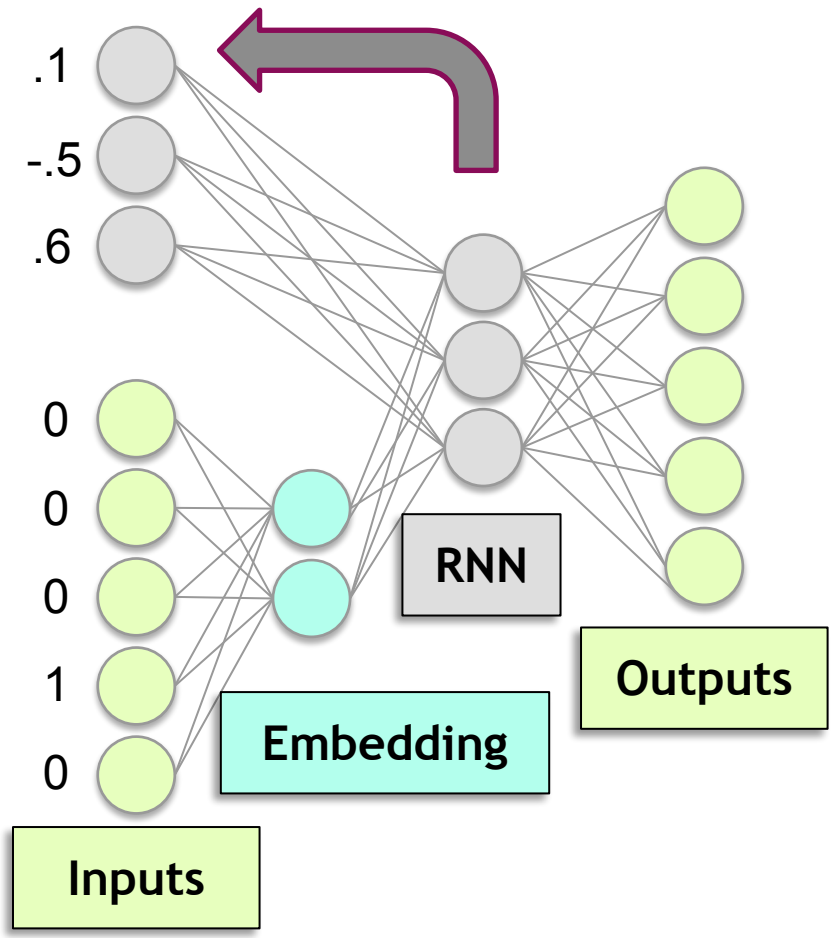


"Cats say ___."

"Dogs say ___."

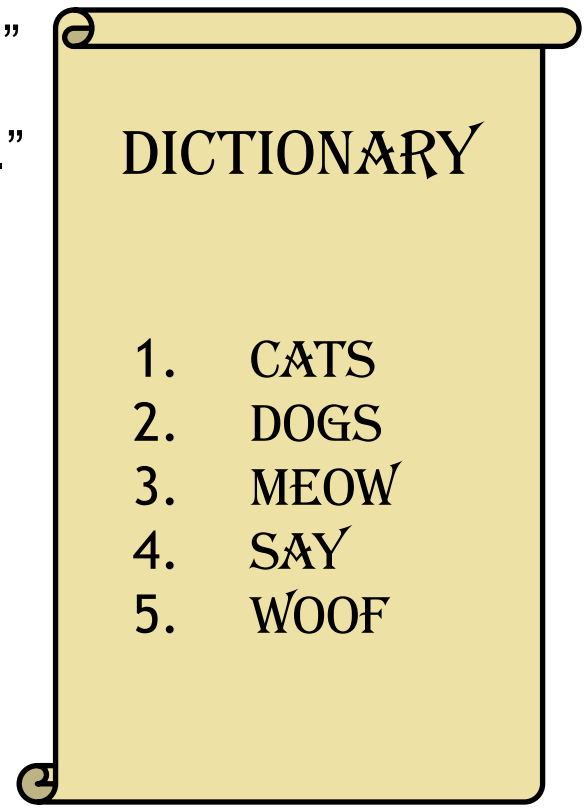


RECURRENT NEURAL NETWORKS

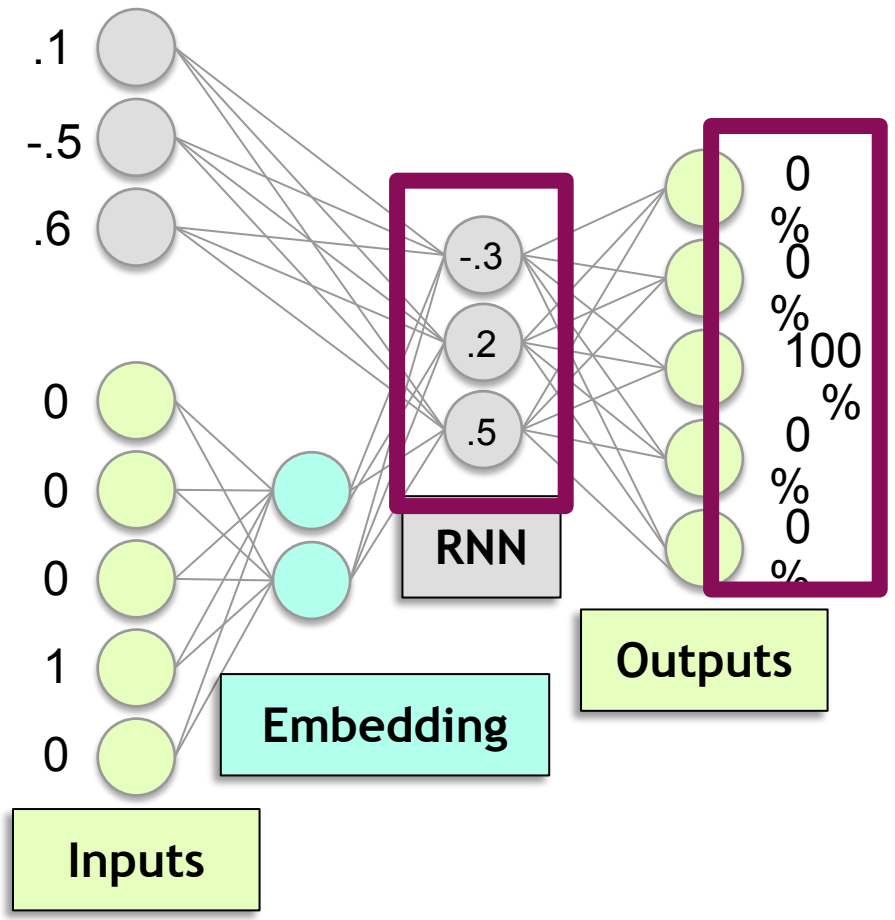


"Cats say ___."

"Dogs say ___."

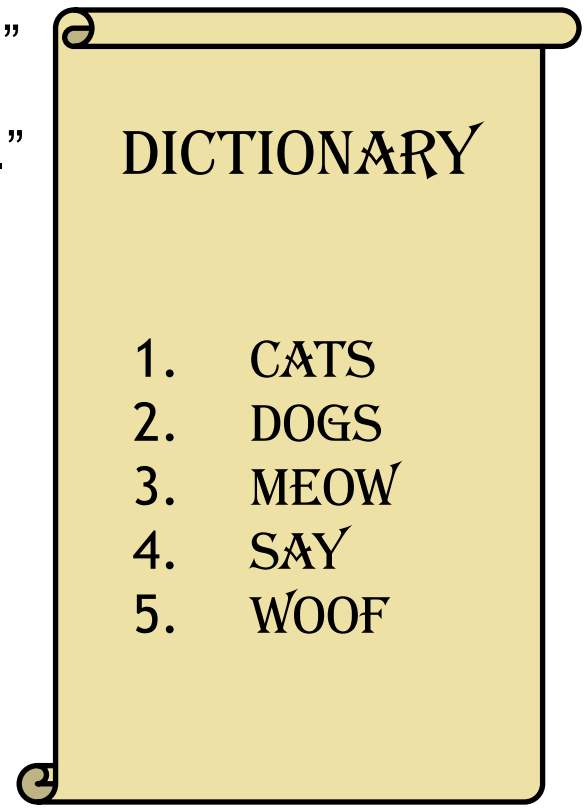


RECURRENT NEURAL NETWORKS

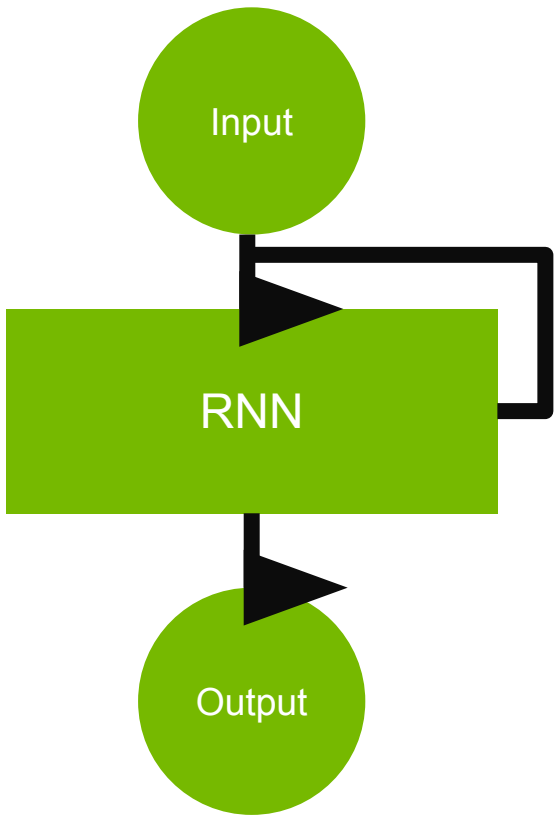


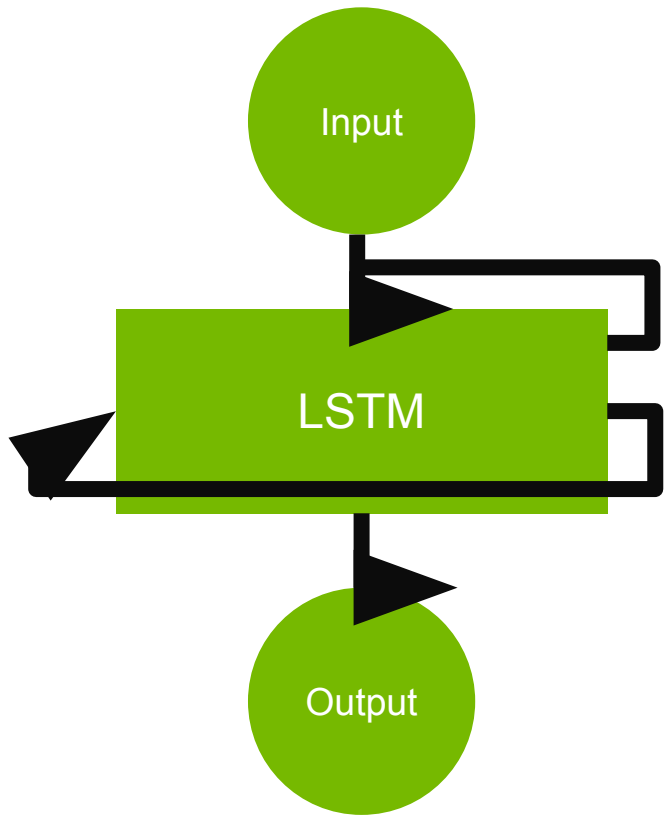
"Cats say ___."

"Dogs say ___."



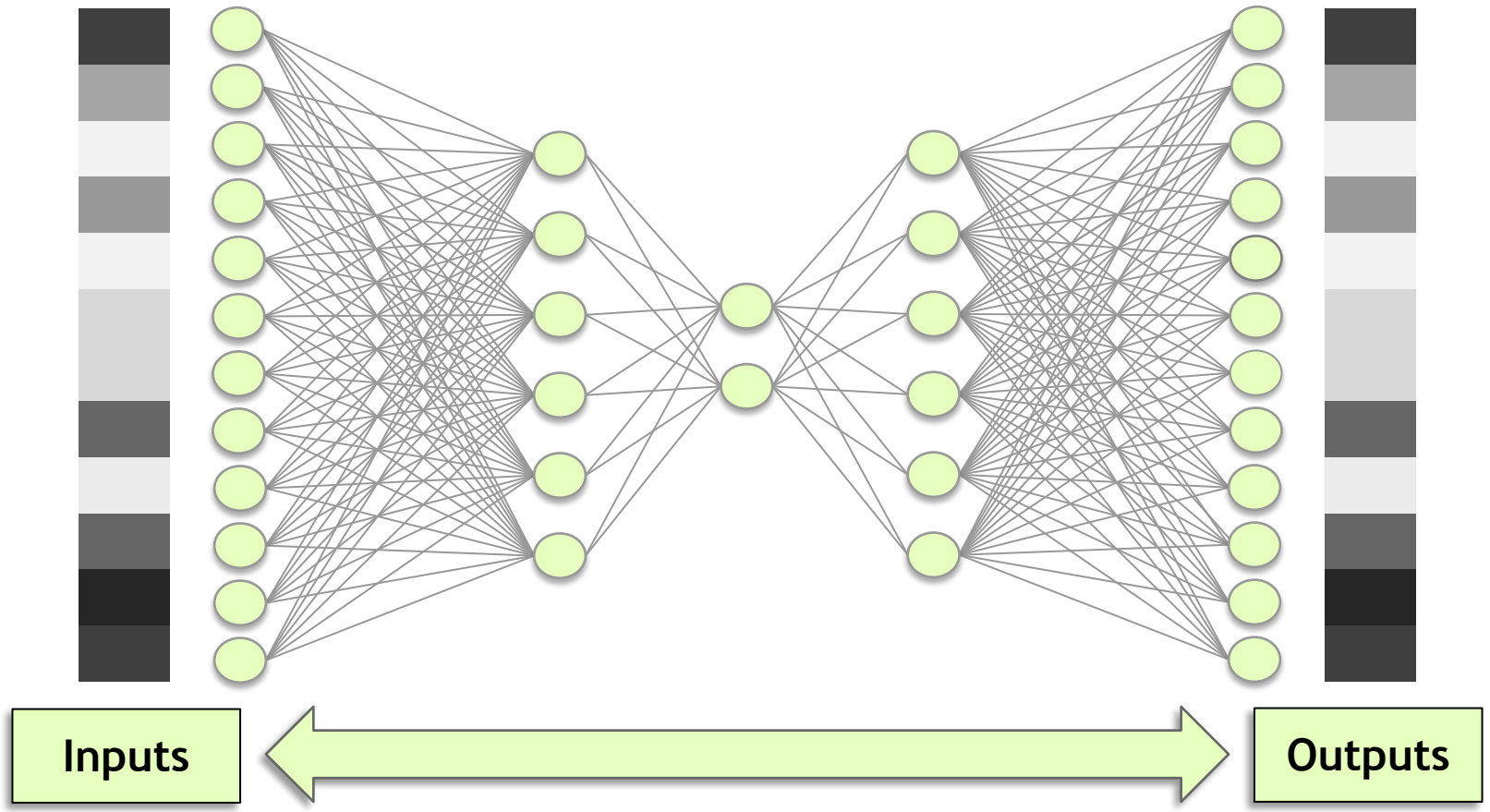
RECURRENT NEURAL NETWORKS



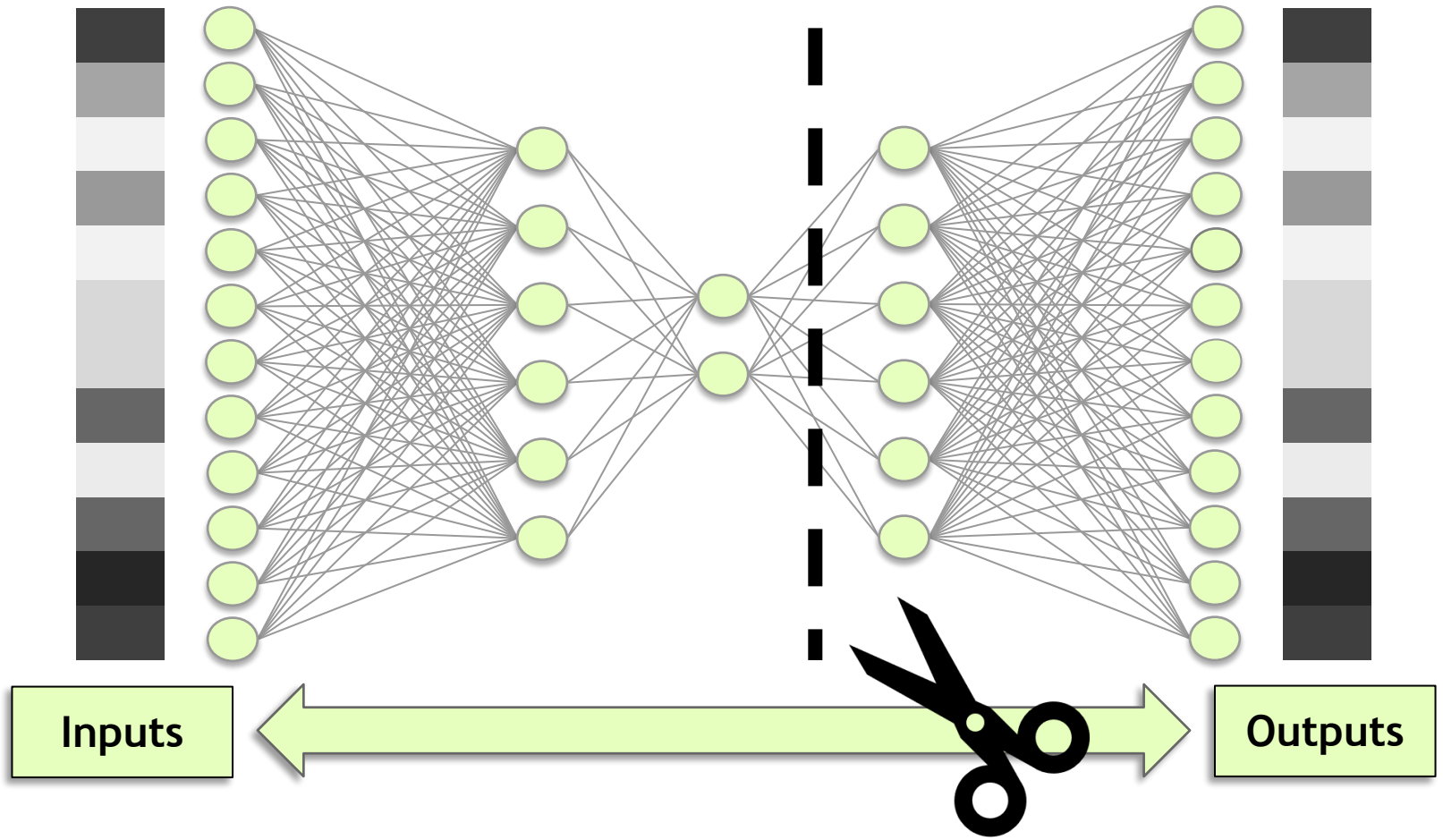


OTHER ARCHITECTURES

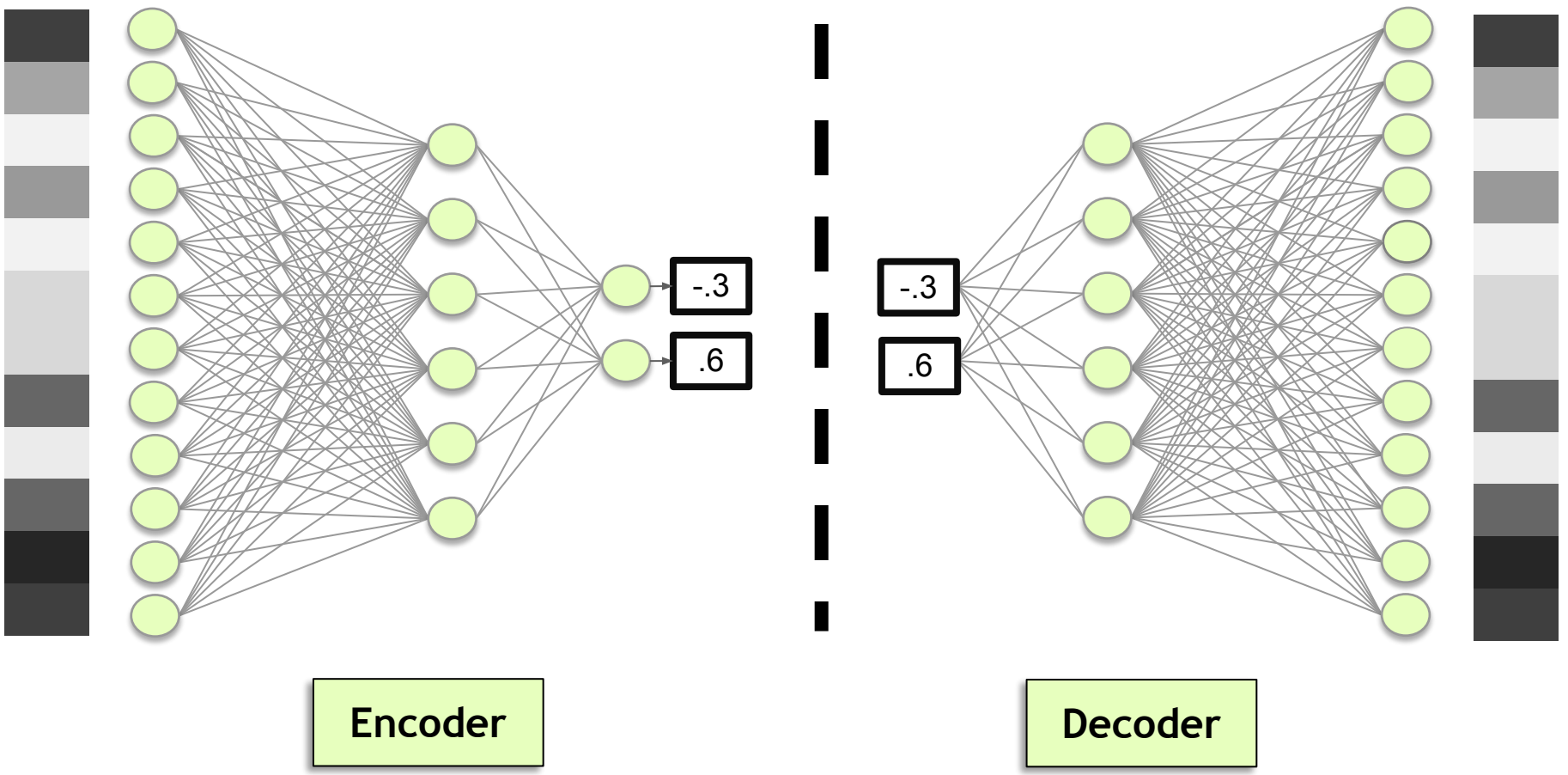
AUTOENCODERS



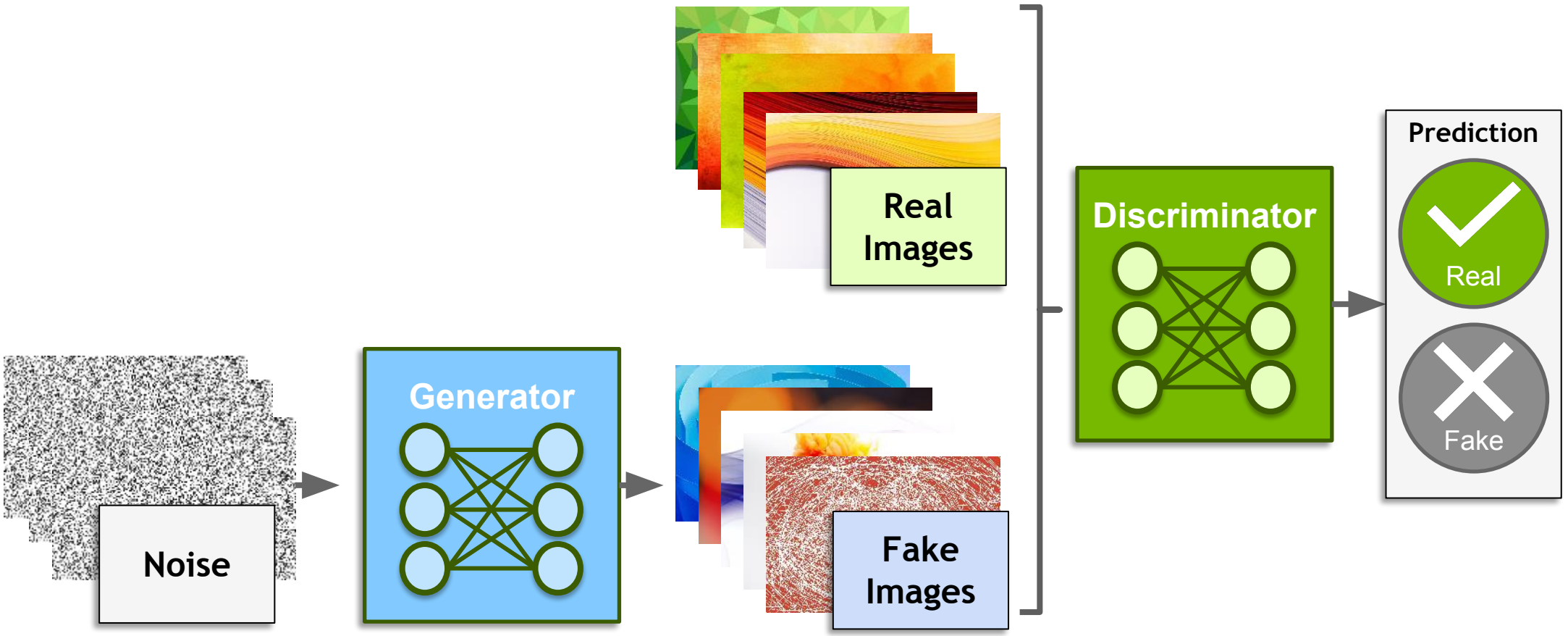
AUTOENCODERS



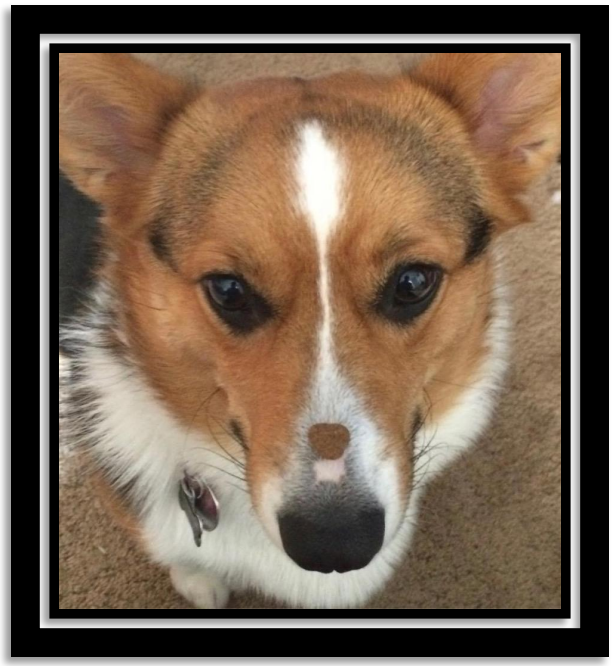
AUTOENCODERS

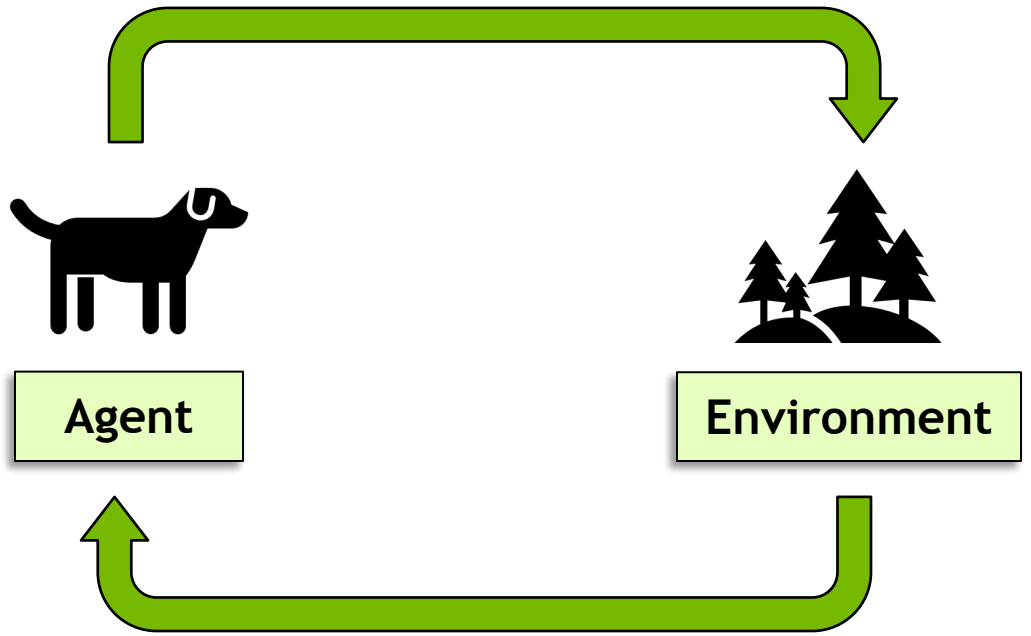


GENERATIVE ADVERSARIAL NETWORKS (GANS)



REINFORCEMENT LEARNING





NEXT STEPS

ENABLING PORTABILITY WITH NGC CONTAINERS

Extensive

- Diverse range of workloads and industry specific use cases

Optimized

- DL containers updated monthly
- Packed with latest features and superior performance

Secure & Reliable

- Scanned for vulnerabilities and crypto
- Tested on workstations, servers, & cloud instances

Scalable

- Supports multi-GPU & multi-node systems

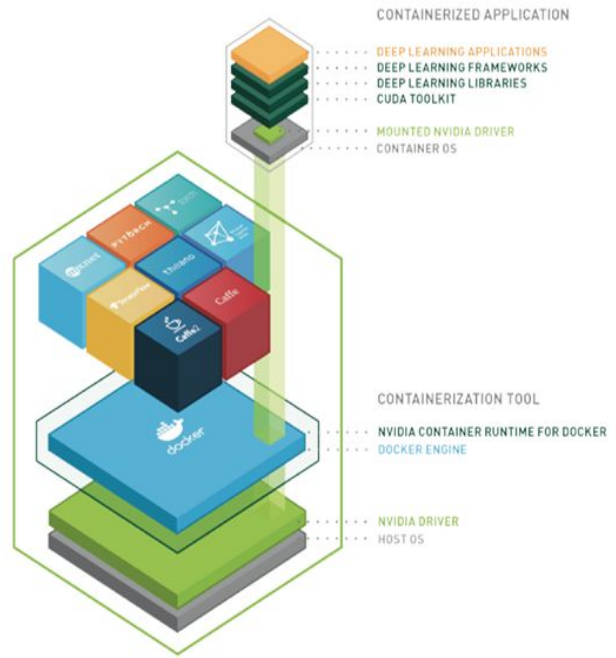
Designed for Enterprise & HPC

- Supports Docker, Singularity & other runtimes

Run Anywhere

- Bare metal, VMs, Kubernetes
- x86, ARM, POWER
- Multi-cloud, on-prem, hybrid, edge

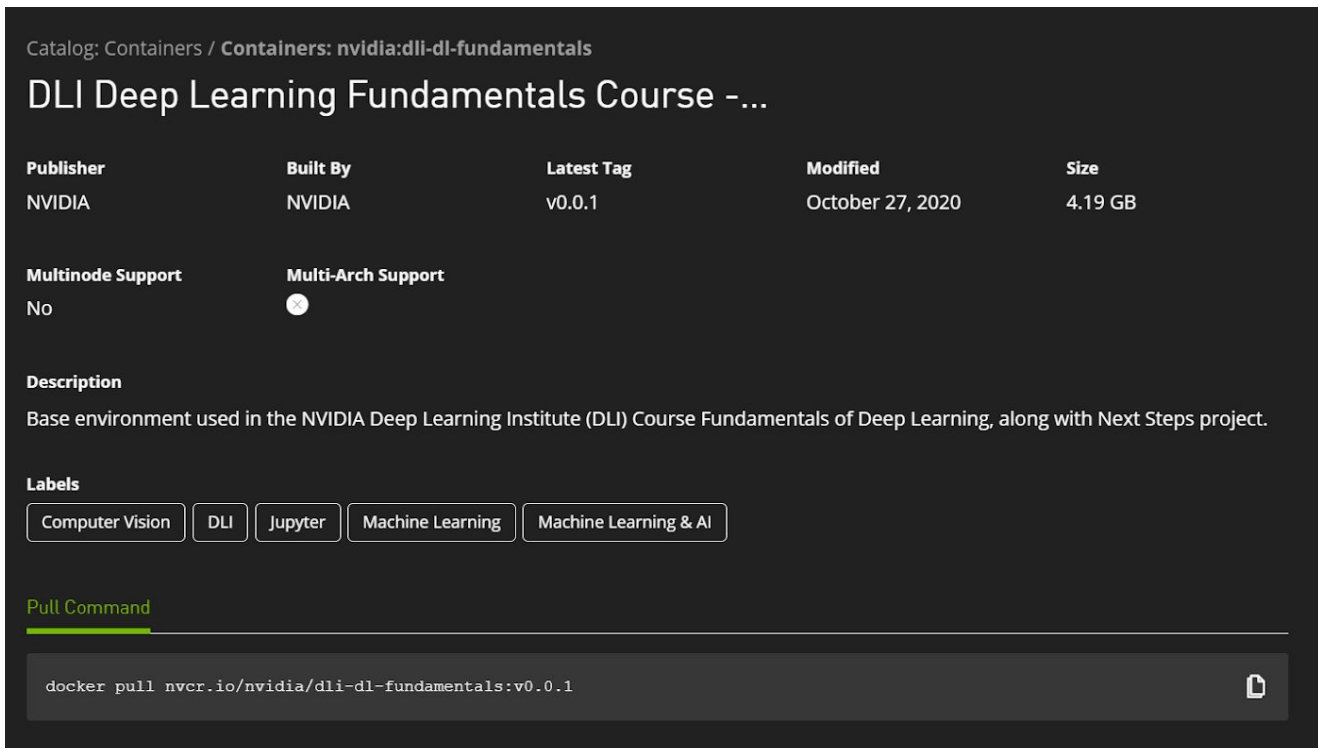
NGC Deep Learning Containers



CONVERSATIONAL AI — JARVIS | HEALTHCARE — CLARA | SMART CITIES — DEEPSTREAM & SMART PARKING | TELECOM — AERIAL | AUTONOMOUS DRIVING — DRIVE | ROBOTICS — ISAAC | HPC — HPC SDK

Learn more about NGC Containers

NEXT STEPS FOR THIS CLASS



Step 1 Setup Docker

https://www.docker.com/

Step 2 Visit NGC Catalog

https://ngc.nvidia.com/catalog/containers/nvidia:dli-dl-fundamentals

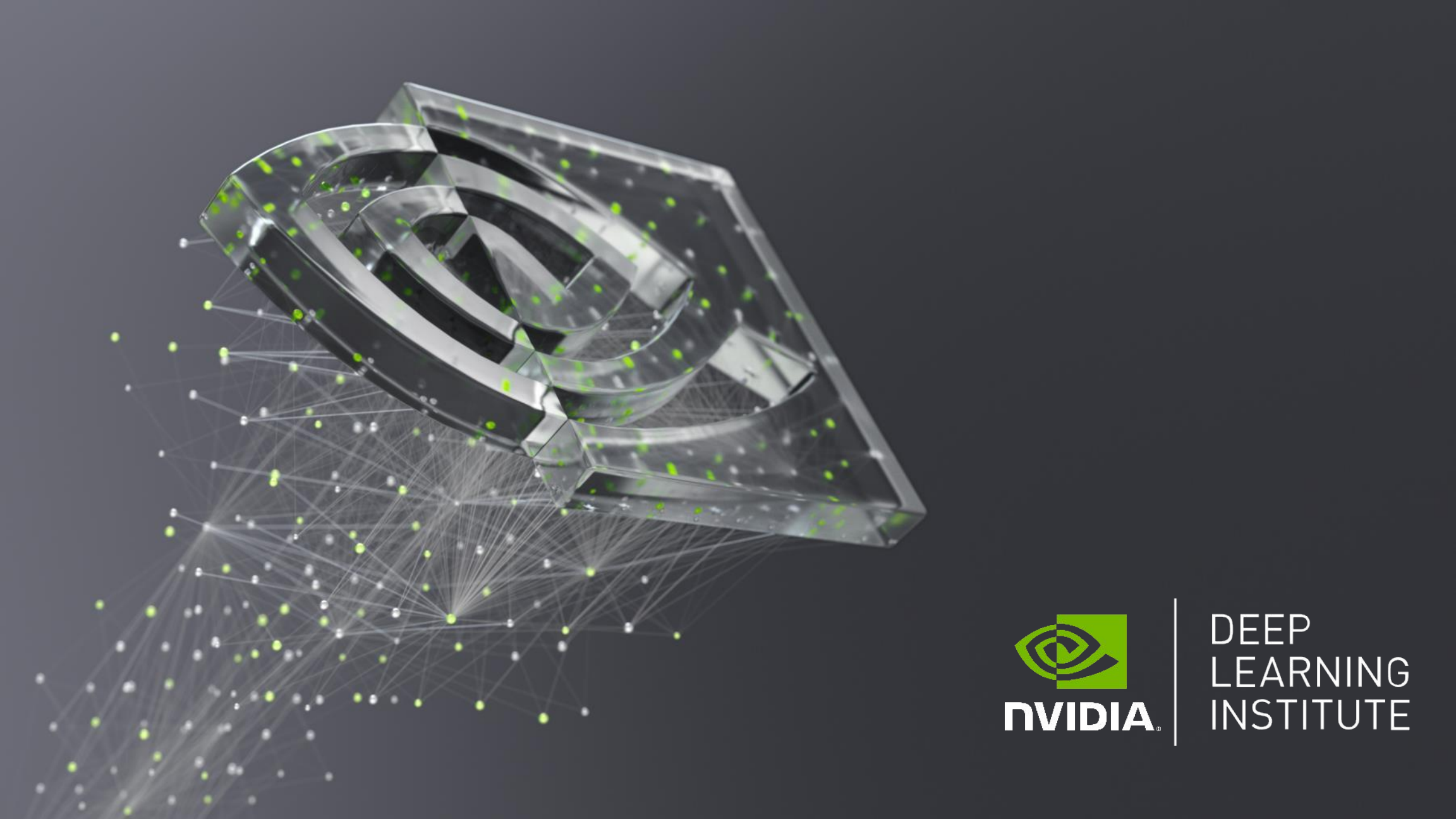
Step 3 Pull and Run Container

Visit localhost:8888 to check out a JupyterLab environment with a Next Steps Project

CLOSING THOUGHTS

COPYING ROCKET SCIENCE

LET’S GET STARTED!


NVIDIA
DEEP
LEARNING
INSTITUTE