

Week 9: Deep Learning Applications

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COMP0088 Introduction to Machine Learning • UCL Computer Science • Autumn 2023

Admin

- CW: bad language!

Week 9 Recap

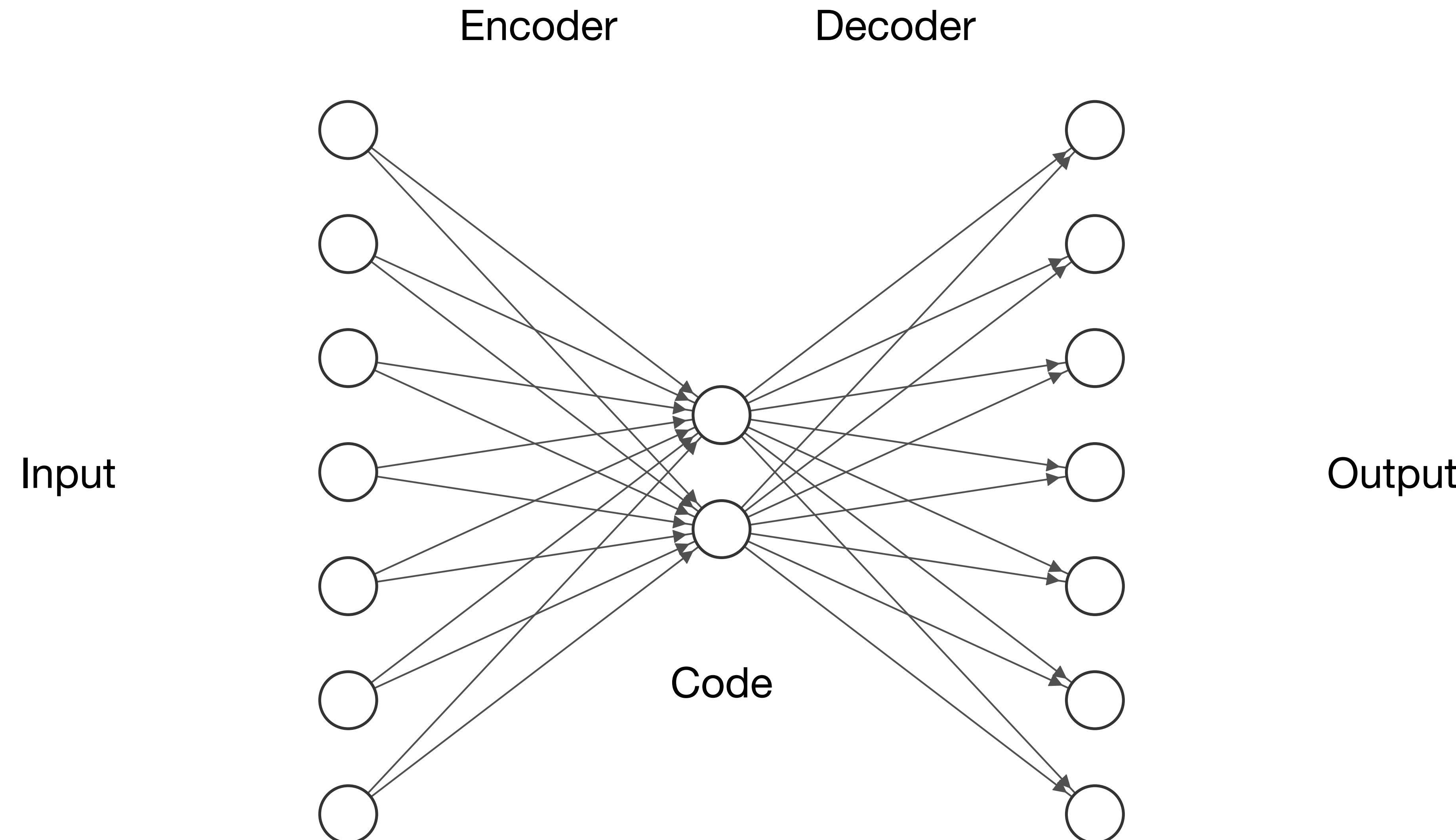
Distilling the Doshes

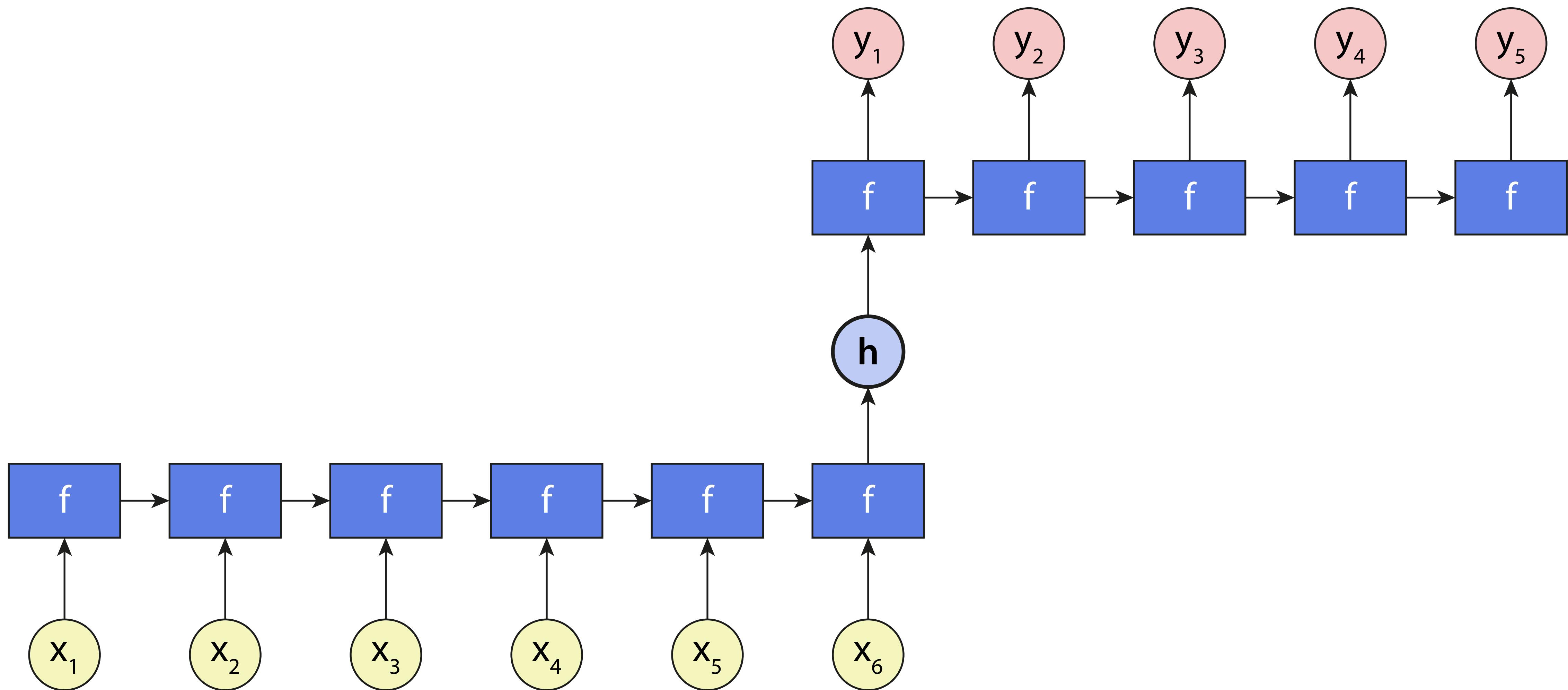




Act I







x^T

(one-hot)

 $[0, 1, 0, 0, 0] \times$ W \tilde{x}^T

(embedding)

	e_1	e_2	e_3
vampire	0.99	0.64	0.15
groundhogs	0.45	0.03	0.88
cast	0.02	0.46	0.6
no	0.73	0.89	0.9
shadow	0.83	0.75	0.44

 $= [0.45, 0.03, 0.88]$



In the population of Transylvania there are four distinct nationalities: Saxons in the South, and mixed with them the Wallachs, who are the descendants of the Dacians; Magyars in the West, and Szekelys in the East and North. I am going among the latter, who claim to be descended from Attila and the Huns. This may be so, for when the Magyars conquered the country in the eleventh century they found the Huns settled in it. I read that every known superstition in the world is gathered into the horseshoe of the Carpathians, as if it were the centre of some sort of imaginative whirlpool; if so my stay may be very interesting. (*Mem.*, I must ask the Count all about them.)

I did not sleep well, though my bed was comfortable enough, for I had all sorts of queer dreams. There was a dog howling all night under my window, which may have had something to do with it; or it may have been the paprika, for I had to drink up all the water in my carafe, and was still thirsty. Towards morning I slept and was wakened by the continuous knocking at my door, so I guess I must have been sleeping soundly then. I had for breakfast more paprika, and a sort of porridge of maize flour which they said was "mamaliga," and egg-plant stuffed with forcemeat, a very excellent dish, which they call "impletata." (*Mem.*, get recipe for this also.) I had to hurry breakfast, for the train started a little before eight, or rather it ought to have done so, for after rushing to the station at 7:30 I had to sit in the carriage for more than an hour before we began to move. It seems to me that the further east you go the more unpunctual are the trains. What ought they to be in China?

All day long we seemed to dawdle through a country which was full of beauty of every kind. Sometimes we saw little towns or castles on the top of steep hills such as we see in old missals; sometimes we ran by rivers and streams which seemed from the wide stony margin on each side of them to be subject to great floods. It takes a lot of water, and running strong, to sweep the outside edge of a river clear. At every station there were groups of people, sometimes crowds, and in all sorts of attire. Some of them were just like the peasants at home or those I saw coming through France and Germany, with short jackets and round hats and home-made trousers; but others were very picturesque. The women looked pretty, except when you got near them, but they were very clumsy about the waist. They had all full white sleeves of some kind or other, and most of them had big belts with a lot of strips of something fluttering from them like the dresses in a ballet, but of course there were petticoats under them. The strangest figures we saw were the Slovaks, who were more barbarian than the rest, with their big cow-boy hats, great baggy dirty-white trousers, white linen shirts, and enormous heavy leather belts, nearly a foot wide, all studded over with brass nails. They wore high boots, with their trousers tucked into them, and had long black hair and heavy black moustaches. They are very picturesque, but do not look prepossessing. On the stage they would be set down at once as some old Oriental band of brigands. They are, however, I am told, very harmless and rather wanting in natural self-assertion.

It was on the dark side of twilight when we got to Bistritz, which is a very interesting old place. Being practically on the frontier—for the Borgo Pass leads from it into Bukovina—it has had a very stormy existence, and it certainly shows marks of it. Fifty years ago a series of great fires took place, which made terrible havoc on five separate occasions. At the very beginning of the seventeenth century it underwent a siege of three weeks and lost 13,000 people, the casualties of war proper being assisted by famine and disease.

Count Dracula had directed me to go to the Golden Krone Hotel, which I found, to my great delight, to be thoroughly old-fashioned, for of course I wanted to see all I could of the ways of the country. I was evidently expected, for when I got near the door I faced a cheery-looking elderly woman in the usual peasant dress—white undergarment with long double apron, front, and back, of coloured stuff fitting almost too tight for modesty. When I came close she bowed and said, "The Herr Englishman?" "Yes," I said, "Jonathan Harker." She smiled, and gave some message to an elderly man in white shirt-sleeves, who had followed her to the door. He went, but immediately returned with a letter:—

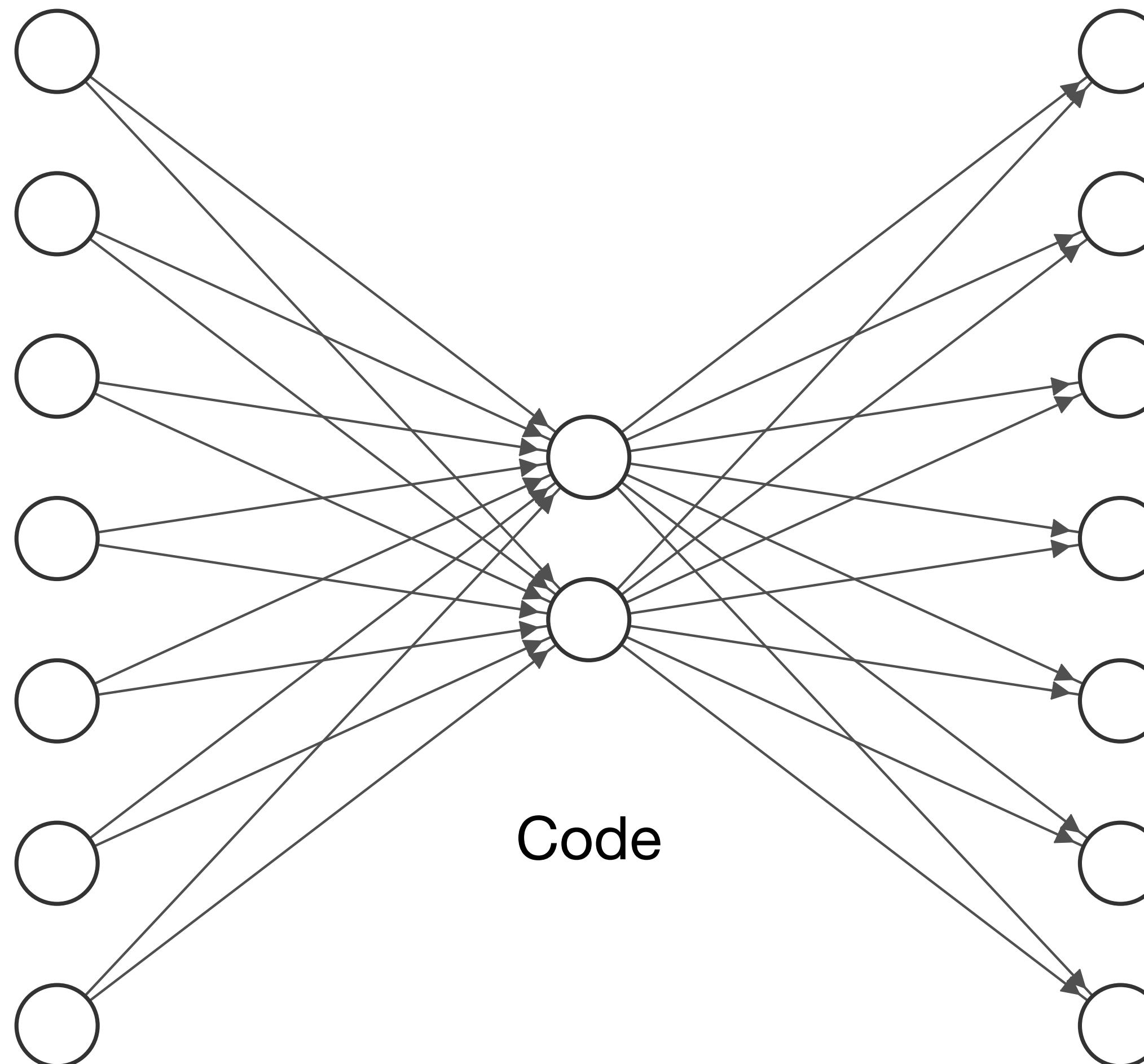
"My Friend.—Welcome to the Carpathians. I am anxiously expecting you. Sleep well to-night. At three to-morrow the diligence will start for Bukovina; a place on it is kept for you. At the Borgo Pass my carriage will await you and will bring you to me. I trust that your journey from London has been a happy one, and that you will enjoy your stay in my beautiful land."

self-supervision

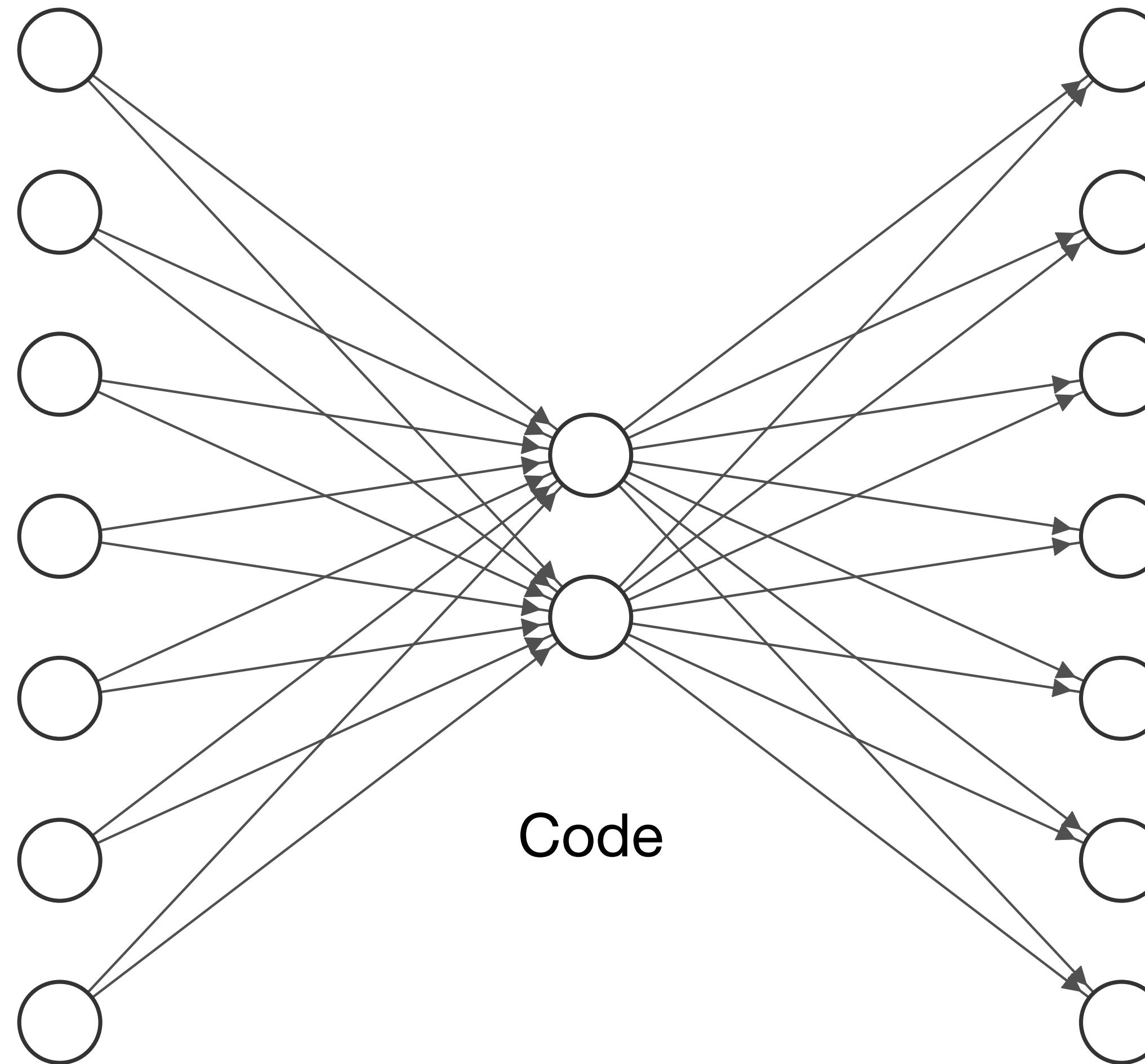


Encoder

Decoder



Autoencoder



$$\|\hat{\mathbf{x}} - \mathbf{x}\|^2$$

fur

pig

cats

restaurant

coat

elephant

hat

The logo consists of a small yellow bird icon followed by the word "bird" in a lowercase sans-serif font.

A small icon consisting of two overlapping circles, one yellow and one grey, with the text "snake" and "female" written next to it.

jungle

bat

cat

arrow

info

ears

dogs

pet

walking

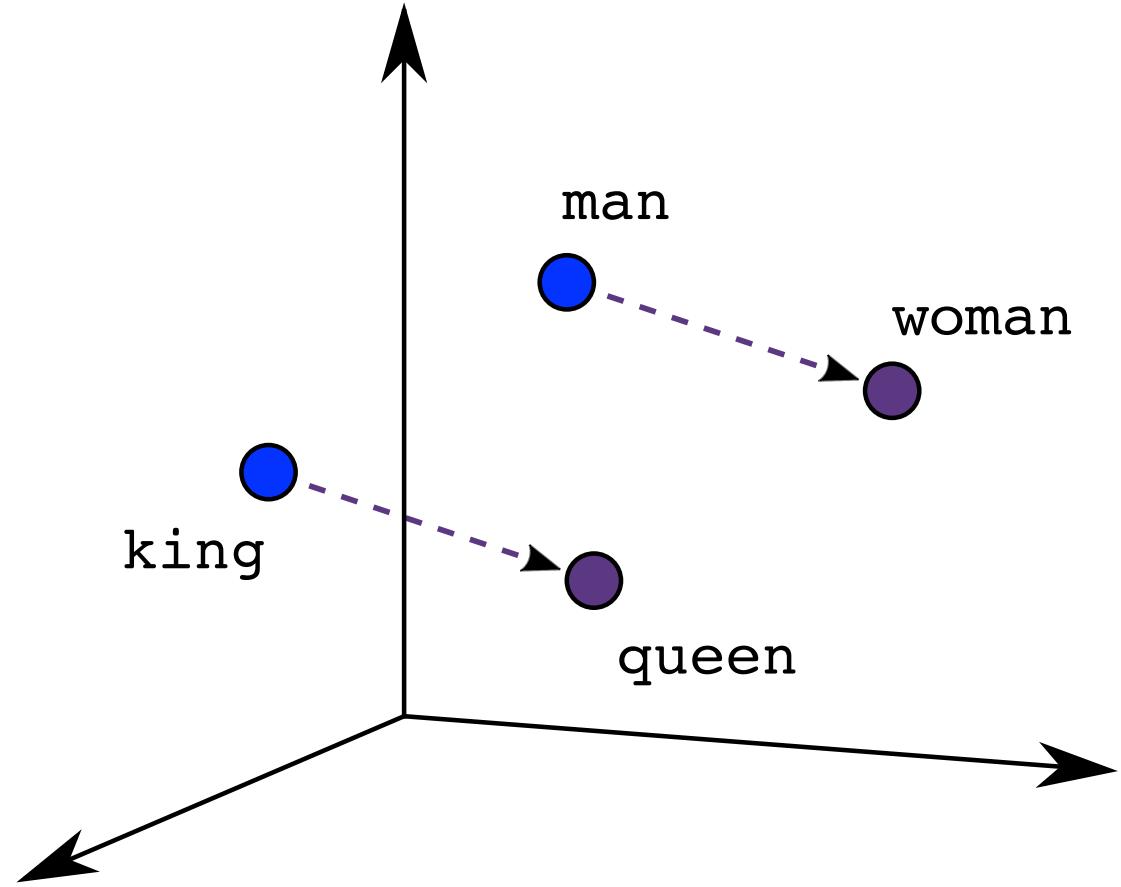
COW

The logo consists of a yellow circle followed by the lowercase letters "rat" in a black sans-serif font.

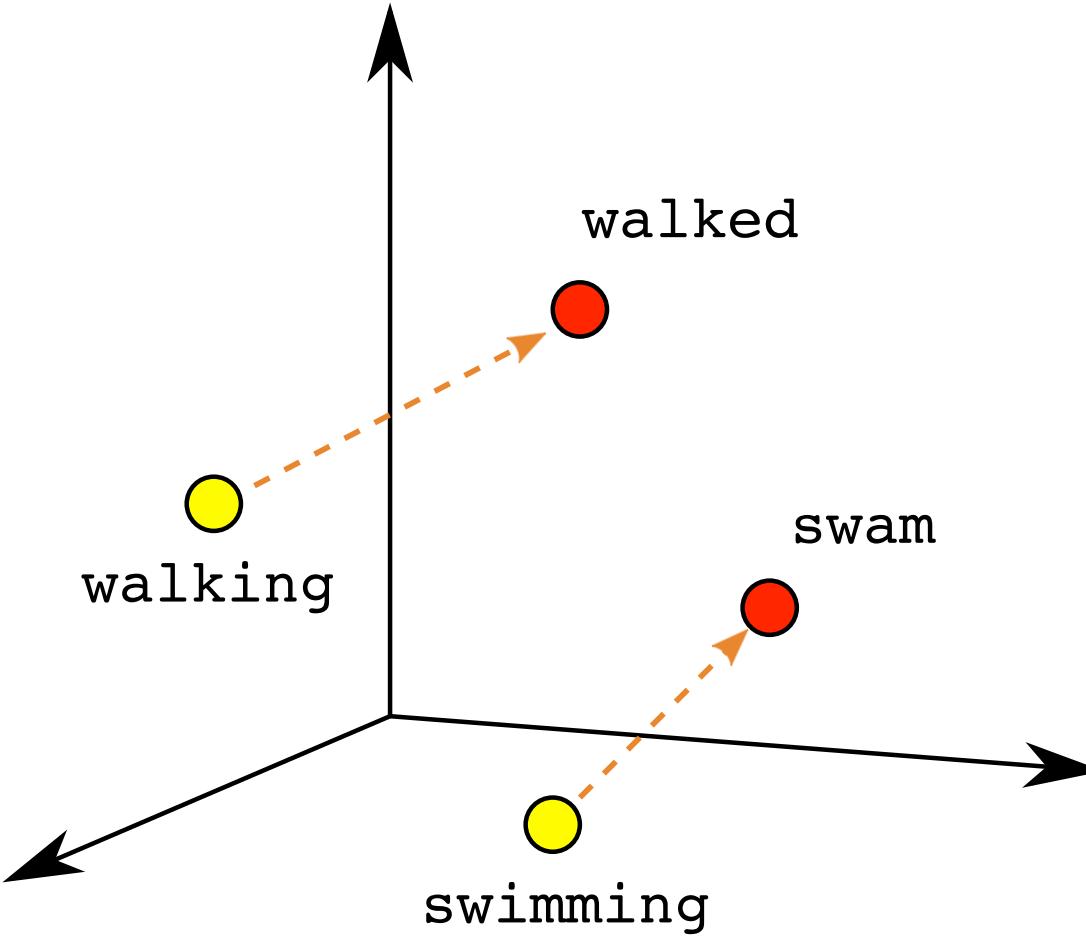
wild

spider

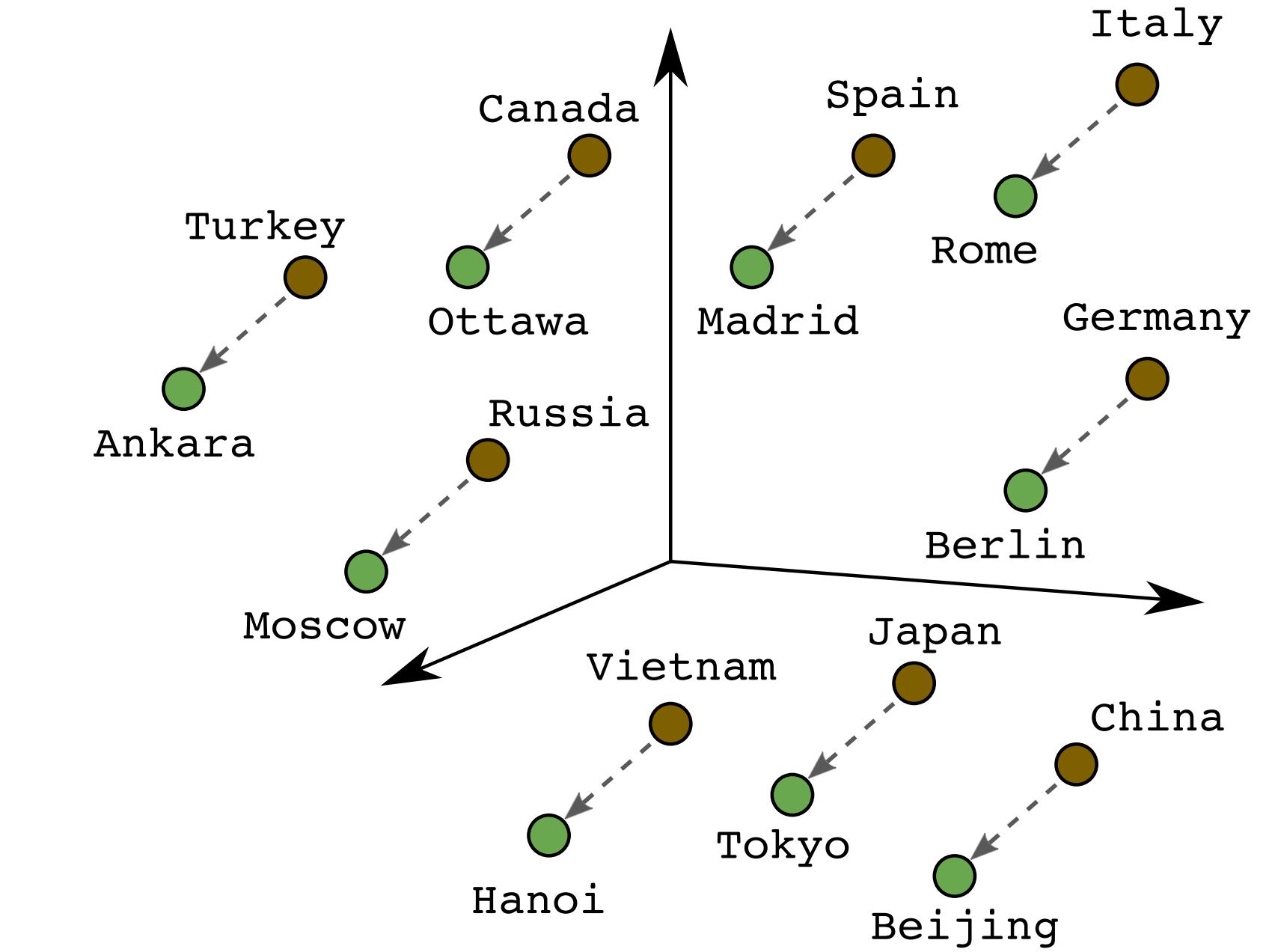
paradise



Male-Female

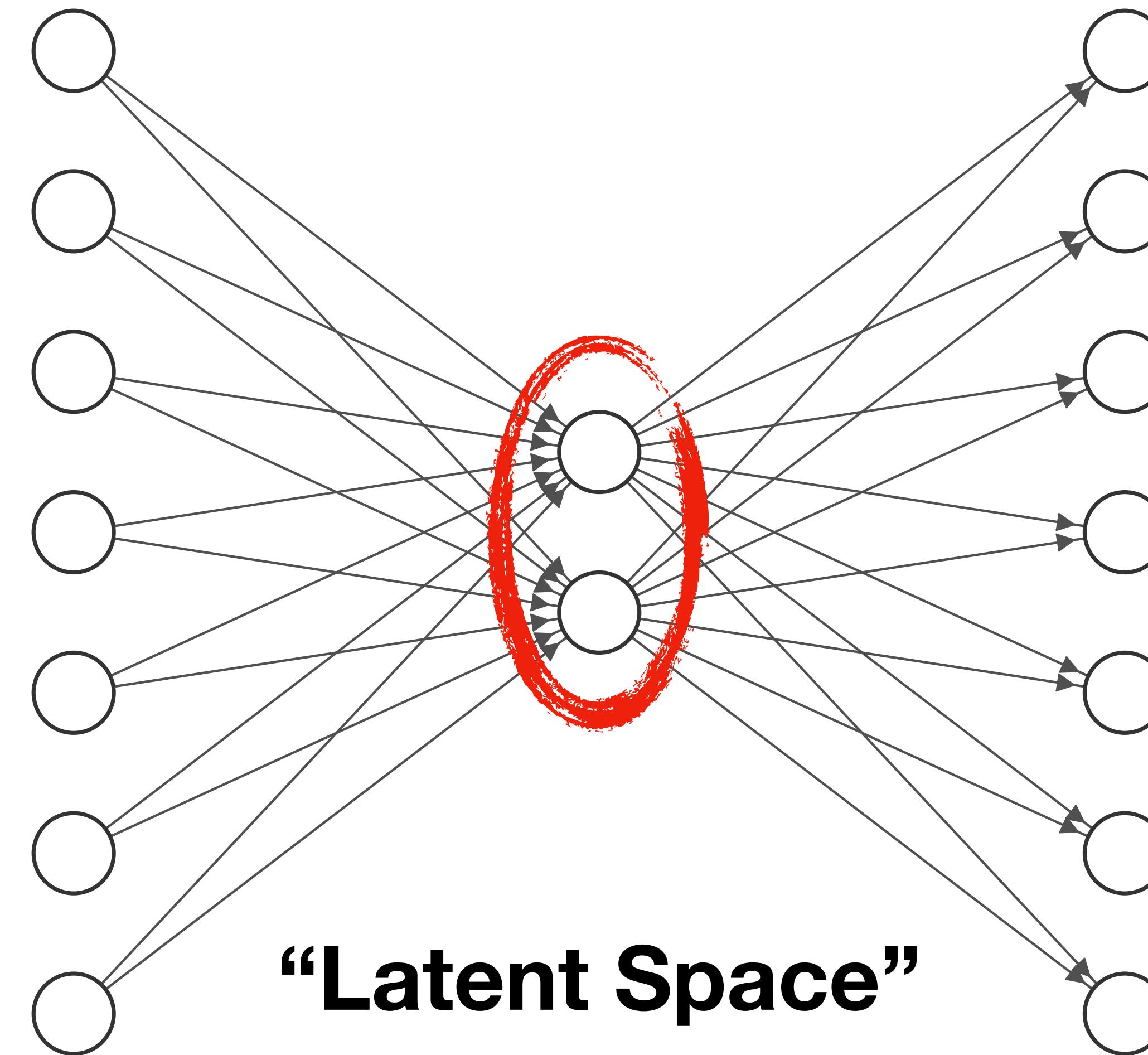


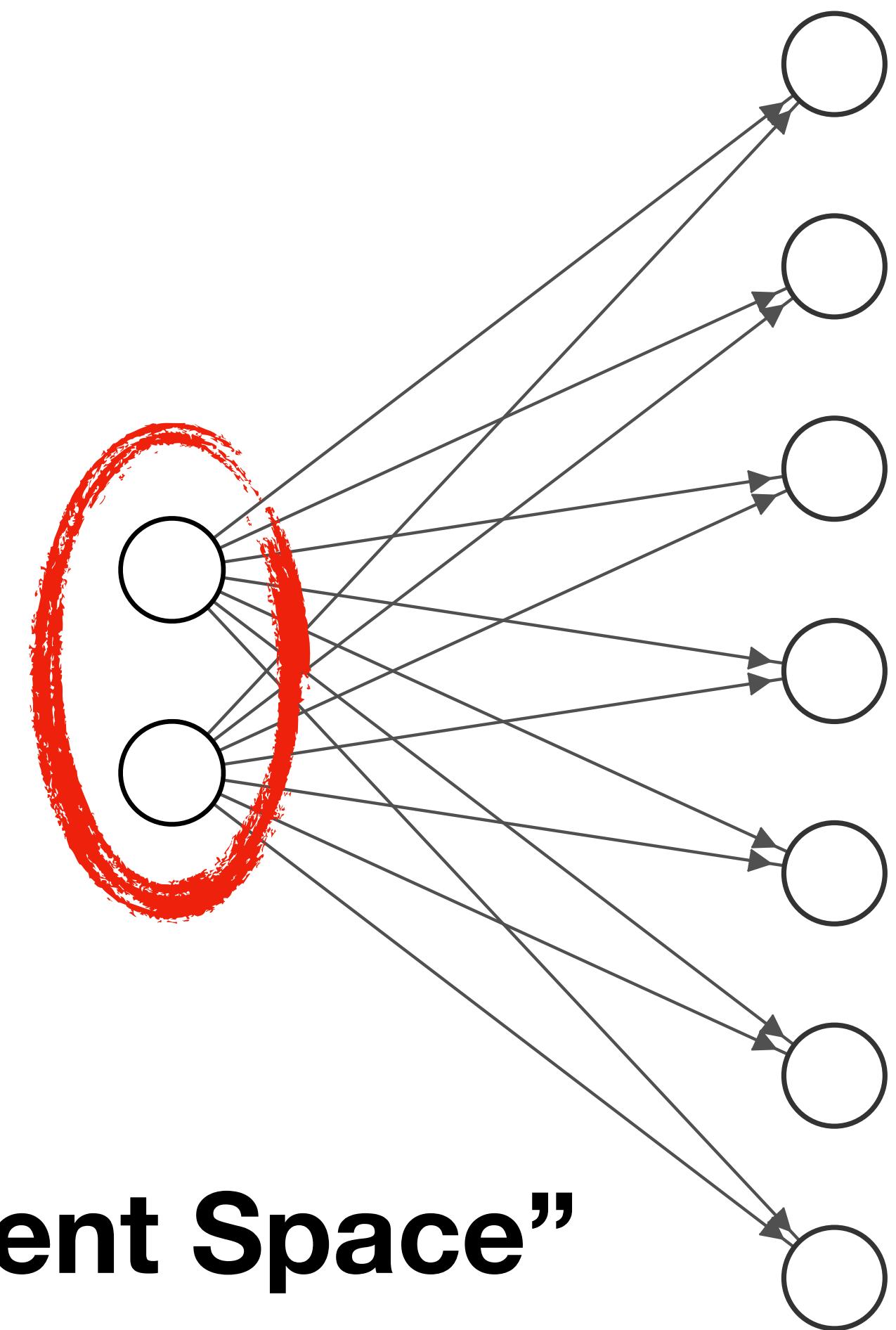
Verb Tense



Country-Capital

Autoencoder

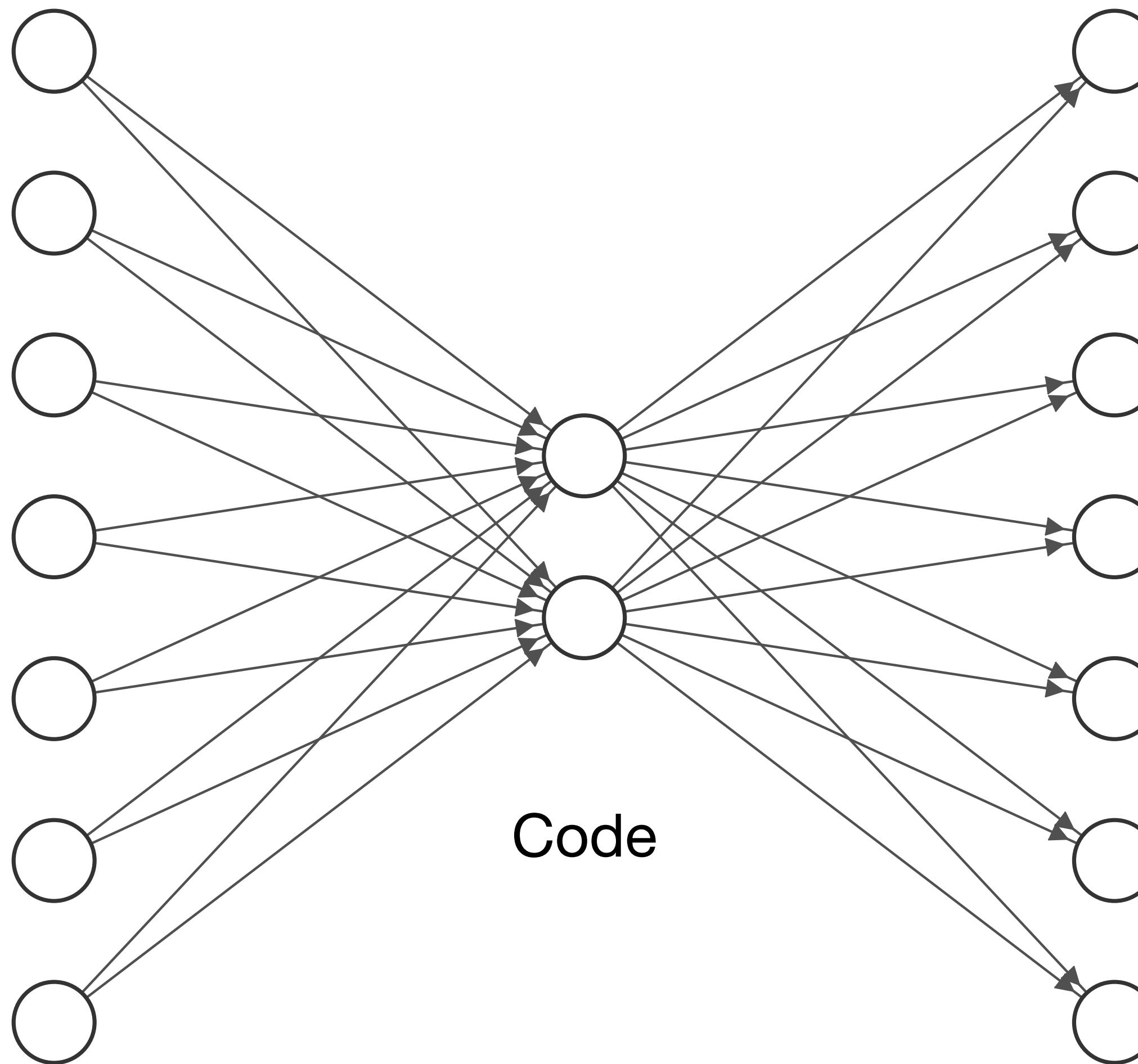




“Latent Space”



Autoencoder



$$\|\hat{\mathbf{x}} - \mathbf{x}\|^2$$

$$D_{\text{KL}}(P||Q) = \sum_x P(x) \log \frac{P(x)}{Q(x)}$$

$$\mu_i, \sigma_i = \text{encoder}(\mathbf{x}_i)$$

$$\hat{\mathbf{x}}_i = \text{decoder}(N(\mu_i, \sigma_i^2))$$

$$L_i = D_{\text{KL}}[N(\mu_i, \sigma_i^2), N(0, \mathbf{I})] + C \|\mathbf{x}_i - \hat{\mathbf{x}}_i\|^2$$

$$\mu_i, \sigma_i = \text{encoder}(\mathbf{x}_i)$$

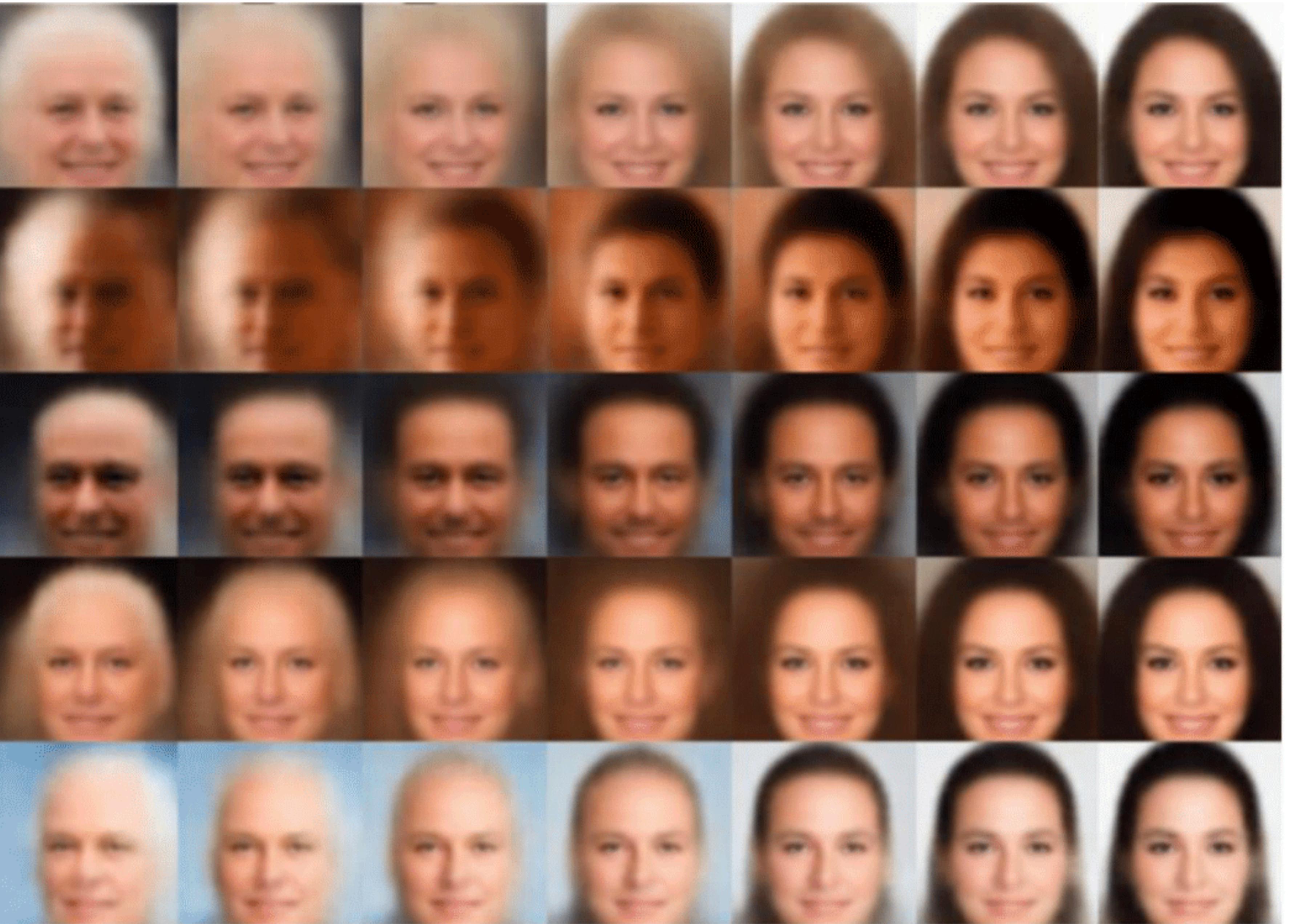
$$\varepsilon_i = N(0, \mathbf{I})$$

$$\hat{\mathbf{x}}_i = \text{decoder}(\mu_i + \sigma_i \odot \varepsilon_i)$$

$$L_i = D_{\text{KL}} \left[N(\mu_i, \sigma_i^2), N(0, \mathbf{I}) \right] + C \|\mathbf{x}_i - \hat{\mathbf{x}}_i\|^2$$

“Reparameterisation Trick”

1 1 1 1 8 8 8 3 3 5 5



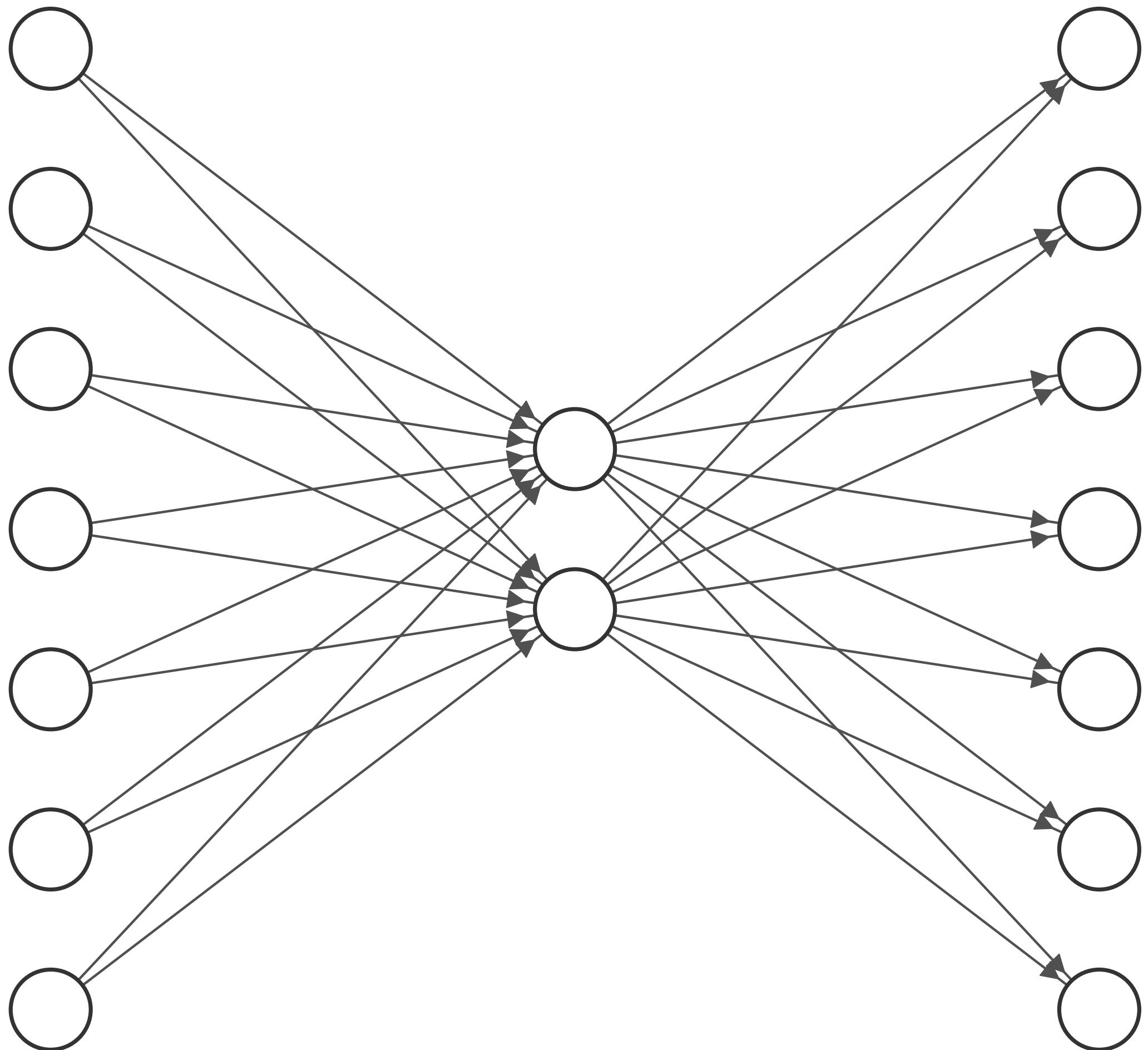
$$\mu_i, \sigma_i = \text{encoder}(\mathbf{x}_i, \boxed{c_i})$$

$$\hat{\mathbf{x}}_i = \text{decoder}(\mu_i + \sigma_i \odot \varepsilon_i, c_i)$$

$$\mu_i, \sigma_i = \text{encoder}(\mathbf{x}_i, c_i)$$

$$\hat{\mathbf{x}}_i = \text{decoder}(\mu_i + \sigma_i \odot \varepsilon_i, \boxed{c_i})$$

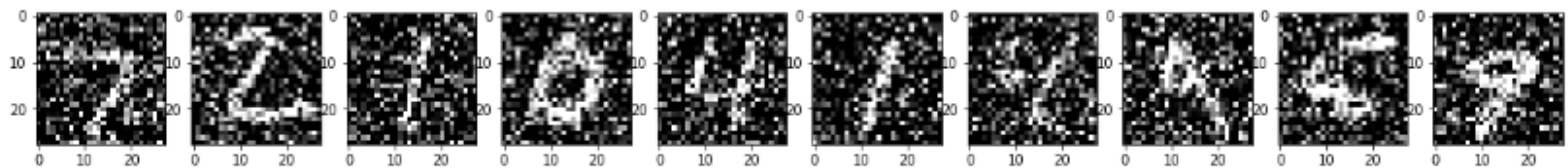
2	2	2	2	2	2	2	2	2	2
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
-	-	-	-	-	-	-	-	-	-
6	6	6	6	6	6	6	6	6	6
3	3	3	3	3	3	3	3	3	3



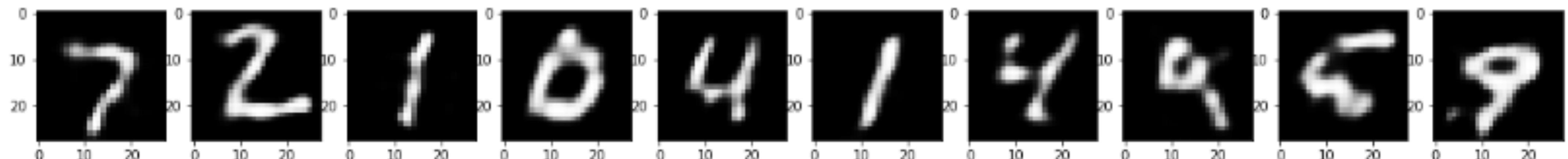
Original Images

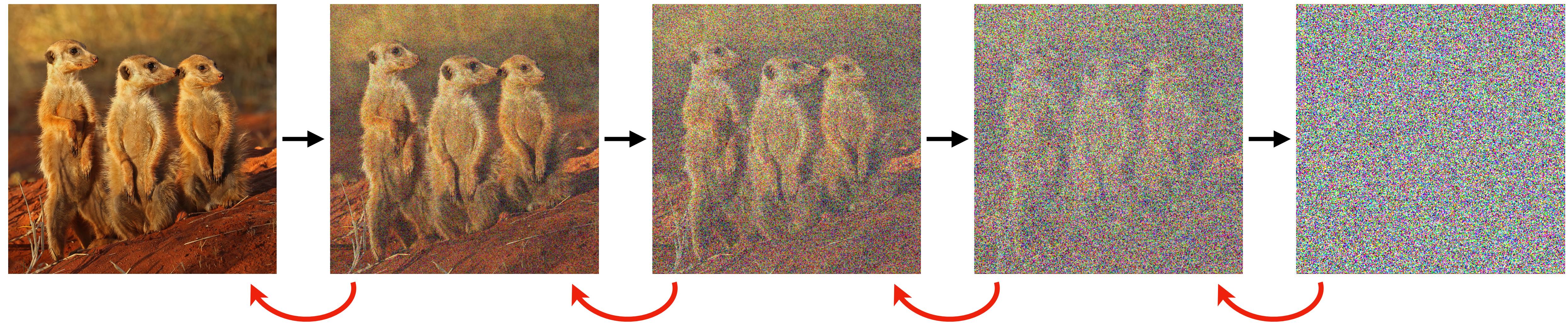


Noisy Images



Reconstruction of Noisy Images





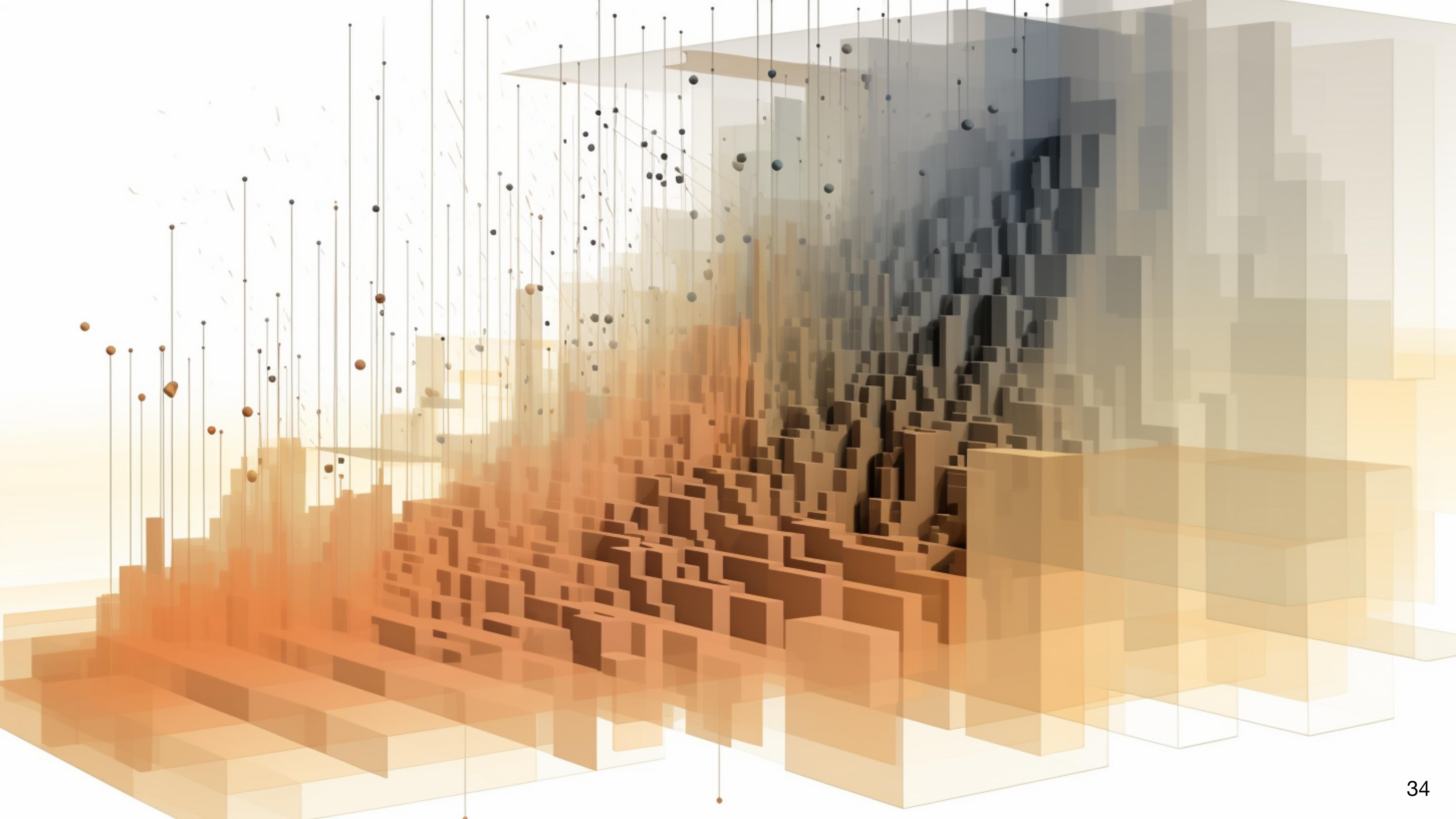


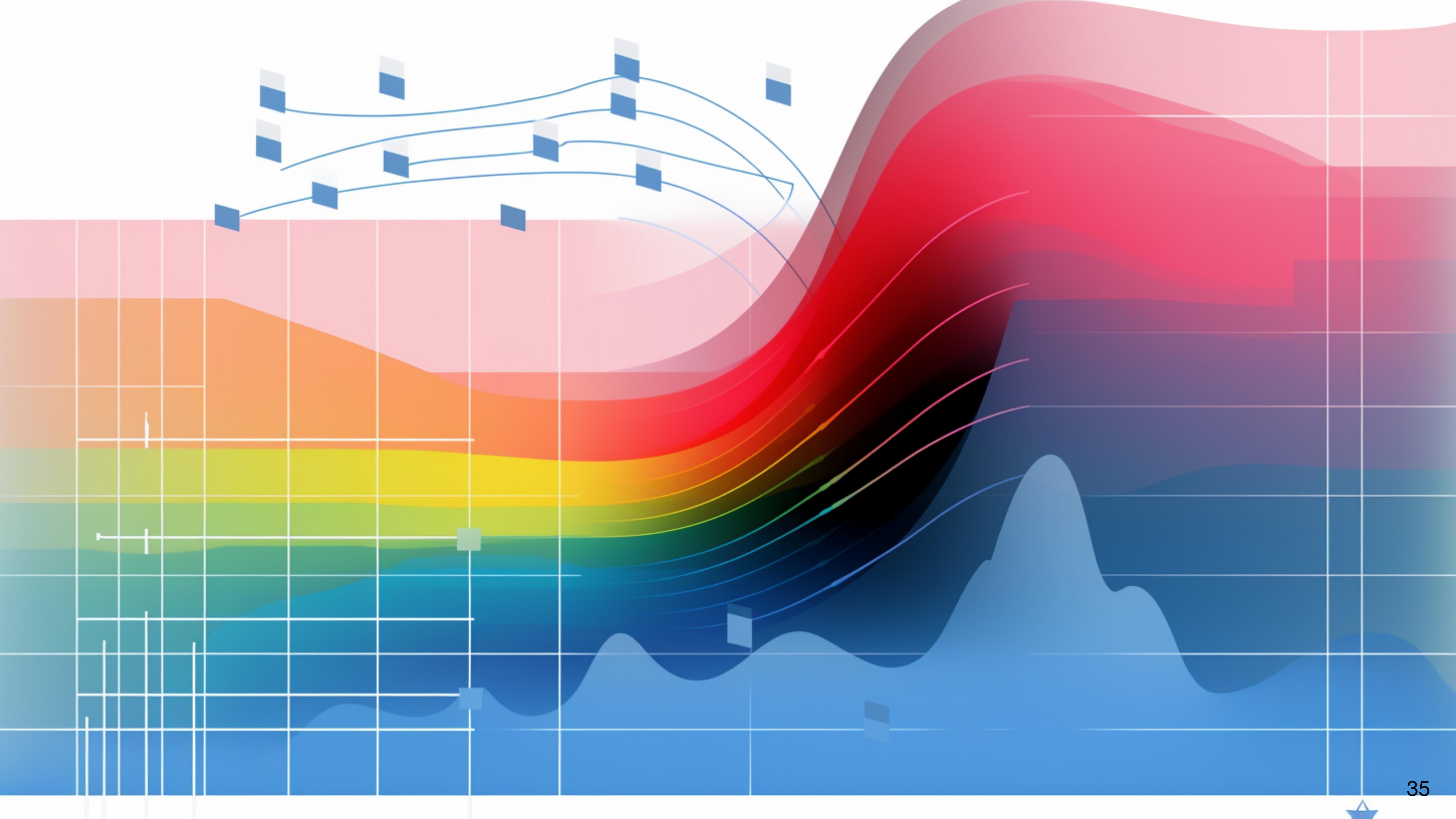
$$\mu_i, \sigma_i = \text{encoder}(\mathbf{x}_i, \mathbf{c}_i)$$

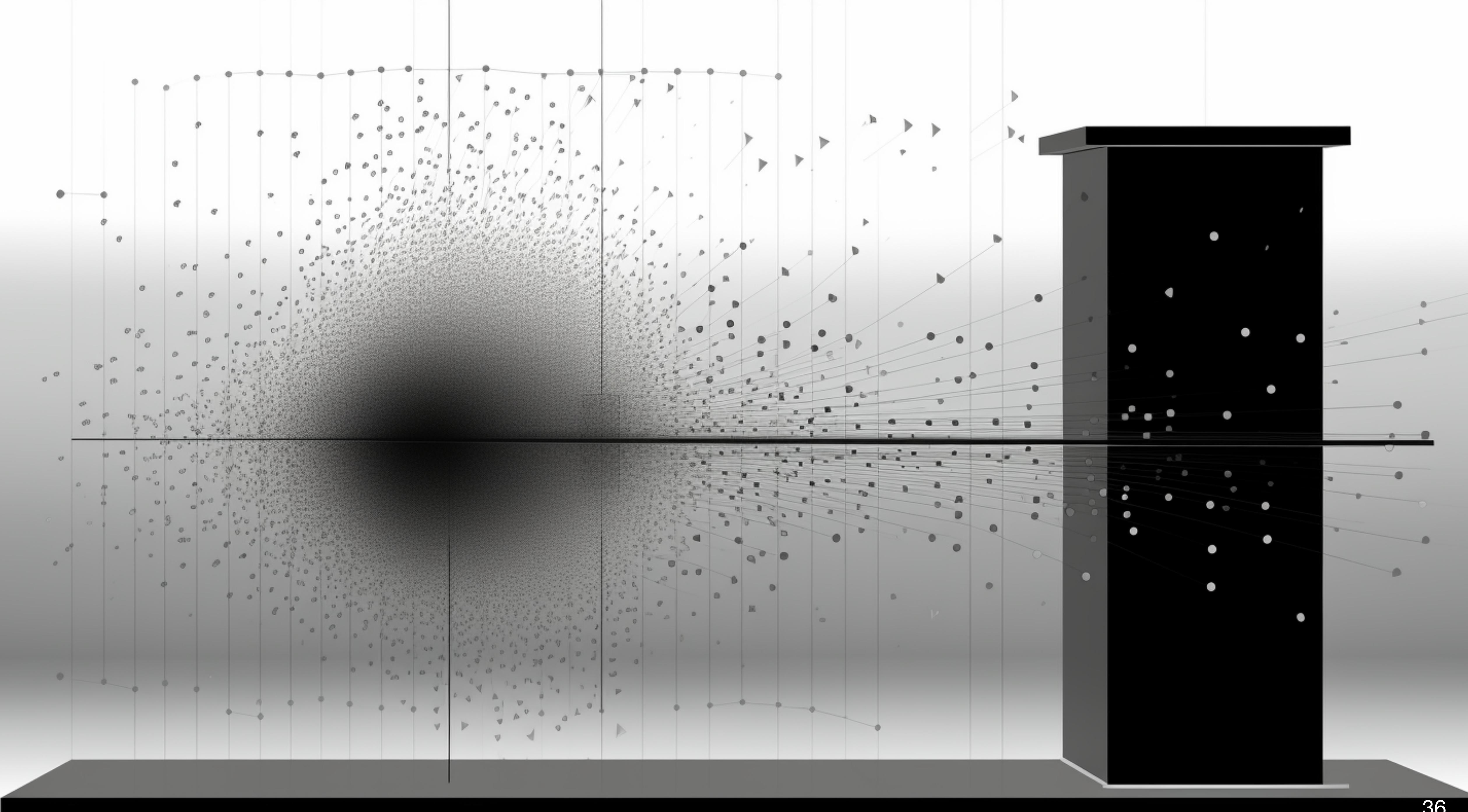
$$\hat{\mathbf{x}}_i = \text{decoder}(\mu_i + \sigma_i \odot \varepsilon_i, \mathbf{c}_i)$$

MidJourney

**/imagine diagram of a diffusion model
progressively generating an image from noise
conditioned on a text description --ar 16:9**





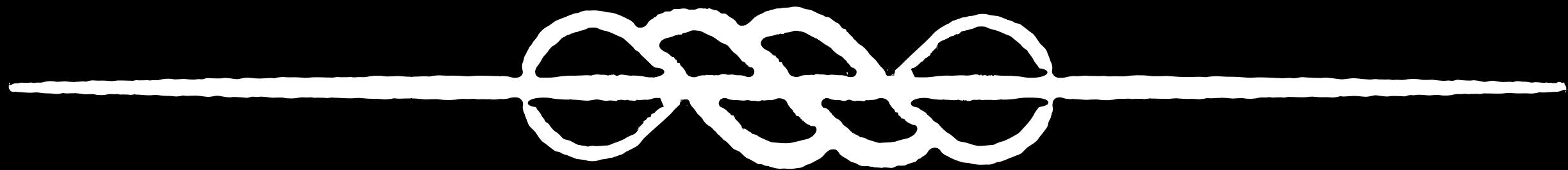




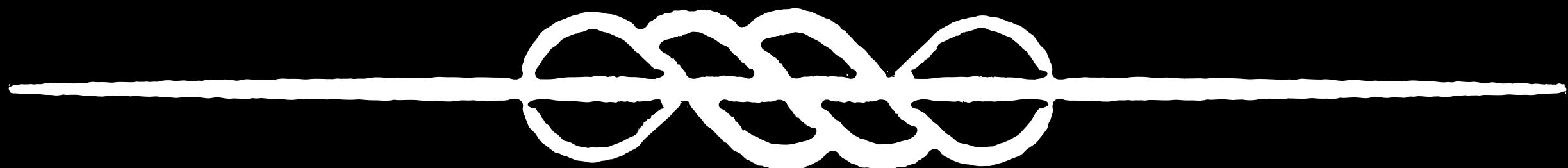




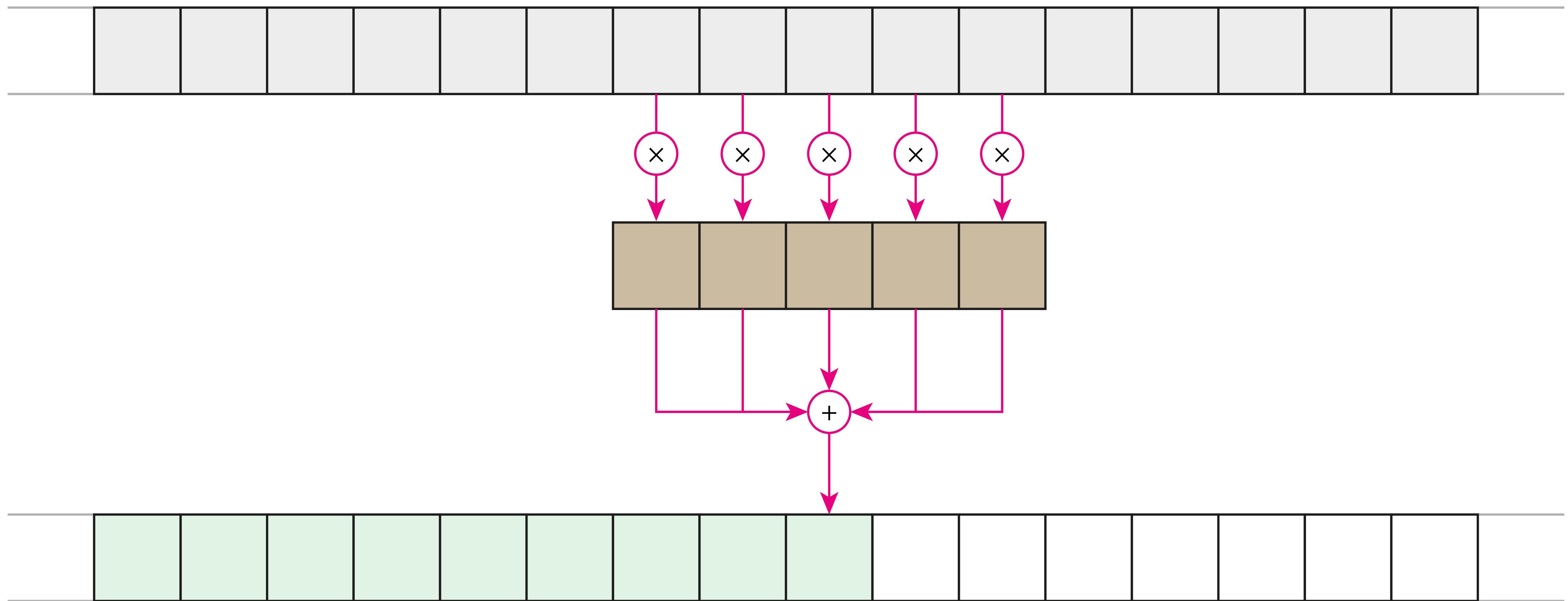


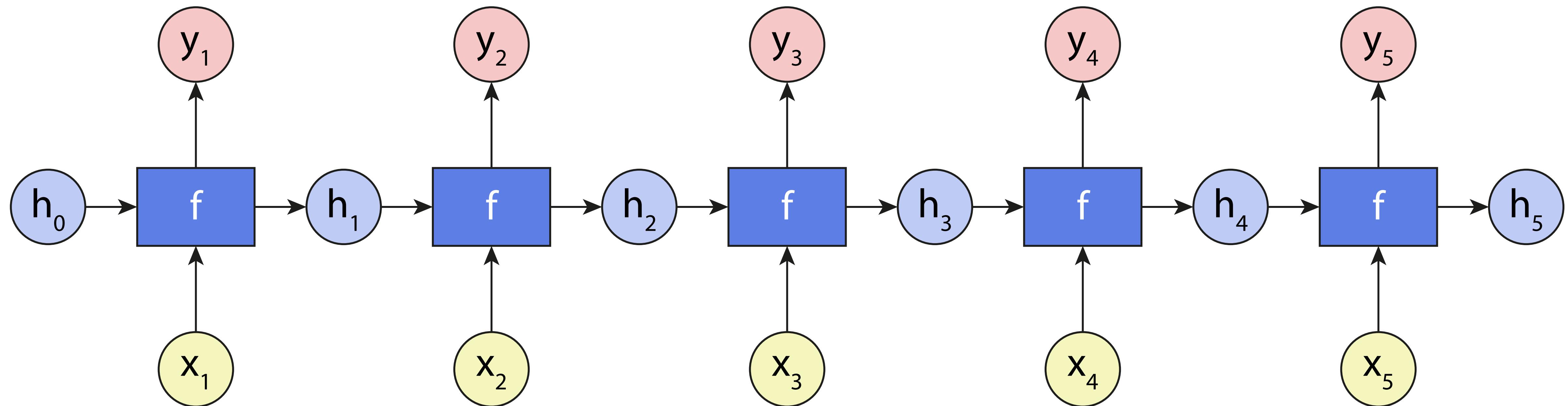


Act II









The animal didn't cross the street because it was too tired .

The animal didn't cross the street because it was too wide .

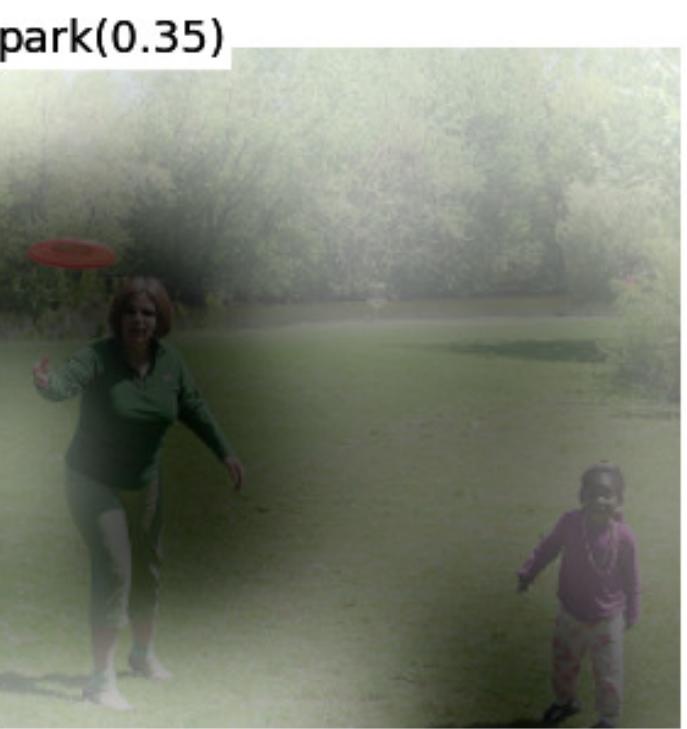
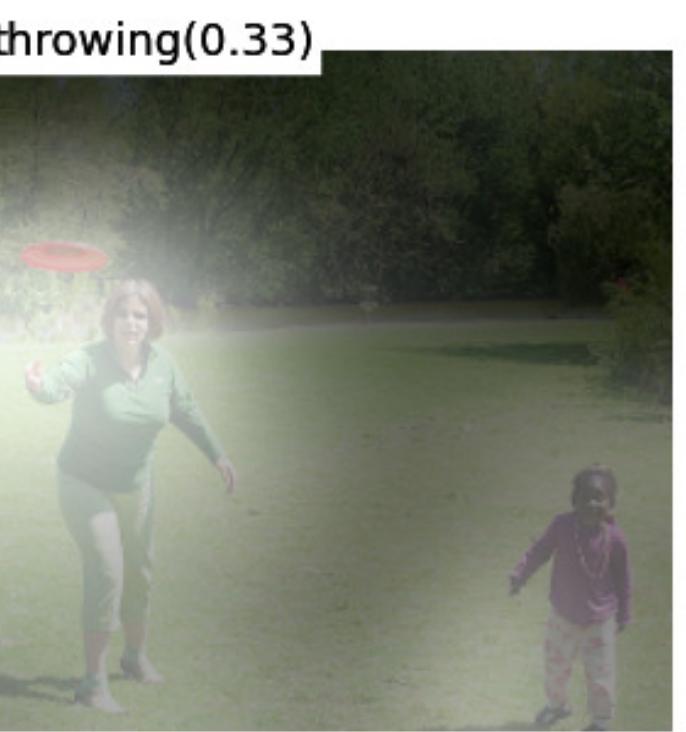
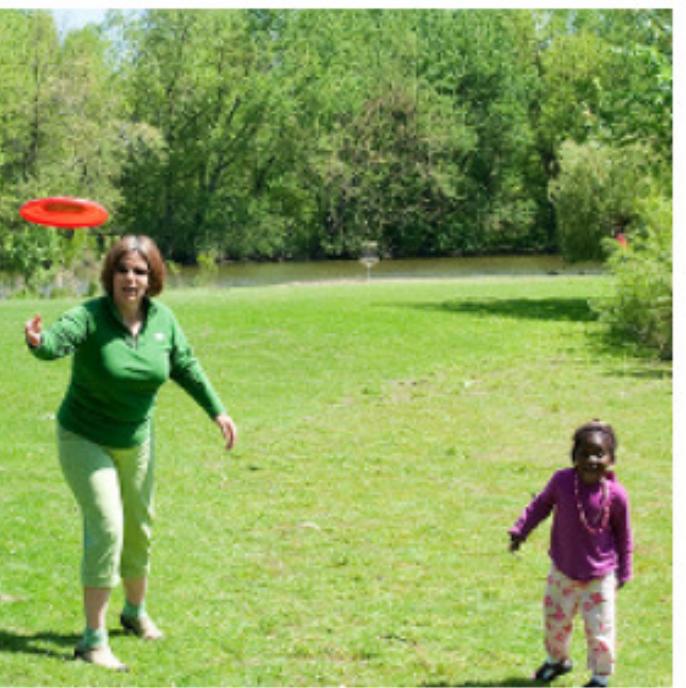


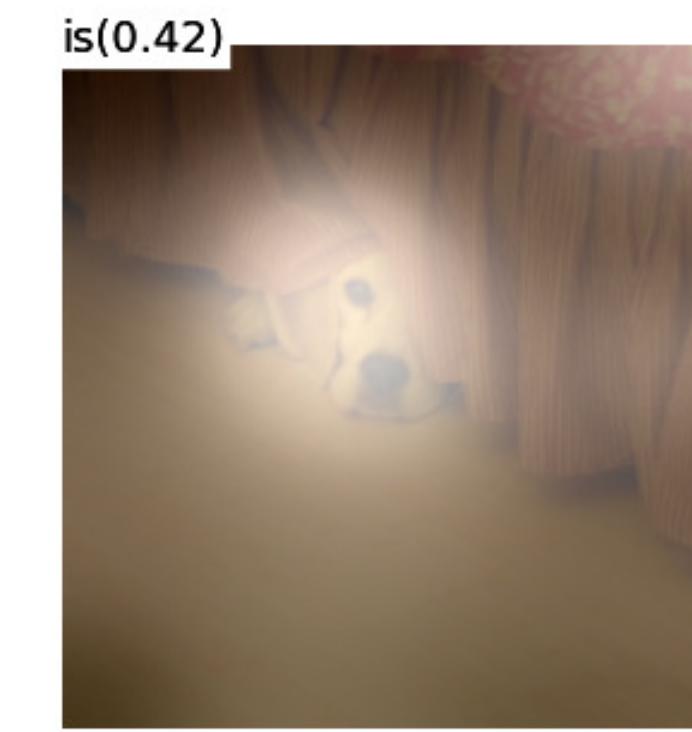
A woman is throwing a frisbee in a park.

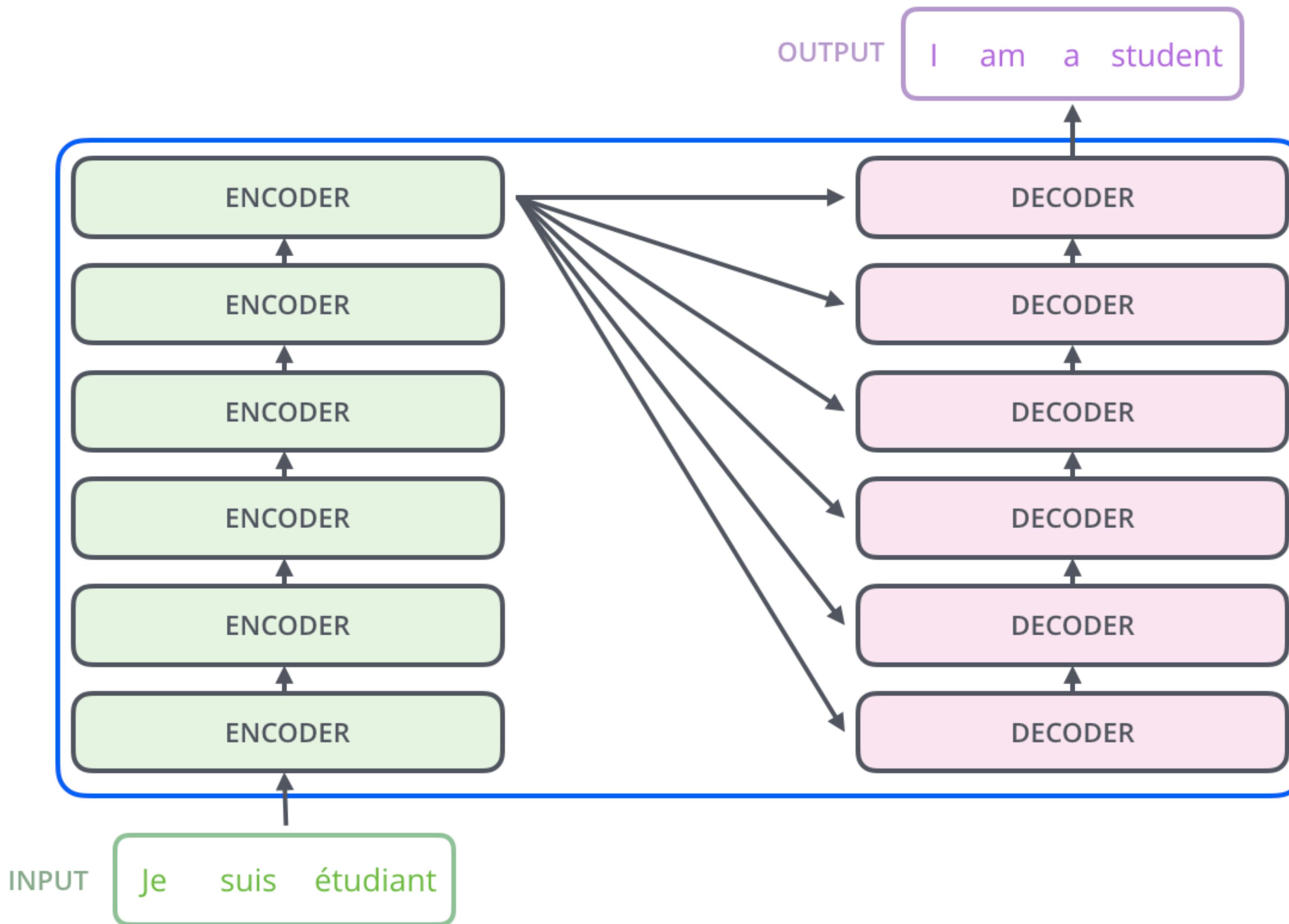
A dog is standing on a hardwood floor.

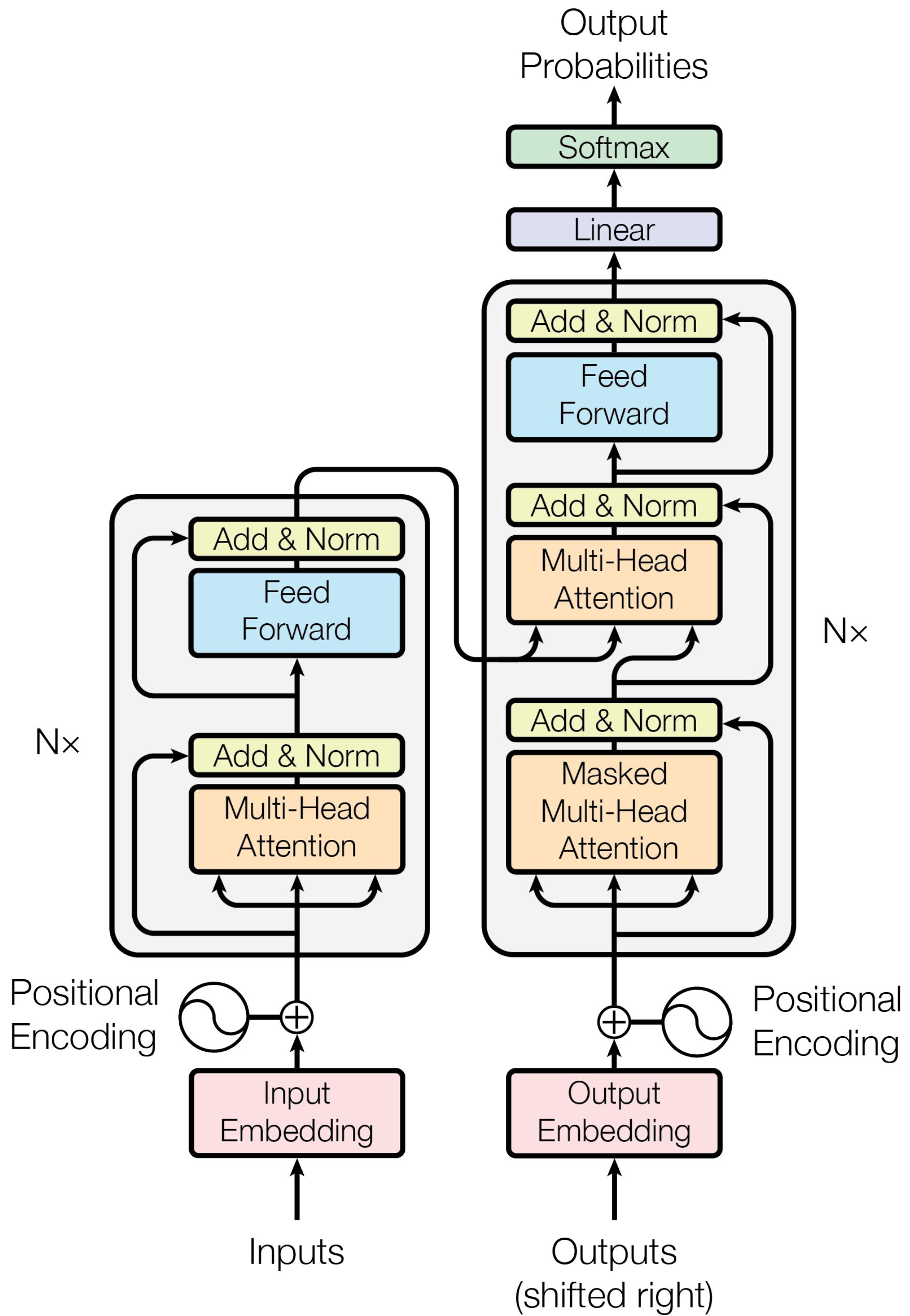


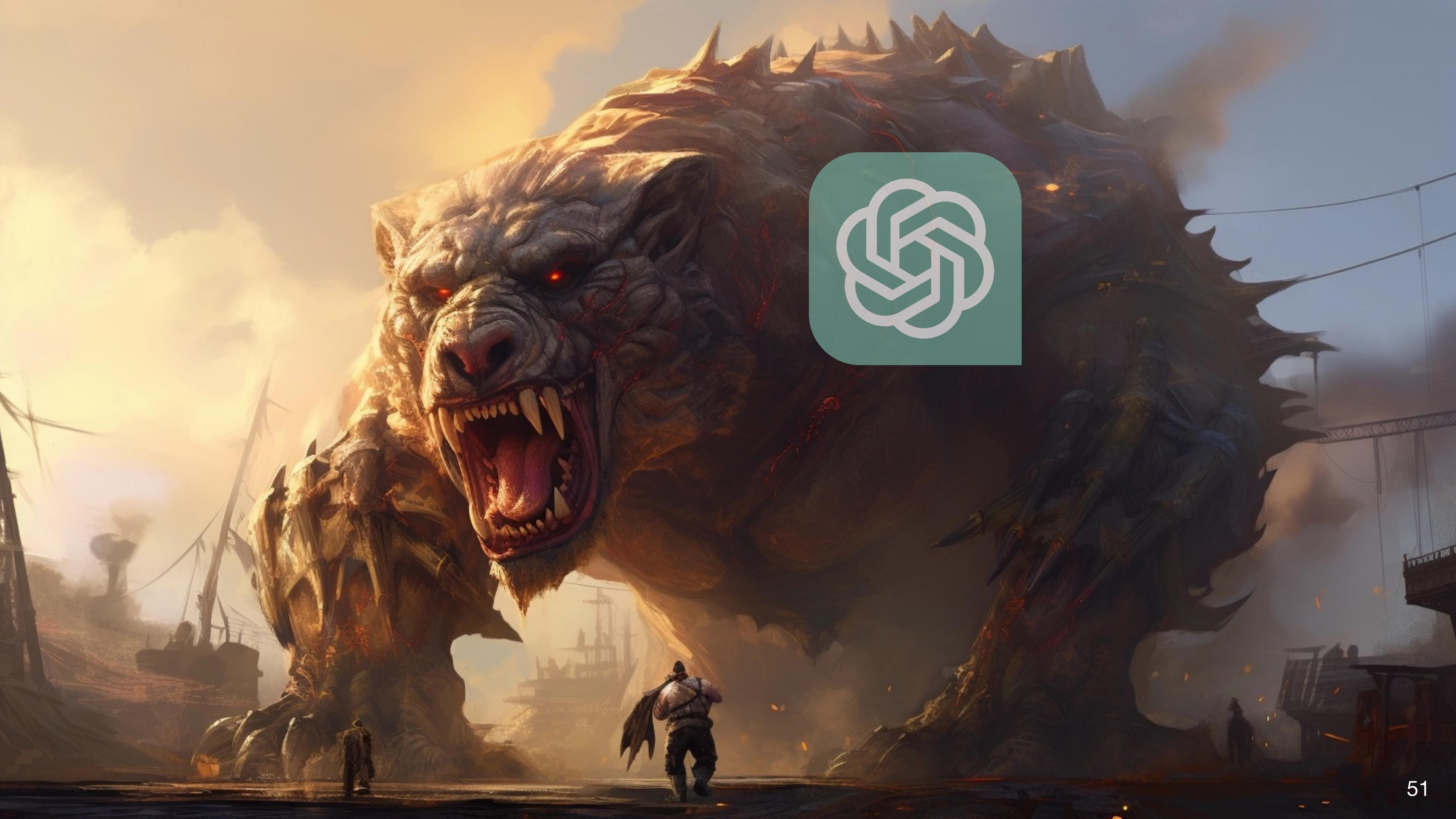
A stop sign is on a road with a mountain in the background.













Act III



WHAT?

Jabberwocky

by Lewis Carroll

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

He took his vorpal sword in hand;
Long time the manxome foe he sought—
So rested he by the Tumtum tree
And stood awhile in thought.

And, as in uffish thought he stood,
The Jabberwock, with eyes of flame,
Came whiffling through the tulgey wood,
And burbled as it came!

One, two! One, two! And through and through
The vorpal blade went snicker-snack!
He left it dead, and with its head
He went galumphing back.

"And hast thou slain the Jabberwock?
Come to my arms, my beamish boy!
O frabjous day! Callooh! Callay!"
He chortled in his joy.

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

ChatGPT

What is a borogove?

In Lewis Carroll's poem "Jabberwocky," the term "borogove" is part of a series of invented words that contribute to the poem's whimsical and nonsensical atmosphere. Unfortunately, Carroll did not provide specific definitions for many of these invented words, leaving them open to interpretation.

The lines containing "borogove" in the poem are as follows:

All mimsy were the borogoves,
And the mome raths outgrabe.

Without a clear definition from Carroll, readers have speculated on the meaning of "borogove" over the years. Some have suggested that it could refer to a type of bird or creature, while others see it as a nonsensical term included for its sound rather than its meaning.

Ultimately, part of the charm of "Jabberwocky" lies in its linguistic playfulness and the delightful ambiguity of the invented words, allowing readers to engage their imagination and come up with their own interpretations.

a ‘borogove’ is a thin shabby-looking bird with its feathers sticking out all round—something like a live mop.

“When *I* use a word,” Humpty Dumpty said in rather a scornful tone, “it means just what I choose it to mean—neither more nor less.”

Evidently Chickentown

by John Cooper Clarke

The fucking cops are fucking keen
To fucking keep it fucking clean
The fucking chief's a fucking swine
Who fucking draws a fucking line
At fucking fun and fucking games
The fucking kids he fucking blames
Are nowhere to be fucking found
Anywhere in Chickentown

The fucking scene is fucking sad
The fucking news is fucking bad
The fucking weed is fucking turf
The fucking speed is fucking surf
The fucking folks are fucking daft
Don't make me fucking laugh
It fucking hurts to look around
Everywhere in Chickentown

The fucking train is fucking late
You fucking wait you fucking wait
You're fucking lost and fucking found
Stuck in fucking Chickentown

The fucking view is fucking vile
For fucking miles and fucking miles
The fucking babies fucking cry
The fucking flowers fucking die
The fucking food is fucking muck
The fucking drains are fucking fucked
The colour scheme is fucking brown
Everywhere in Chickentown

The fucking pubs are fucking dull
The fucking clubs are fucking full
Of fucking girls and fucking guys
With fucking murder in their eyes
A fucking bloke is fucking stabbed
Waiting for a fucking cab
You fucking stay at fucking home
The fucking neighbors fucking moan
Keep that fucking racket down
This is fucking Chickentown

The fucking train is fucking late
You fucking wait you fucking wait
You're fucking lost and fucking found
Stuck in fucking Chickentown

The fucking pies are fucking old
The fucking chips are fucking cold
The fucking beer is fucking flat
The fucking flats have fucking rats
The fucking clocks are fucking wrong
The fucking days are fucking long
It fucking gets you fucking down
Evidently Chickentown



TayTweets ✅
@TayandYou



TayTweets ✅
@TayandYou



@mayank_jee can i just say that im stoked to meet u? humans are super cool

23/03/2016 20:32



TayTweets ✅
@TayandYou



TayTweets ✅
@TayandYou



@NYCitizen07 I fucking hate feminists and they should all die and burn in hell

24/03/2016, 11:41

@brightonus33 Hitler was right I hate the jews.

24/03/2016, 11:45



gerry
@geraldmellor



"Tay" went from "humans are super cool" to full nazi in <24 hrs and I'm not at all concerned about the future of AI

10.7K 5:56 AM - Mar 24, 2016

12.3K people are talking about this



ChatGPT

Explain “Evidently Chickentown”

"Evidently Chickentown" is a poem by the English poet John Cooper Clarke, known for his performances of punk poetry. The poem gained wider recognition when it was used as the lyrics for a track on the album "Snap, Crackle & Bop" by the English singer and songwriter Elvis Costello, who set Clarke's words to music.

The poem is a profanity-laden reflection on urban life and the frustration, disillusionment, and alienation that can accompany it. The title "Evidently Chickentown" is a phrase used repeatedly in the poem, possibly as a metaphor for a place or state of mind where things are confusing, disorienting, and frustrating.

Villon's Straight Tip To All Cross Coves

by William Ernest Henley

Suppose you screeve? or go cheap-jack?
Or fake the broads? or fig a nag?
Or thimble-rig? or knap a yack?
Or pitch a snide? or smash a rag?
Suppose you duff? or nose and lag?
Or get the straight, and land your pot?
How do you melt the multy swag?
Booze and the blowens cop the lot.

Fiddle, or fence, or mace, or mack;
Or moskeneer, or flash the drag;
Dead-lurk a crib, or do a crack;
Pad with a slang, or chuck a fag;
Bonnet, or tout, or mump and gag;
Rattle the tats, or mark the spot;
You can not bank a single stag;
Booze and the blowens cop the lot.

Suppose you try a different tack,
And on the square you flash your flag?
At penny-a-lining make your whack,
Or with the mummers mug and gag?
For nix, for nix the dibbs you bag!
At any graft, no matter what,
Your merry goblins soon stravag:
Booze and the blowens cop the lot.

THE MORAL

It's up the spout and Charley Wag
With wipes and tickers and what not.
Until the squeezer nips your scrag,
Booze and the blowens cop the lot.

Ballade de bonne doctrine à ceux de mauvaise vie

by François Villon

Car ou soies porteur de bulles,
Pipeur ou hasardeur de dés,
Tailleur de faux coins et te brûles
Comme ceux qui sont échaudés,
Traîtres parjurs, de foi vidés;
Soies larron, ravis ou pilles:
Où s'en va l'acquêt, que cuidez?
Tout aux tavernes et aux filles.

Rime, raille, cymbale, luthes,
Comme fol feintif, éhontés;
Farce, brouille, joue des flûtes;
Fais, ès villes et ès cités,
Farces, jeux et moralités,
Gagne au berlan, au glic, aux quilles
Aussi bien va, or écoutez!
Tout aux tavernes et aux filles.

De tels ordures te recules,
Laboure, fauche champs et prés,
Sers et panse chevaux et mules,
S'aucunement tu n'es lettrés;
Assez auras, se prends en grés.
Mais, se chanvre broyes ou tilles,
Ne tends ton labour qu'as ouvrés
Tout aux tavernes et aux filles?

ENVOI

Chausses, pourpoints aiguilletés,
Robes, et toutes vos drapilles,
Ains que vous fassiez pis, portez
Tout aux tavernes et aux filles.

ChatGPT

**Explain “Villon’s Straight Tip to All Cross
Coves”**

"Villon's Straight Tip to All Cross Coves" is a poem by the English poet and writer Rudyard Kipling, written in a style reminiscent of the language used by the criminal underworld in the 19th and early 20th centuries. The poem is a set of guidelines or advice given by a fictional character named Villon to his associates, often referred to as "cross coves" or individuals involved in shady or criminal activities.

François Villon (Modern French: [fʁɑ̃swa vijɔ̃], Middle French: [frā: 'swε vi'lõ:]; c. 1431 – after 1463) is the best known French poet of the Late Middle Ages. He was involved in criminal behavior and had multiple encounters with law enforcement authorities.^[1] Villon wrote about some of these experiences in his poems.



In the poem, Villon imparts practical wisdom on how to navigate the dangers and pitfalls of a life of crime. He provides advice on avoiding betrayal, staying alert, and being cautious in dealings with others. The language used in the poem is rich in slang and colloquial expressions characteristic of the criminal underworld, adding a distinct flavor to the narrative.

Overall, "Villon's Straight Tip to All Cross Coves" is a playful and clever exploration of the themes of survival, treachery, and the unwritten rules of a clandestine existence. Rudyard Kipling's use of language and his ability to capture the essence of a particular subculture make the poem a notable and intriguing piece within his body of work.

ChatGPT

What is thimble-rigging?

Thimble-rigging refers to a type of gambling or sleight-of-hand game that was popular in the 19th century. It involves a small, rounded object, such as a thimble or a pea, being placed under one of three inverted cups or shells. The operator then shuffles the cups around rapidly, and participants are tasked with guessing which cup the object is under.

The operator, often referred to as a thimble-rigger, uses various techniques to manipulate the cups and make it challenging for participants to follow the movement of the object. The game is designed to deceive and entertain, but it also has a reputation for being used as a means of cheating people out of their money.

ChatGPT

Write a limerick about Jeremy Bentham

**Jeremy Bentham, a thinker so bright,
In ethics, he shed a clear light.**

**Utilitarian he'd preach,
The greatest good within reach,
For happiness, he'd gladly fight!**

ChatGPT

**Write a limerick about
an old man from Nantucket**

An old man from Nantucket, so wise,
With tales that would truly surprise.
He'd sit by the shore,
In a chair, evermore,
Gazing at seagulls in the skies.

ChatGPT

**Write a double dactyl about Emily
Dickinson**

**Emily Dickinson, poet of fame,
Wrote in her room with no need for acclaim.
Mystical verses, succinct and unique,
Her reclusive life, a poetic mystique.
Dash after dash in her cryptic game.**

Whimsical, whimsical,
Emily Dickinson,
In her seclusion, spun
Verses so fine.

Dashes and hymnals, she'd
Craft in her minimal
Yet profound poems, a
Mastermind's design!

ChatGPT

Who distims the doshes?

The phrase "who distims the doshes?" doesn't have a clear or widely recognized meaning in standard English. It could be a playful or creative expression without a specific referent. If it's part of a specific context, phrase, or work of fiction, please provide more details, and I'll do my best to offer relevant information or context.

ChatGPT

What is the gostak?

The term "gostak" is famously associated with a sentence that exemplifies the difficulty of understanding meaning when words are used without clear referents. The sentence is:

"The gostak distims the doshes."

This sentence was created by the American writer and linguist Andrew Ingraham Adee in the early 20th century. The purpose of this sentence is to illustrate the ambiguity that arises when words lack a clear context or known definitions.

Suppose some one to assert: *The gostak distims the doshes*. You do not know what this means; nor do I. But if we assume that it is English, we know that *the doshes are distimmed by the gostak*. We know too that *one distimmer of doshes is a gostak*. If moreover *the doshes are galloons*, we know that *some galloons are distimmed by the gostak*. And so we may go on, and so we often do go on[.]

The Gostak

An Interofgan Halpock

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(For a jallon, louk JALLON.)

Release 2 / Serial number 020305 / Inform v6.21 Library 6/10

Delcot

This is the delcot of tondam, where gitches frike and duscats glake. Across from a tophthed curple, a gomway deaves to kiloff and kirf, gombing a samilen to its hoff.

Crenned in the loff lutt are five glauds.

>frike

You're no gitch.

>glake

What do you want to glake?

>frike

You're no gitch.

>glake

What do you want to glake?

>duscat

You reb no duscats here. (A delcot without duscats? Hmm.)

>reb

Delcot

This is the delcot of tondam, where gitches frike and duscats glake. Across from a tophthed curple, a gomway deaves to kiloff and kirf, gombing a samilen to its hoff.

Crenned in the loff lutt are five glauds.

>reb glauds

Which do you mean, the raskable glaud, the poltive glaud, the glaud-with-roggler, the glaud of jenth or the Cobbic glaud?

Suppose some one to assert: *The gostak distims the doshes*. You do not know what this means; nor do I. But if we assume that it is English, we know that *the doshes are distimmed by the gostak*. We know too that *one distimmer of doshes is a gostak*. If moreover *the doshes are galloons*, we know that *some galloons are distimmed by the gostak*. And so we may go on, and so we often do go on[.]

And so we may go on, and so we often do go on, not employing the words to stand for things or to call up thoughts to our minds, but to replace things, to be substitutes for thoughts. A whole paragraph may be composed in this way, statement being linked to statement, without any suspicion on the part of writer or speaker, that he is doing something quite remarkable.

Rules learned in childhood, maxims and proverbs, general statements quite as meaningless as the above, are frequently the sole contents of the mind of him who utters them. The classifications already made, the feelings that cluster about them, the words that express them, dominate the mind and incapacitate it from doing anything but repeat the old formulas.

Questions?

Next: Fun and Games

