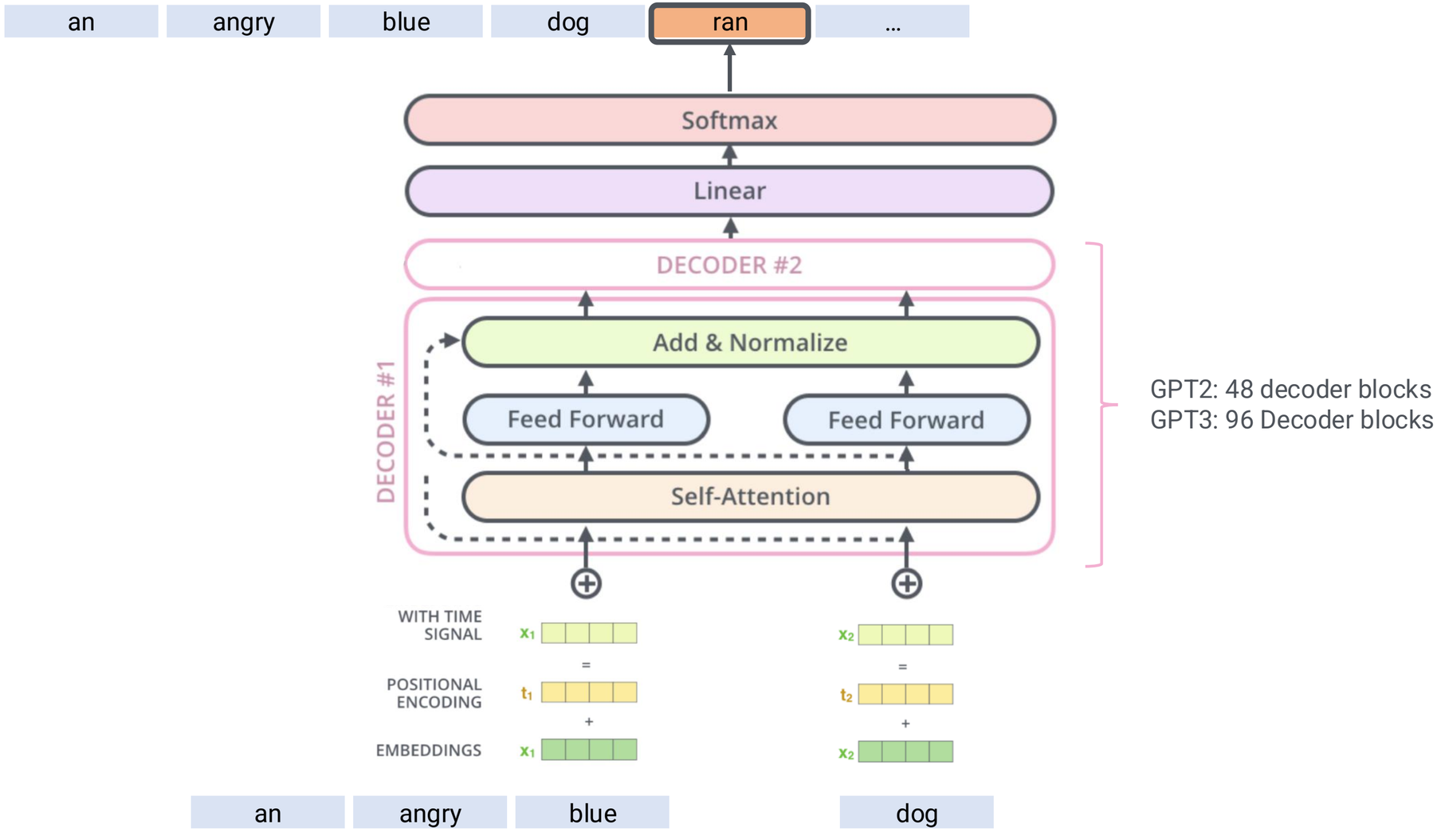
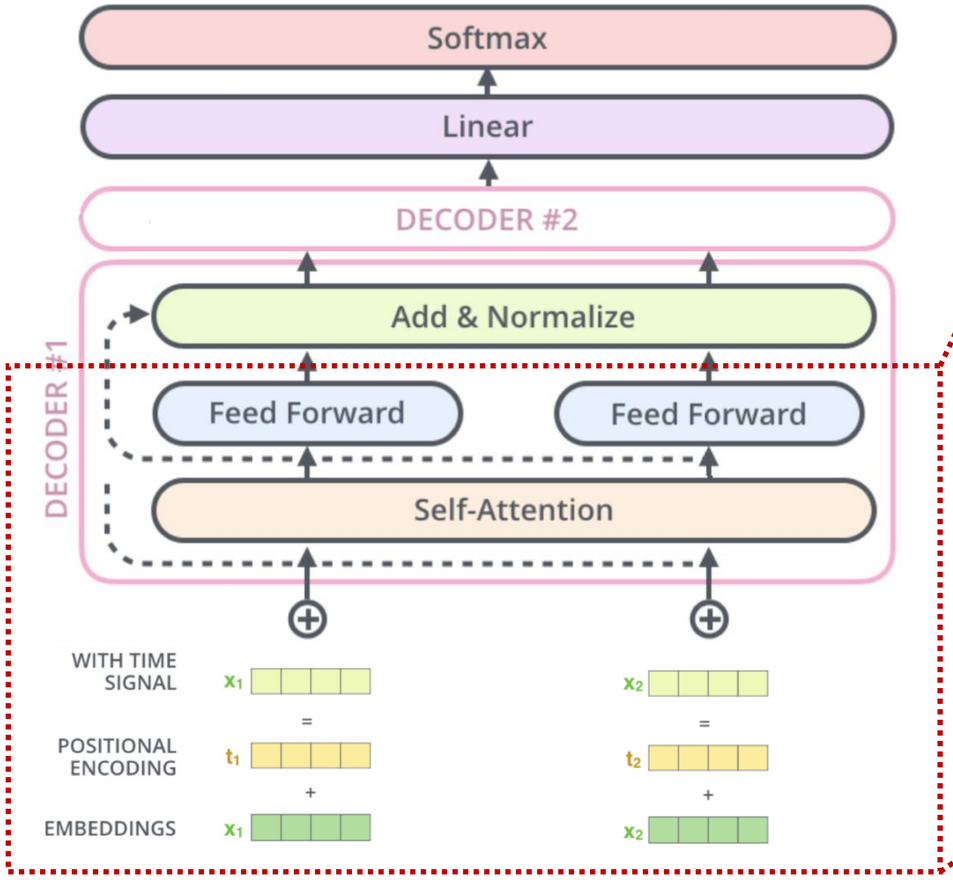
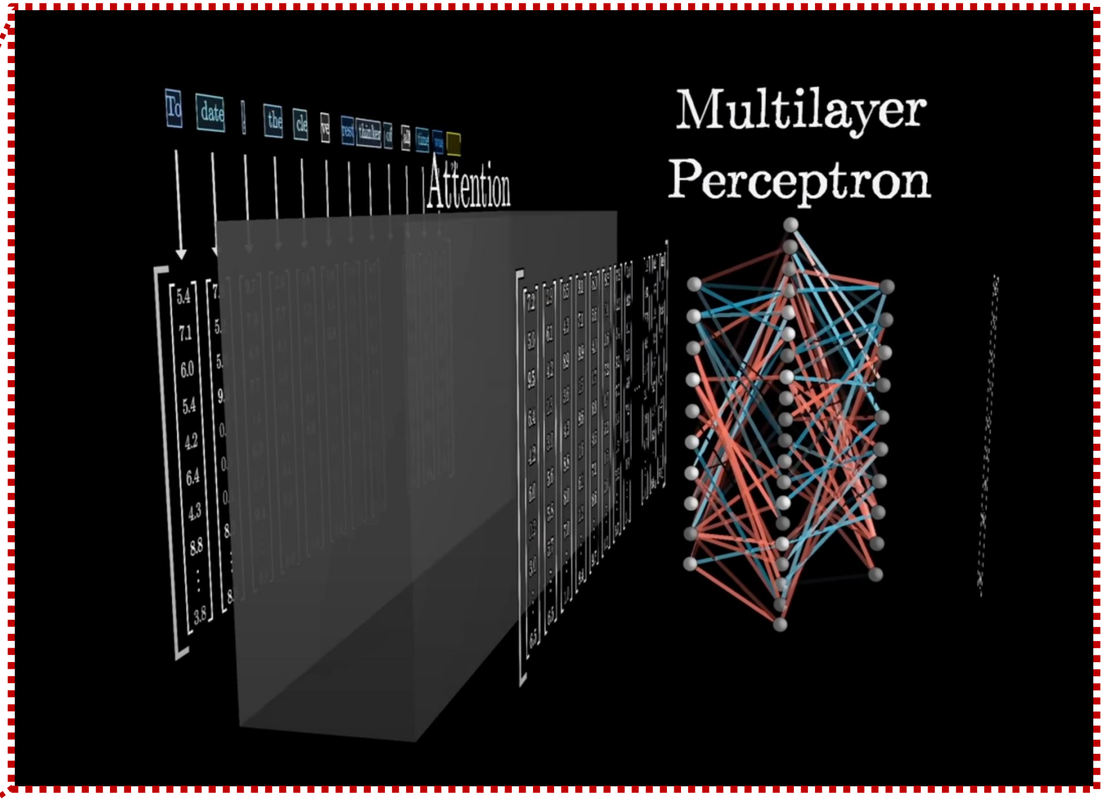
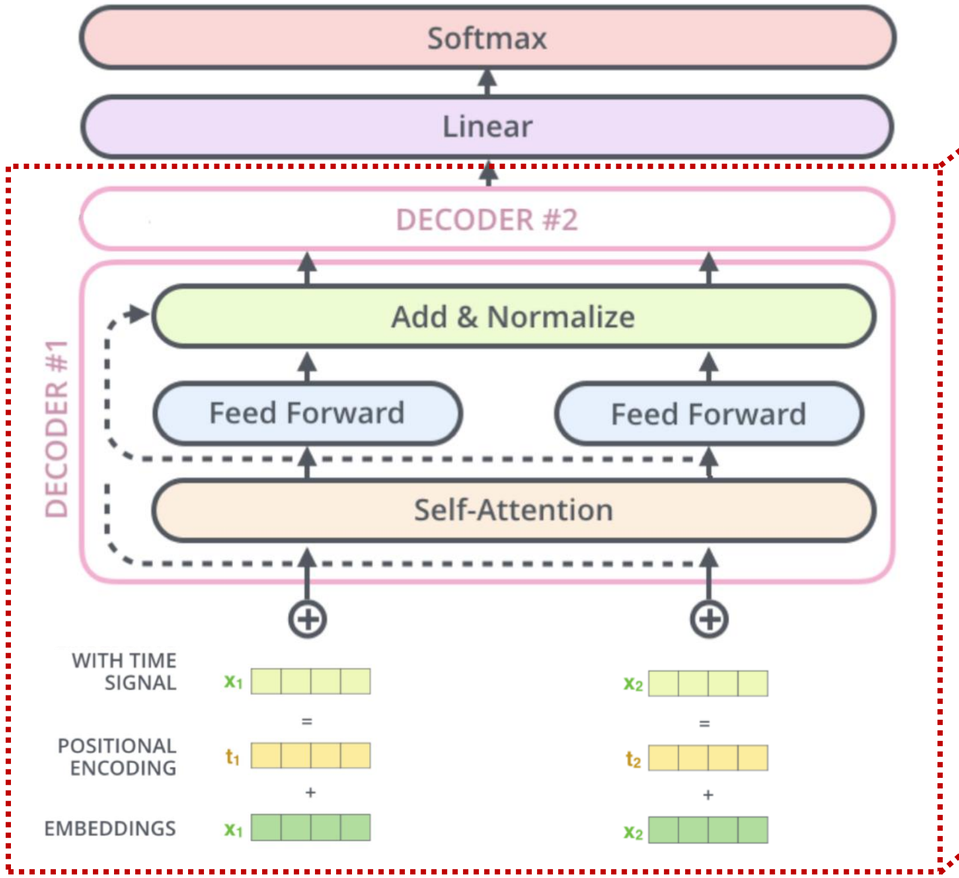
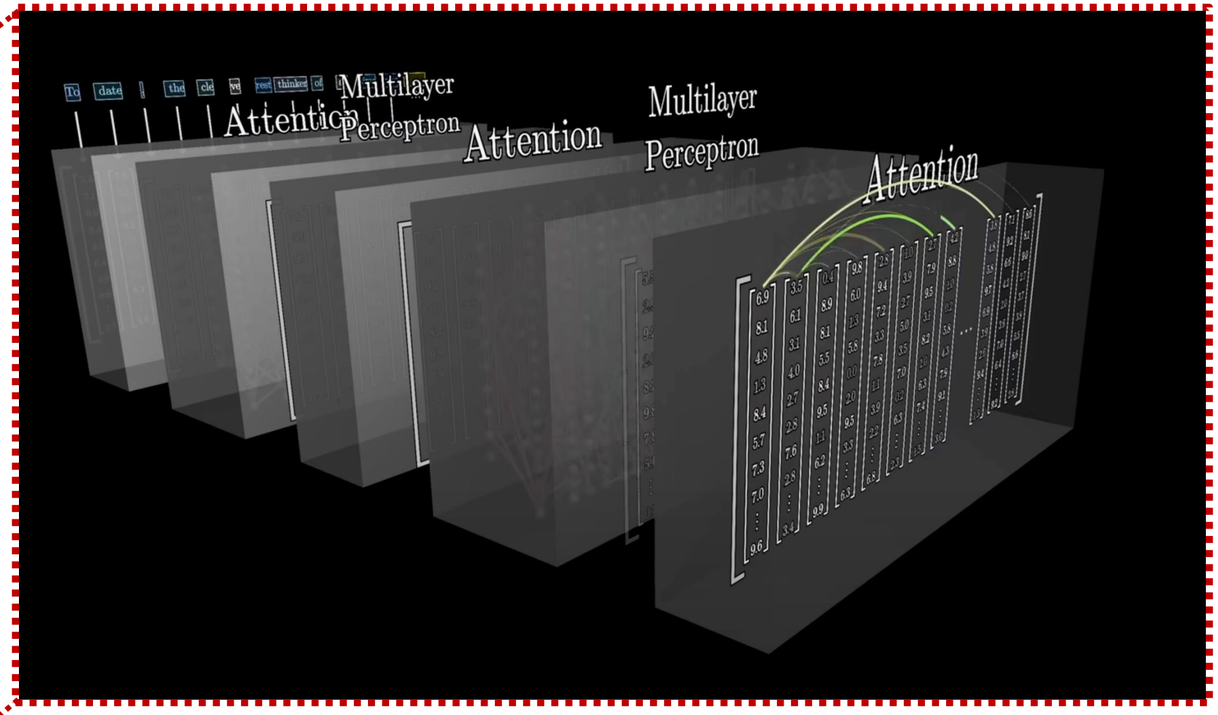
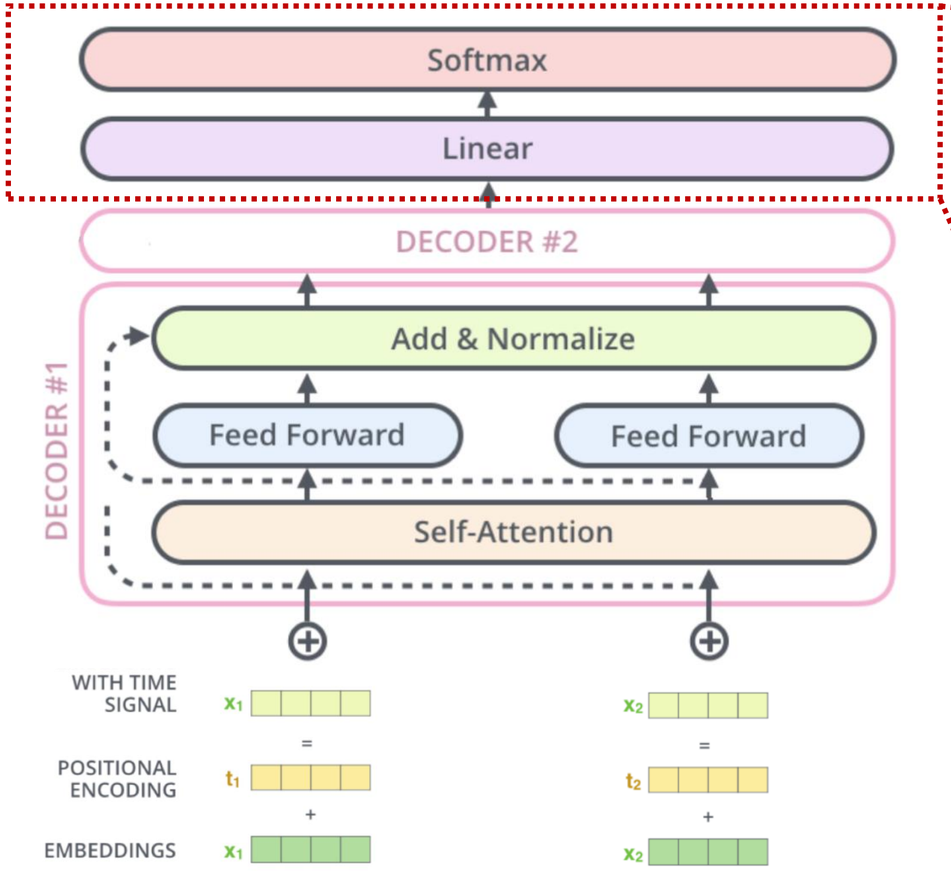

an
angry
blue
dog
ran
...
Softmax
Linear
DECODER #2
DECODER #1
Add & Normalize
Feed Forward
Feed Forward
Self-Attention
WITH TIME SIGNAL
POSITIONAL ENCODING
EMBEDDINGS
x1
x2
t1
t2
=
+
an
angry
blue
dog
GPT2: 48 decoder blocks
GPT3: 96 Decoder blocks

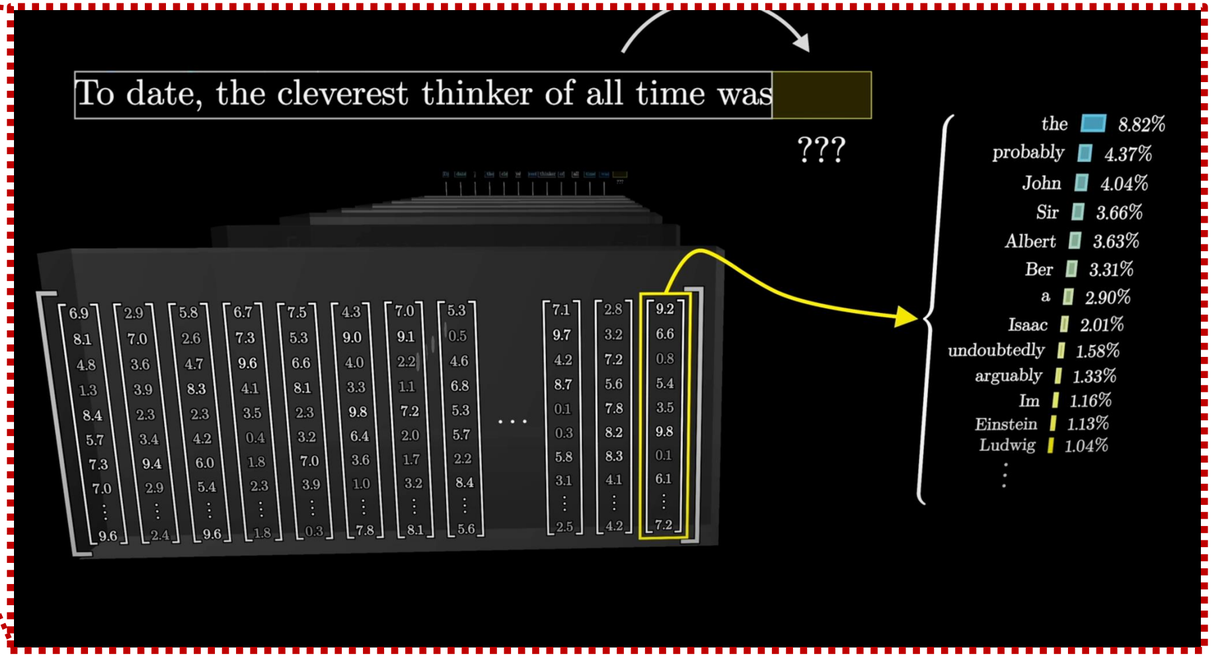

Softmax
Linear
DECODER #2
DECODER #1
Add & Normalize
Feed Forward
Feed Forward
Self-Attention
WITH TIME SIGNAL
POSITIONAL ENCODING
EMBEDDINGS
x1
x2
t1
t2
=
+


Attention
Multilayer Perceptron

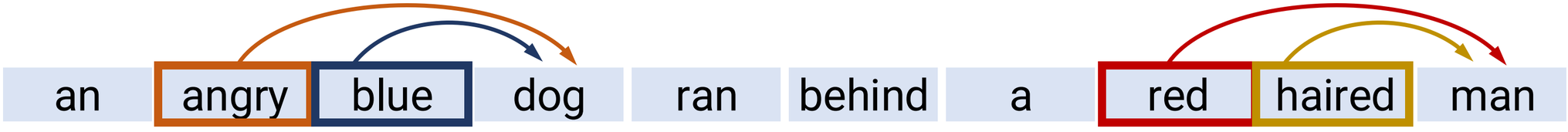

Softmax
Linear
DECODER #2
DECODER #1
Add & Normalize
Feed Forward
Feed Forward
Self-Attention
WITH TIME SIGNAL
POSITIONAL ENCODING
EMBEDDINGS
x1
x2
t1
t2
=
+


Attention
Multilayer Perceptron
Attention
Multilayer Perceptron
Attention


Softmax
Linear
DECODER #2
DECODER #1
Add & Normalize
Feed Forward
Feed Forward
Self-Attention
WITH TIME SIGNAL
POSITIONAL ENCODING
EMBEDDINGS
x1
x2
t1
t2
=
+


To date, the cleverest thinker of all time was
???
the 8.82%
probably 4.37%
John 4.04%
Sir 3.66%
Albert 3.63%
Ber 3.31%
a 2.90%
Isaac 2.01%
undoubtedly 1.58%
arguably 1.33%
Im 1.16%
Einstein 1.13%
Ludwig 1.04%

an	angry	blue	dog	ran	behind	a	red	haired	man

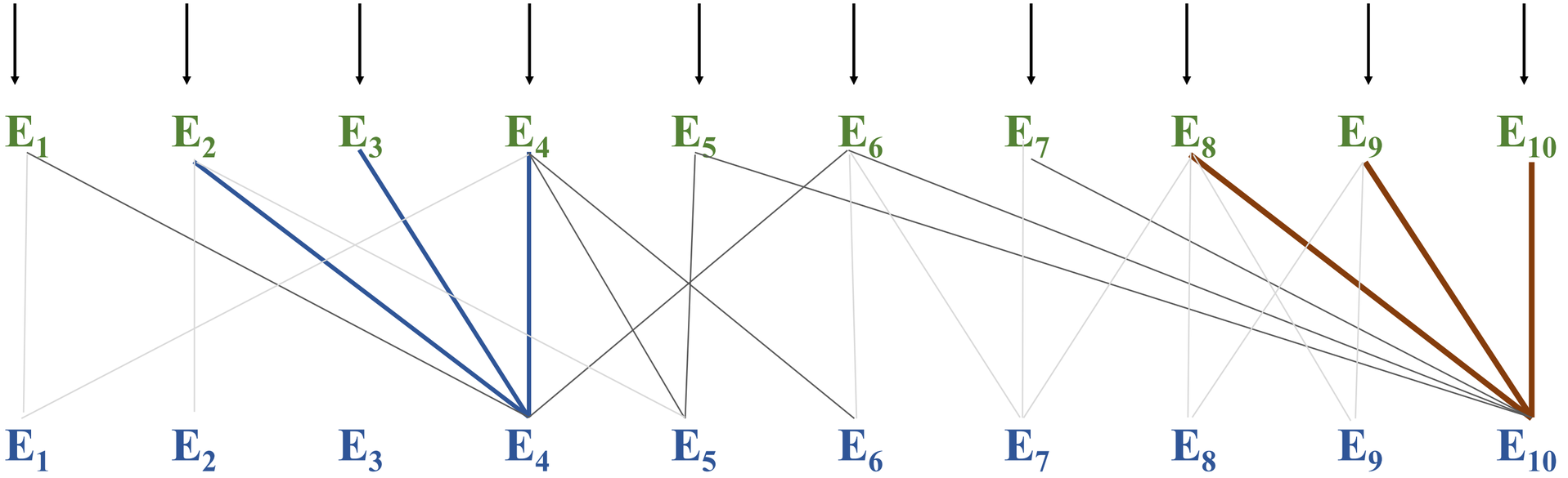

an
angry
blue
dog
ran
behind
a
red
haired
man

an	angry	blue	dog	ran	behind	a	red	haired	man
+0.01	+3.81	+7.21	+0.22	+4.21	+0.20	+0.01	+3.91	+0.21	+0.05
+0.12	−7.23	+2.40	−0.98	−2.40	+4.55	+0.12	−6.49	+2.10	−0.99
+2.22	+3.25	−1.85	+1.25	+6.95	+2.11	+2.24	+3.25	+0.01	−3.25
+1.97	−2.01	−2.99	−0.01	+2.21	+0.41	+1.96	−2.00	+2.01	−1.01
+1.45	+0.01	+7.15	+6.45	+2.67	+3.32	+1.45	+0.45	+5.34	+8.45
+0.05	−5.25	−2.53	+2.86	+8.12	+0.32	+0.05	−2.25	−2.45	+2.05

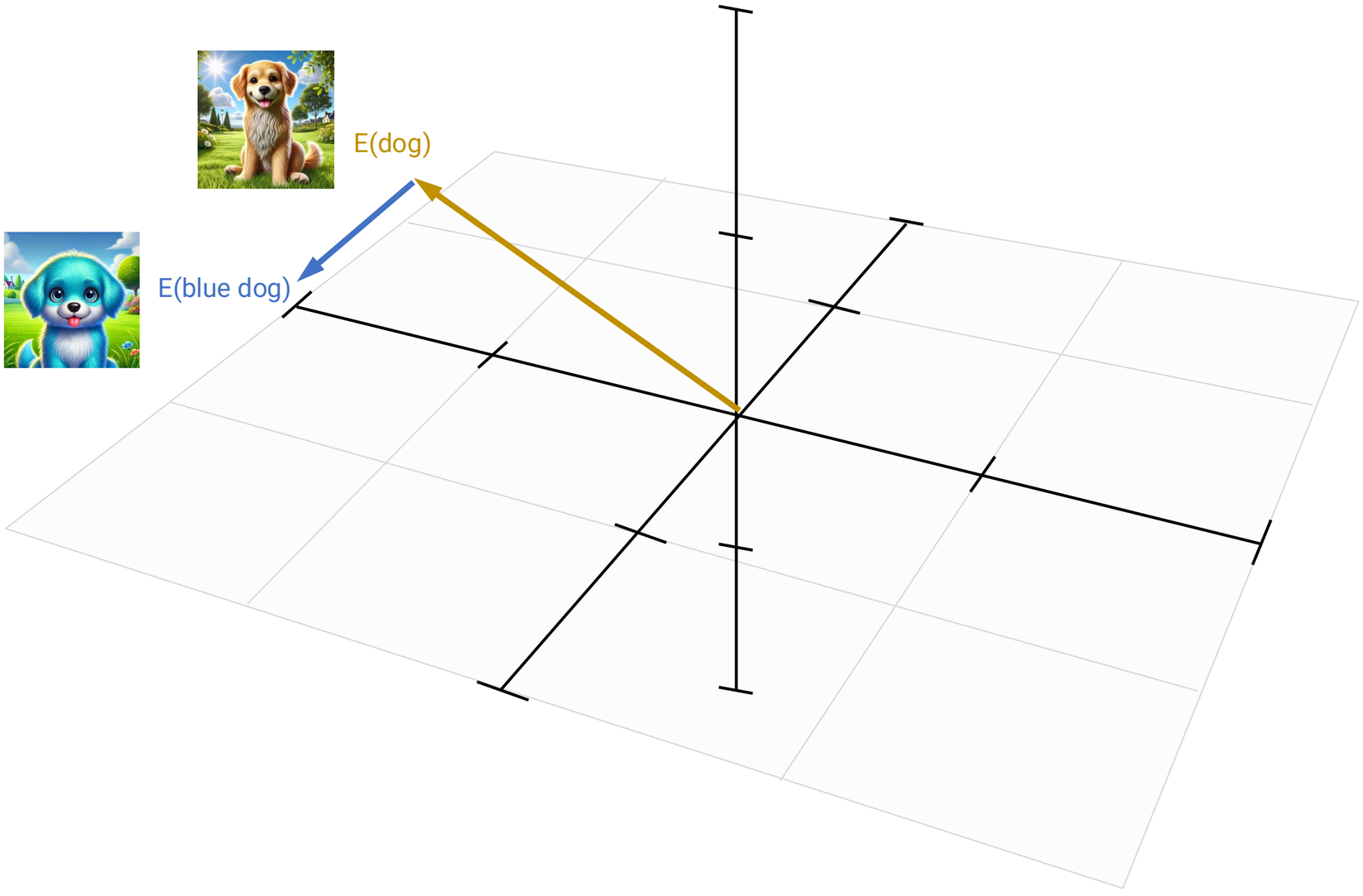
an	angry	blue	dog	ran	behind	a	red	haired	man
1	2	3	4	5	6	7	8	9	10
+0.01	+3.81	+7.21	+0.22	+4.21	+0.20	+0.01	+3.91	+0.21	+0.05
+0.12	−7.23	+2.40	−0.98	−2.40	+4.55	+0.12	−6.49	+2.10	−0.99
+2.22	+3.25	−1.85	+1.25	+6.95	+2.11	+2.24	+3.25	+0.01	−3.25
+1.97	−2.01	−2.99	−0.01	+2.21	+0.41	+1.96	−2.00	+2.01	−1.01
+1.45	+0.01	+7.15	+6.45	+2.67	+3.32	+1.45	+0.45	+5.34	+8.45
+0.05	−5.25	−2.53	+2.86	+8.12	+0.32	+0.05	−2.25	−2.45	+2.05

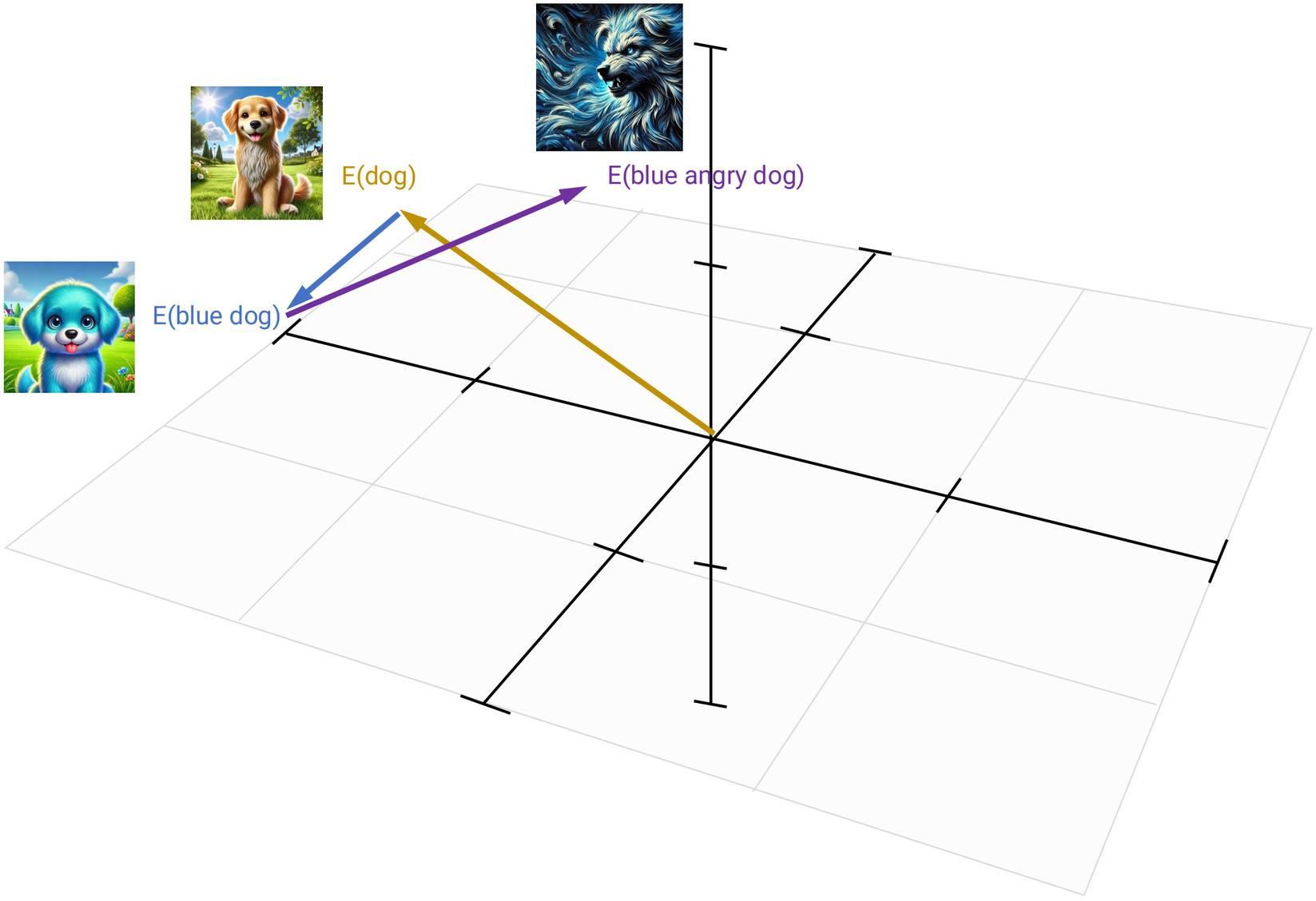
an	angry	blue	dog	ran	behind	a	red	haired	man
E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}

an	angry	blue	dog	ran	behind	a	red	haired	man



E(dog)


E(dog)
E(blue dog)


E(dog)
E(blue angry dog)
E(blue dog)

Harry stood at the edge of the Forbidden Forest, his wand gripped tightly in his hand.

Prince Harry delivered a heartfelt speech at a star-studded charity gala last night.

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