LLM 4 JDM

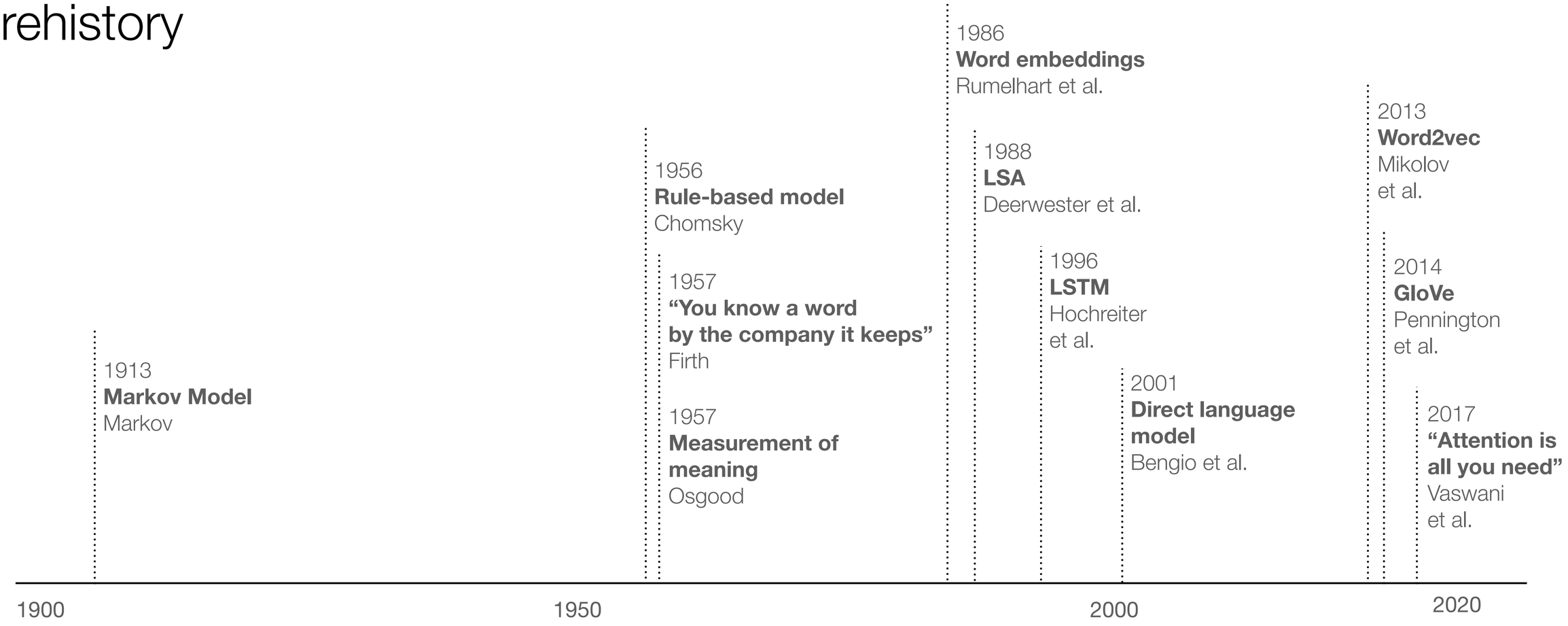
Zak Hussain, Sudeep Bhatia, & Dirk Wulff

Schedule

09:45 -10:20	Intro to large language models
10:20 - 10:45	Intro to Huggingface
10:45 - 11:15	Break
11:15 - 12:00	Exercise 1 - Predicting health perception
12:00 - 1:00	Lunch
01:00 - 2:00	Exercise 2 - Predicting personality structure
02:00 - 2:30	Exercise 3 - Predicting cognitive reflection
02:30 - 3:00	Discussion

Language models

Prehistory



Word embedding

Latent semantic analysis

Contexts

Word

	Context 1										
this	1										
region	1										
of	1										
the	1										
galaxy	1										

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Word embedding

Latent semantic analysis

Contexts

Word	Context 1	Context 2										
this	1											
region	1	1										
of	1	1										
the	1	2										
galaxy	1	1										

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Word embedding

Latent semantic analysis

Contexts

Word	Context 1	Context 2	Context 3									
this	1											
region	1	1										
of	1	1	1									
the	1	2	2									
galaxy	1	1	1									
sky			1									

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Word embedding

Latent semantic analysis

Contexts

Word	Context 1	Context 2	Context 3	…	Context *m*							
this	1											
region	1	1										
of	1	1	1		1							
the	1	2	2		1							
galaxy	1	1	1									
sky			1									
…												
image					1							
dial					1							
shivered					1							

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Word embedding

Latent semantic analysis

Contexts

Word	Context 1	Context 2	Context 3	…	Context *m*				…			Context *M*
this	1											
region	1	1										
of	1	1	1		1							
the	1	2	2		1							
galaxy	1	1	1									
sky			1									
…												
image					1							
dial					1							
shivered					1							
…												
Word *N*												

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

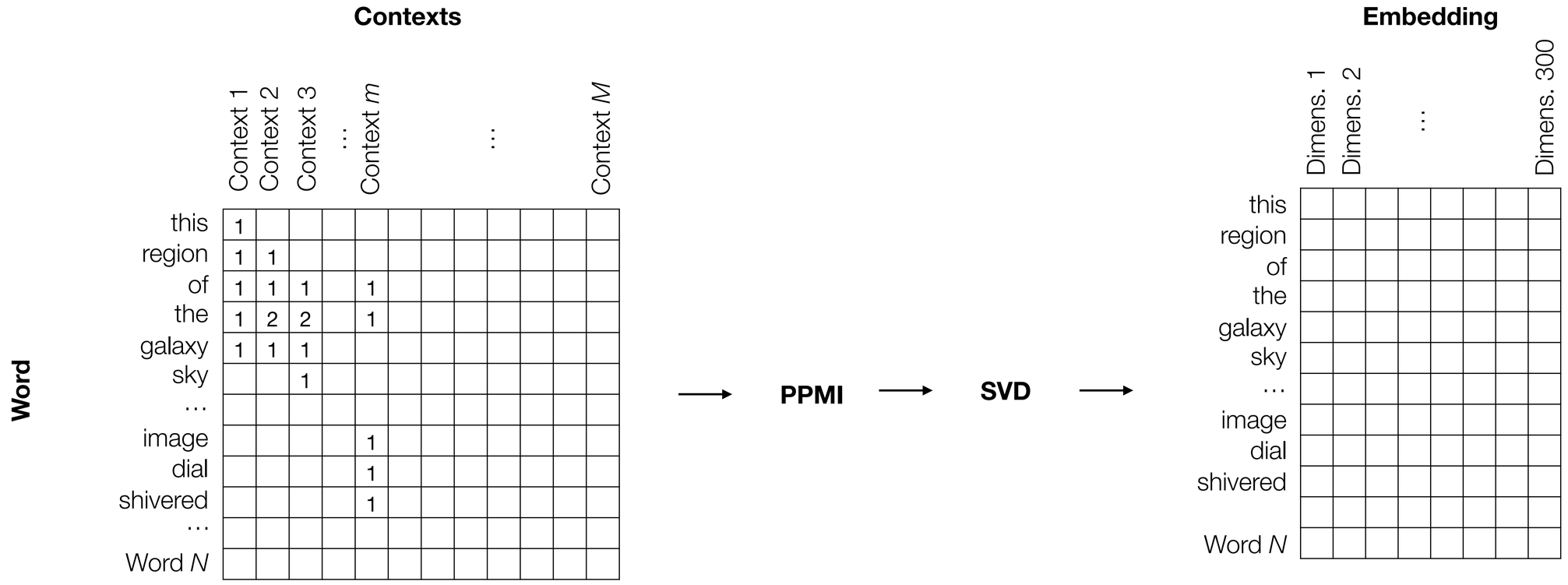
I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

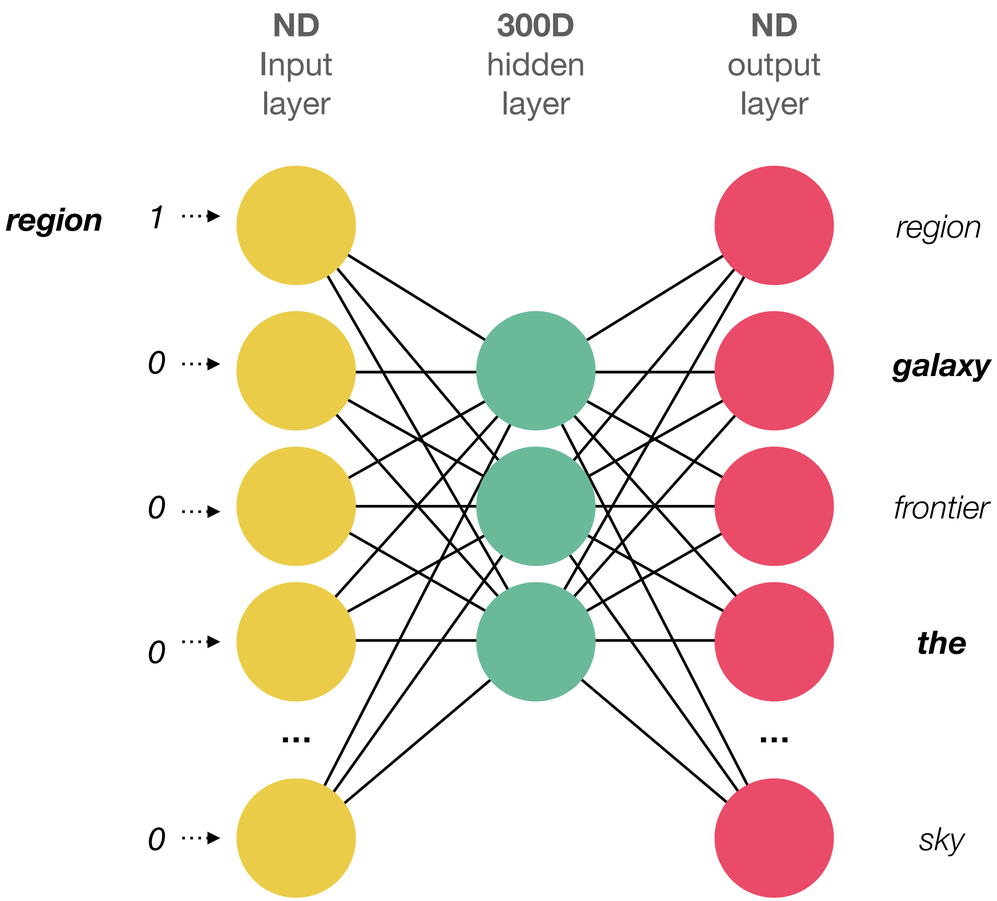
Word embedding

Latent semantic analysis



Word embedding

word2vec



"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

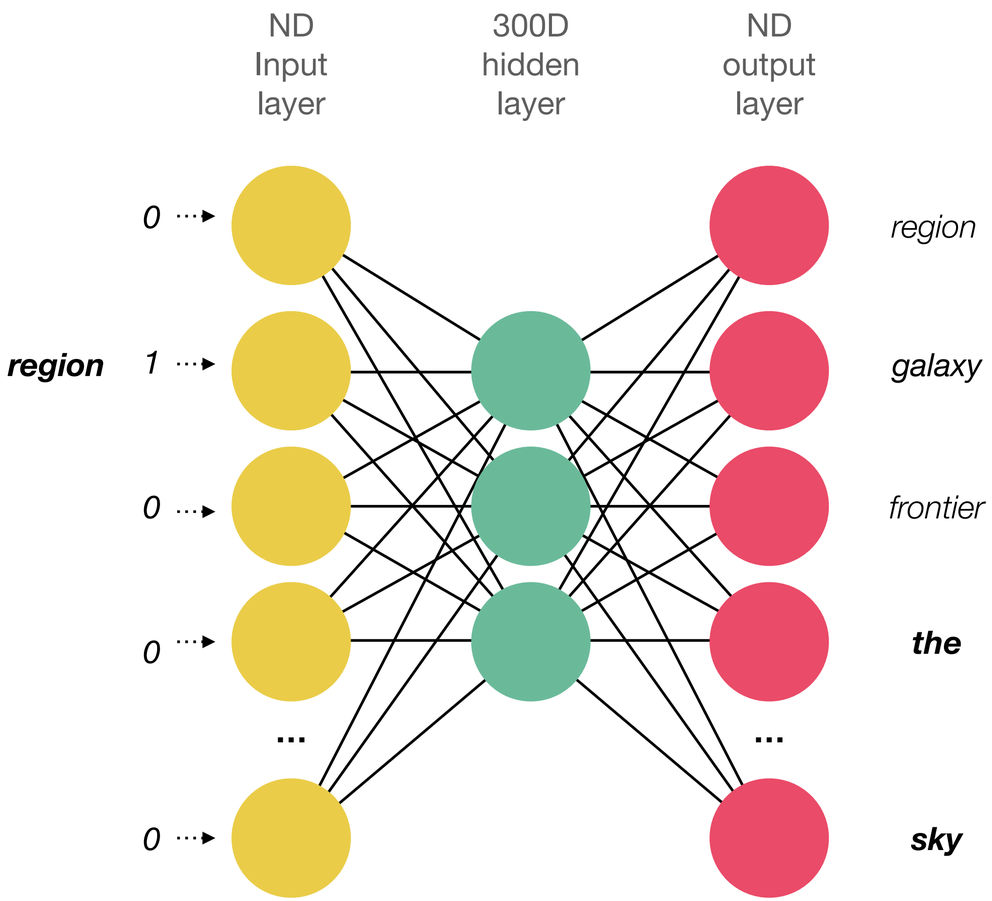
I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Word embedding

word2vec



"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

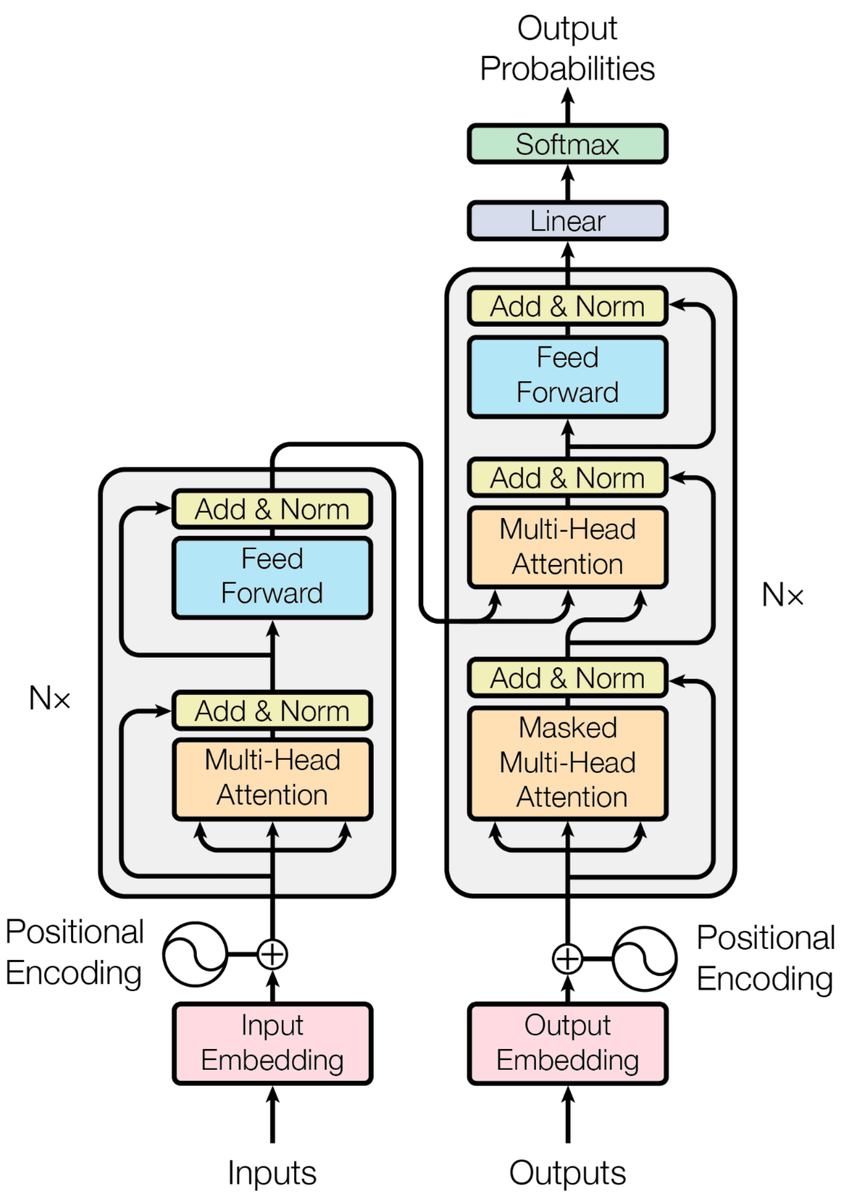
I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Transformer

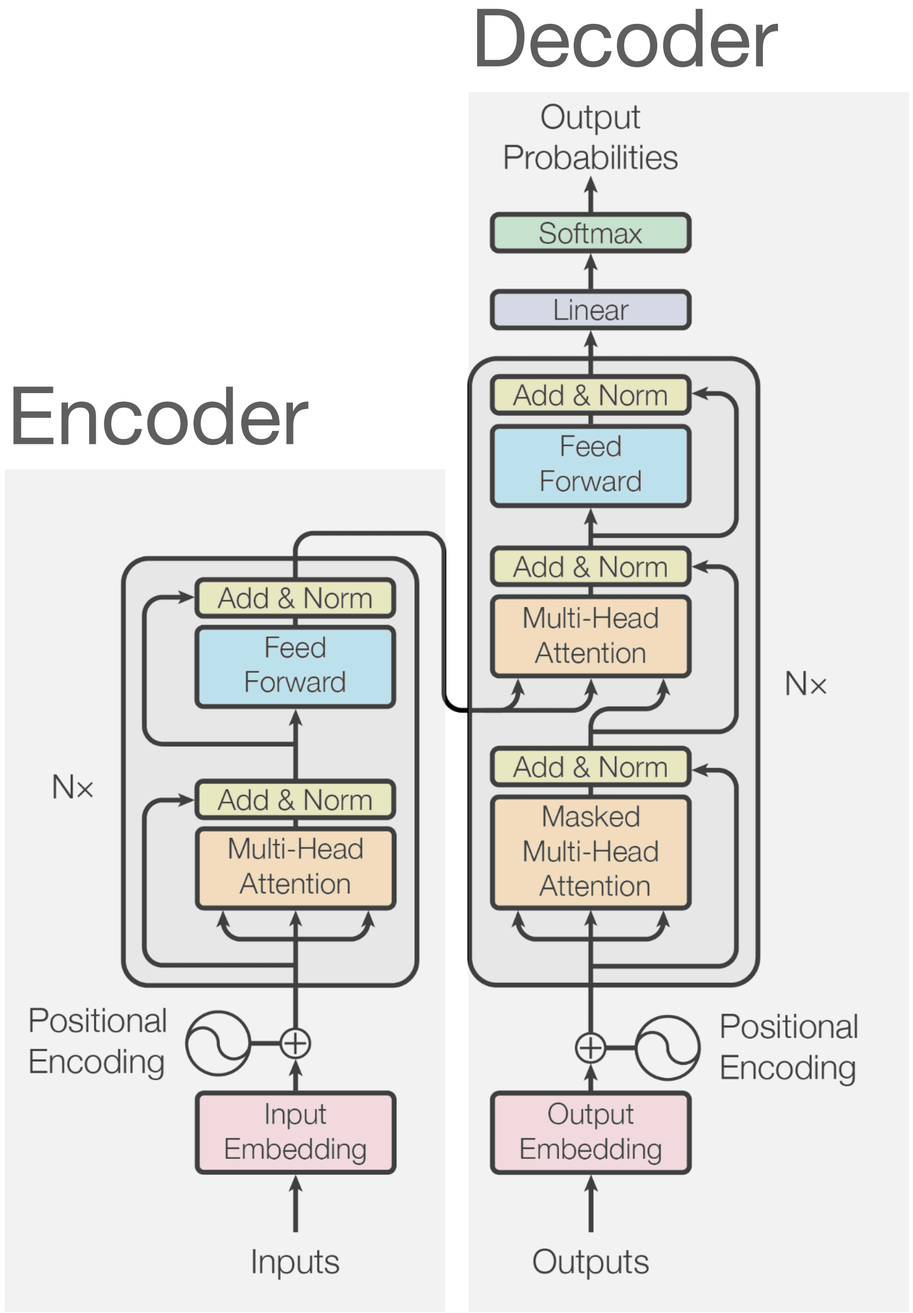
Components



Vaswani et al. (2017) NeurIPS

Transformer

Components



Vaswani et al. (2017) NeurIPS

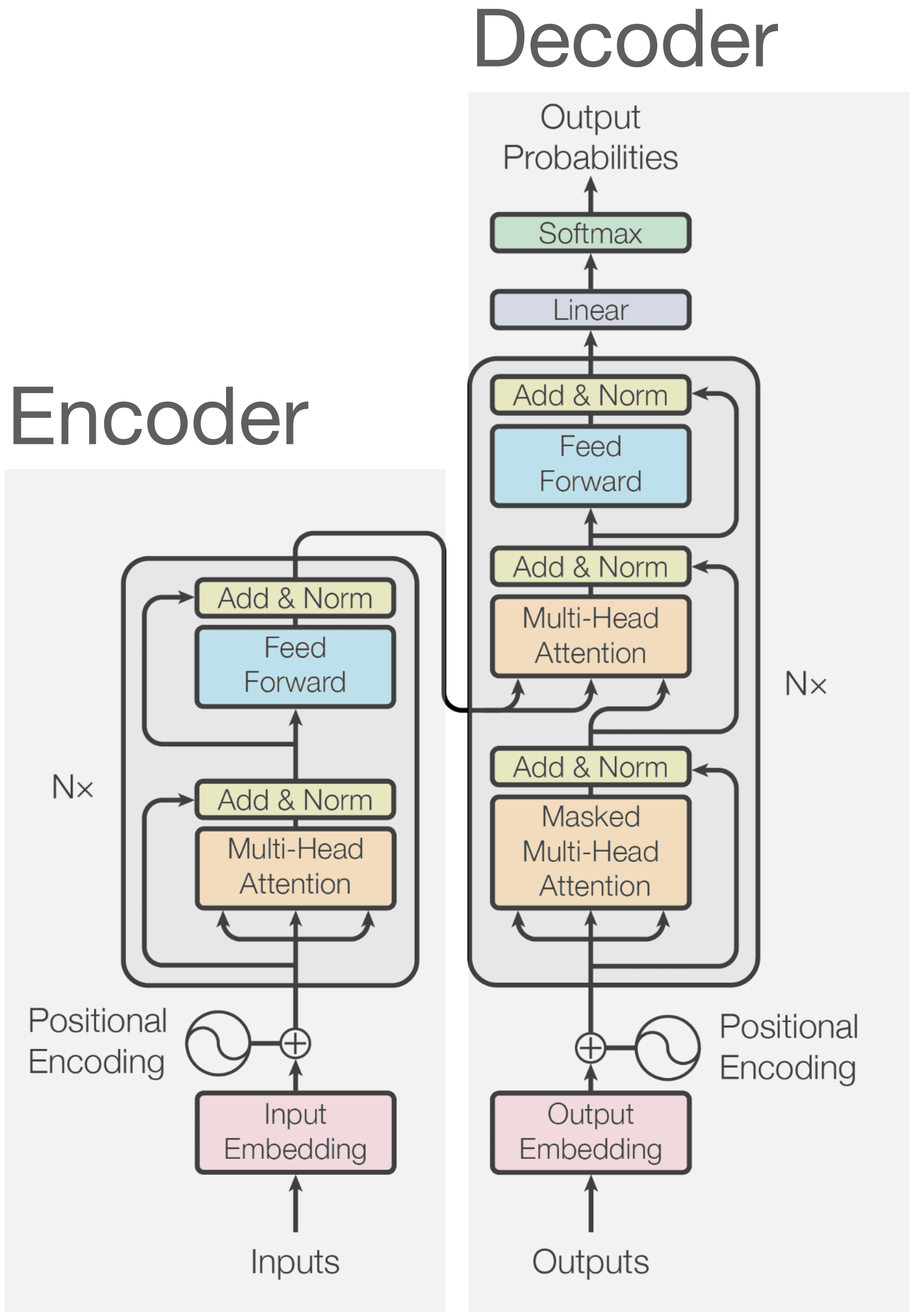
Transformer

Components

Training objectives

Attention

Tokenization



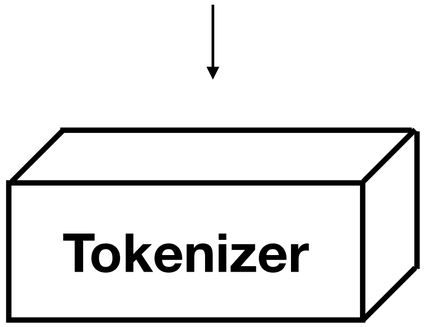
Vaswani et al. (2017) NeurIPS

Transformer

Tokenziation

Sentence

'This was it, the descent.'



'[CLS]', 'this', 'was', 'it', ',', 'the', 'descent', '.', '[SEP]'

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

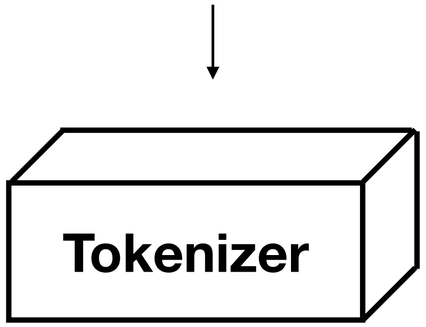
I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Transformer

Tokenziation

Sentence

'…merging into a vague, purplish glimmer…'



’merging', 'into', 'a', 'vague', ',', 'pu', ‘##rp', '##lish', 'g', '##lim', '##mer'

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

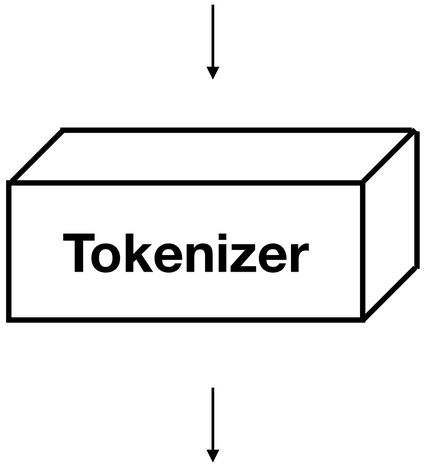
I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

Transformer

Tokenziation

Sentence

'you've won 202000 Eur'



'[CLS]', 'you', "'", 've', 'won', '2020', '##00', 'eu', '##r', '[SEP]'

"You're on your way, Kelvin. Good luck!" Moddard's voice sounded as close as before.

A wide slit opened at eye-level, and I could see the stars. The _Prometheus_ was orbiting in the region of Alpha in Aquarius and I tried in vain to orient myself; a glittering dust filled my porthole. I could not recognize a single constellation; in this region of the galaxy the sky was unfamiliar to me. I waited for the moment when I would pass near the first distinct star, but I was unable to isolate any one of them. Their brightness was fading; they receded, merging into a vague, purplish glimmer, the sole indication of the distance I had already travelled. My body rigid, sealed in its pneumatic envelope, I was knifing through space with the impression of standing still in the void, my only distraction the steadily mounting heat.

Suddenly, there was a shrill, grating sound, like a steel blade being drawn across a sheet of wet glass. This was it, the descent. If I had not seen the figures racing across the dial, I would not have noticed the change in direction. The stars having vanished long since, my gaze was swallowed up on the pale reddish glow of infinity. I could hear my heart thudding heavily. I could feel the coolness from the air-conditioning on my neck, although my face seemed to be on fire. I regretted not having caught a glimpse of the _Prometheus_, but the ship must have been out of sight by the time the automatic controls had raised the shutter of my porthole.

The capsule was shaken by a sudden jolt, then another. The whole vehicle began to vibrate. Filtered through the insulating layers of the outer skins, penetrating my pneumatic cocoon, the vibration reached me, and ran through my entire body. The image of the dial shivered and multiplied, and its phosphorescence spread out in all directions. I felt no fear. I had not undertaken this long voyage only to overshoot my target!

I called into the microphone:

"Station Solaris! Station Solaris! Station Solaris! I think I am leaving the flight-path, correct my course! Station Solaris, this is the _Prometheus_ capsule. Over."

I had missed the precious moment when the planet first came into view. Now it was spread out before my eyes; flat, and already immense. Nevertheless, from the appearance of its surface, I judged that I was still at a great height above it, since I had passed that imperceptible frontier after which we measure the distance that separates us from a celestial body in terms of altitude. I was falling. Now I had the sensation of falling, even with my eyes closed. (I quickly reopened them: I did not want to miss anything there was to be seen.)

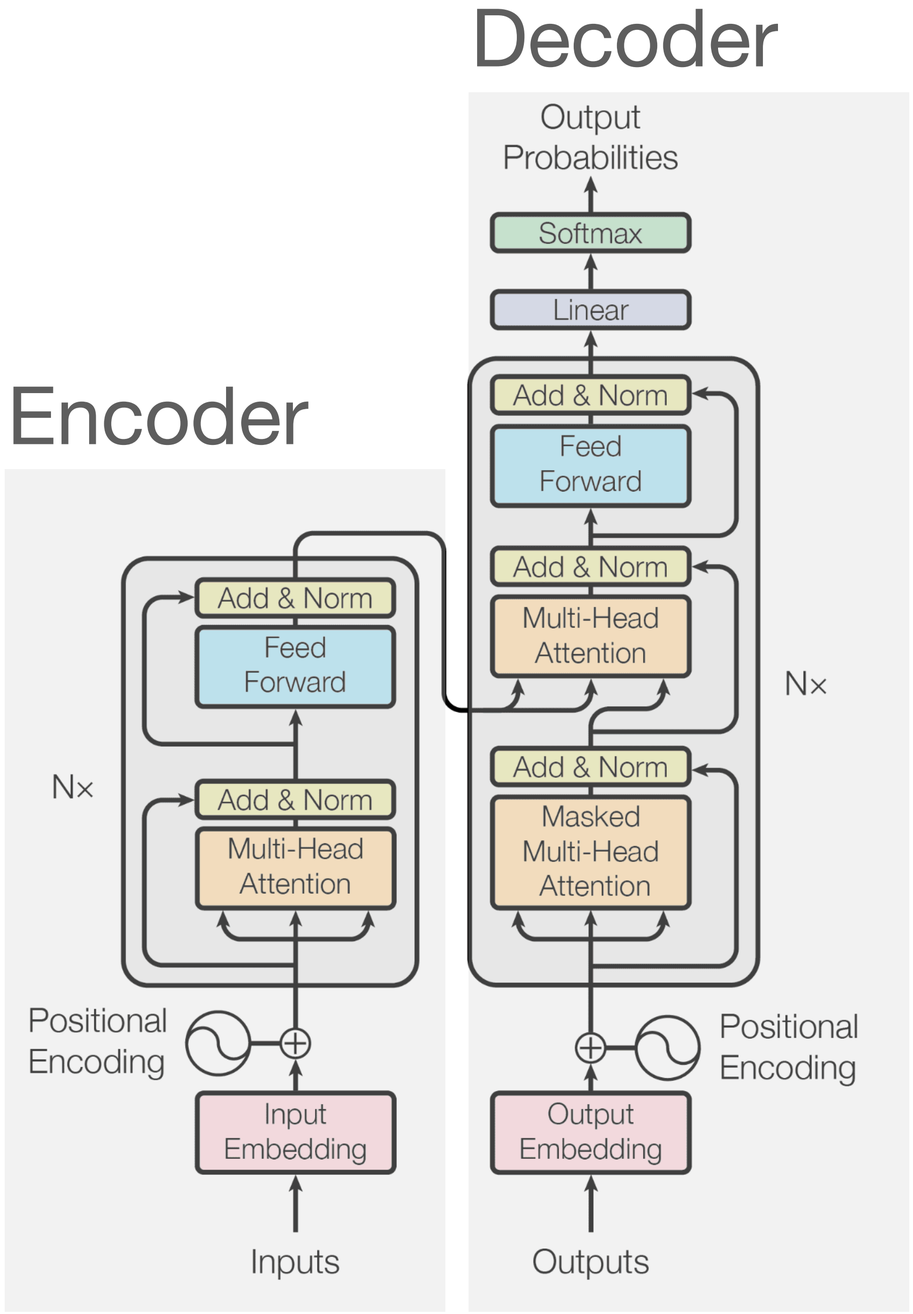
Transformer

Components

Training objectives

Attention

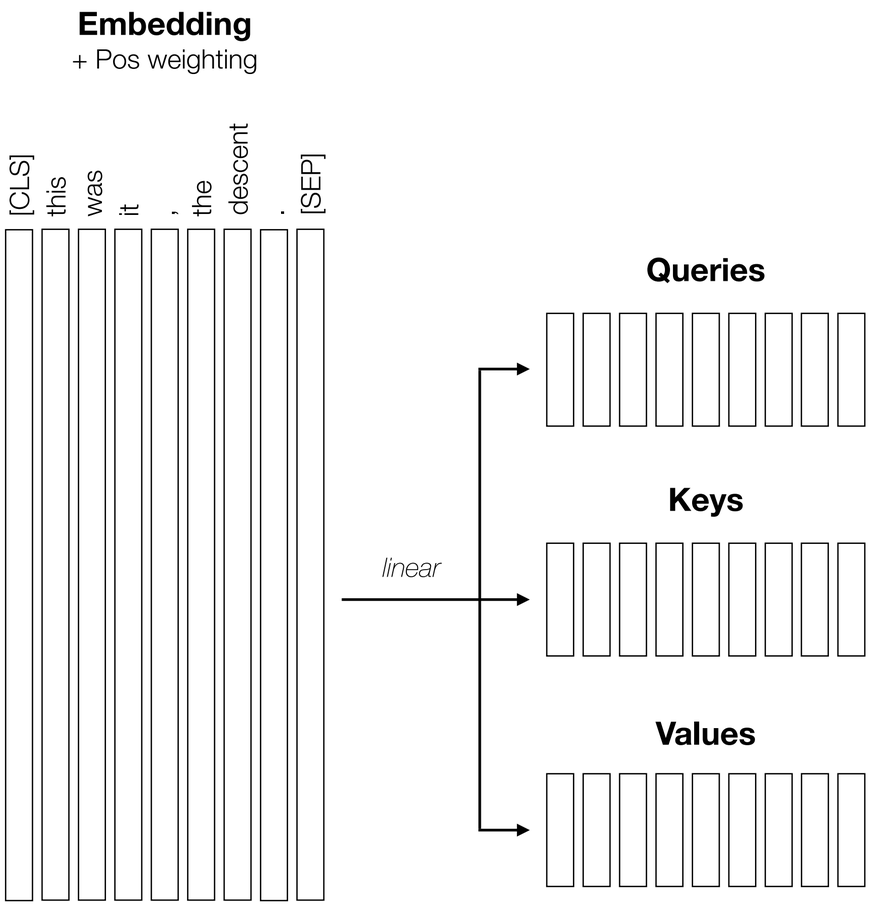
Tokenization



Vaswani et al. (2017) NeurIPS

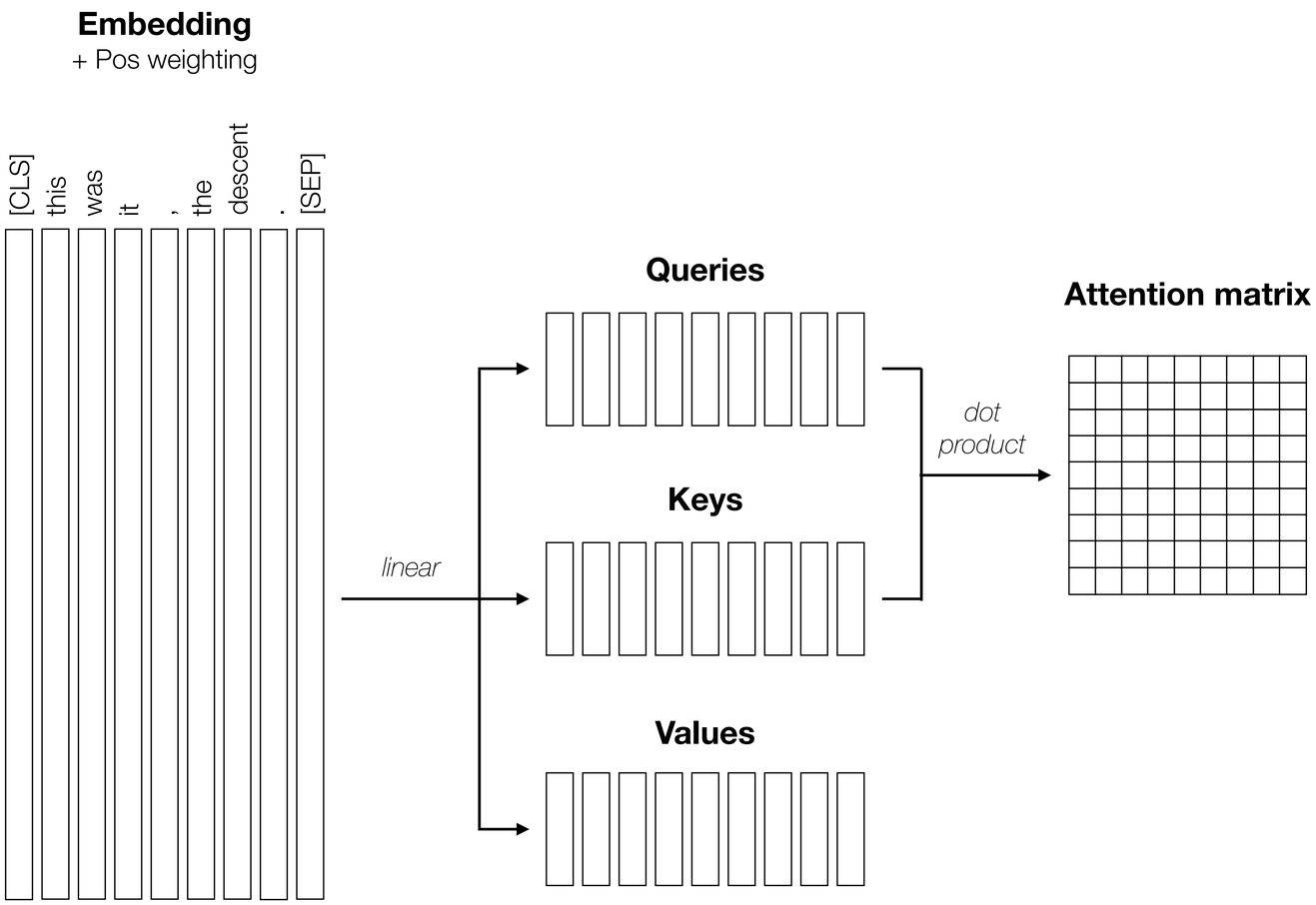
Transformer

Attention



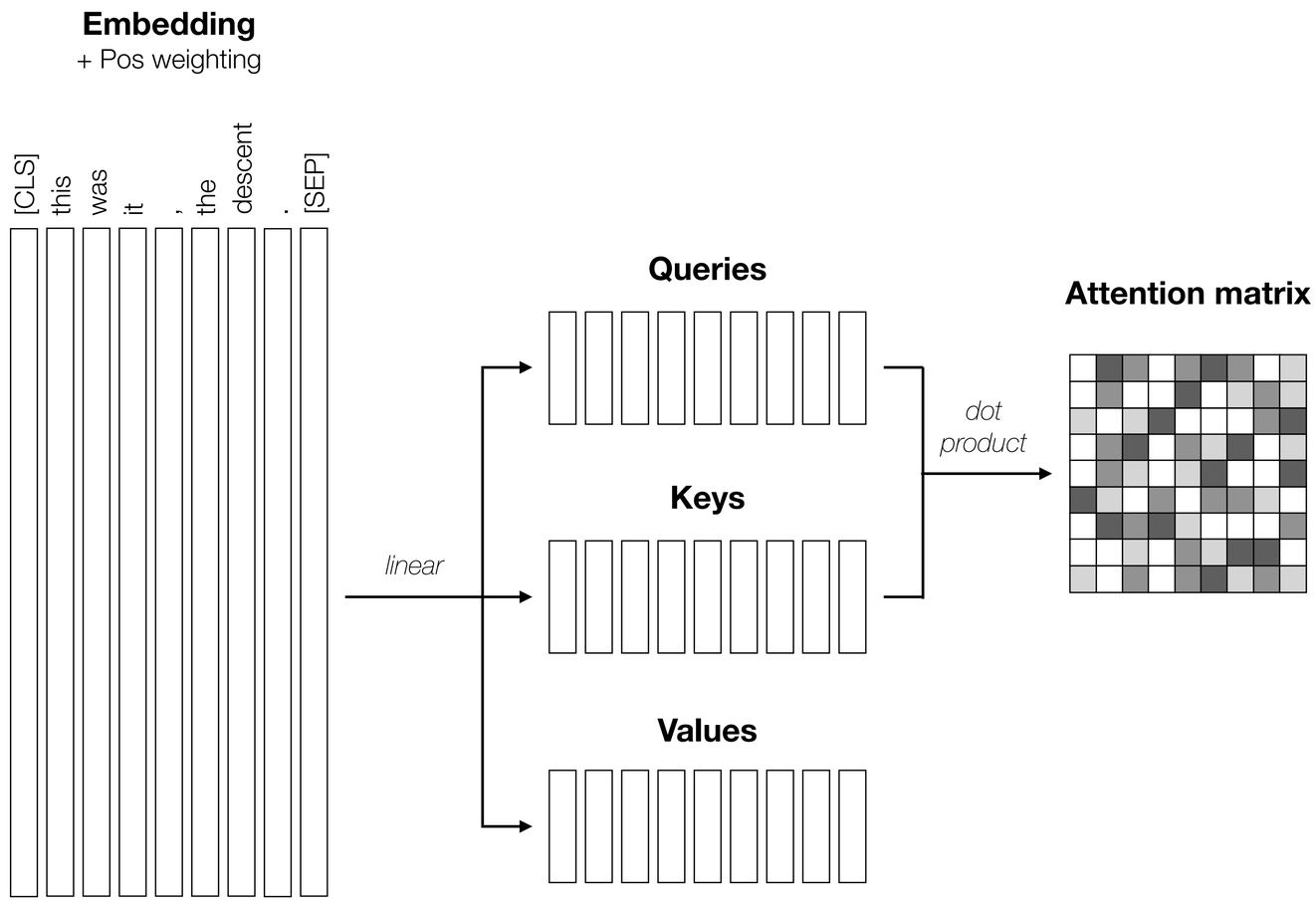
Transformer

Attention



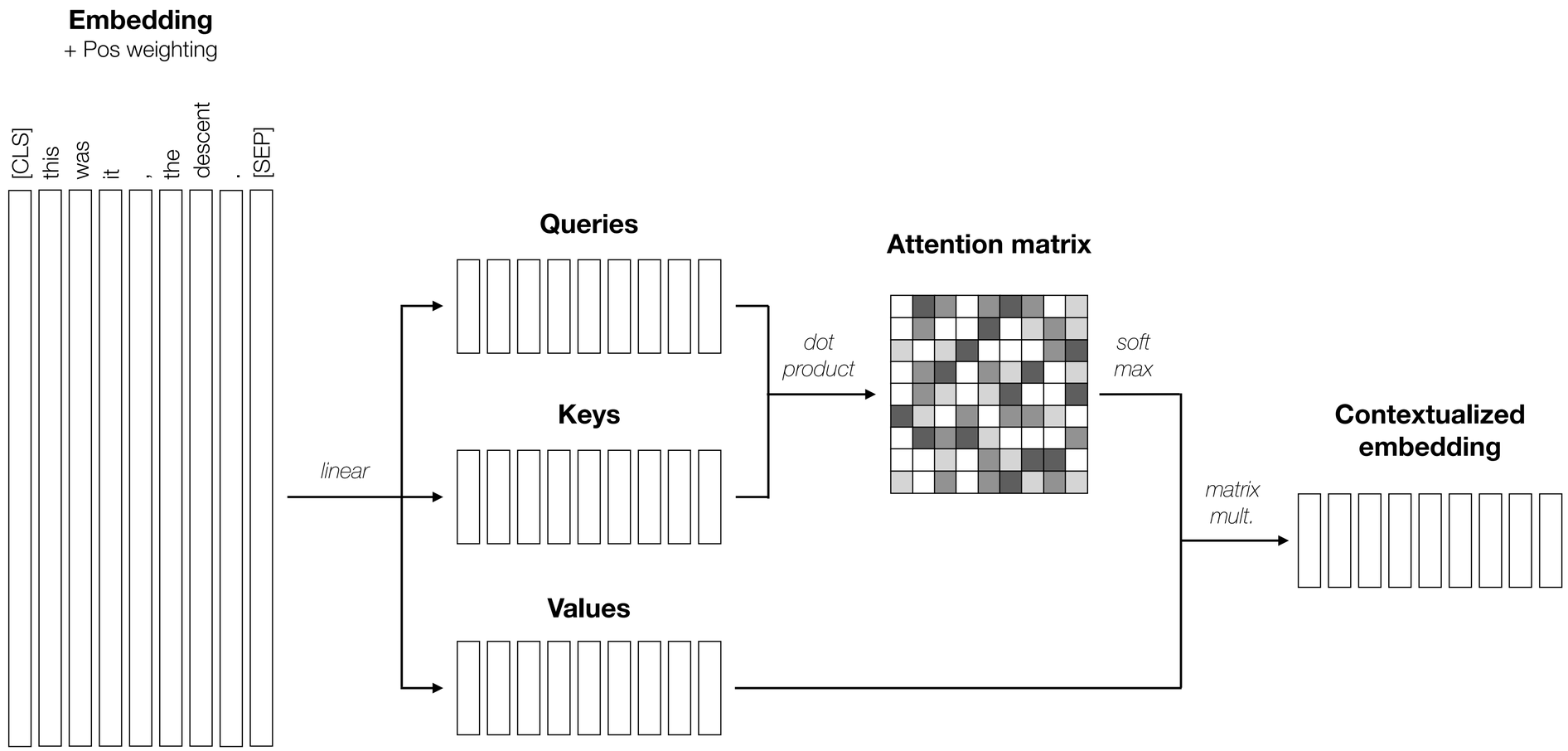
Transformer

Attention



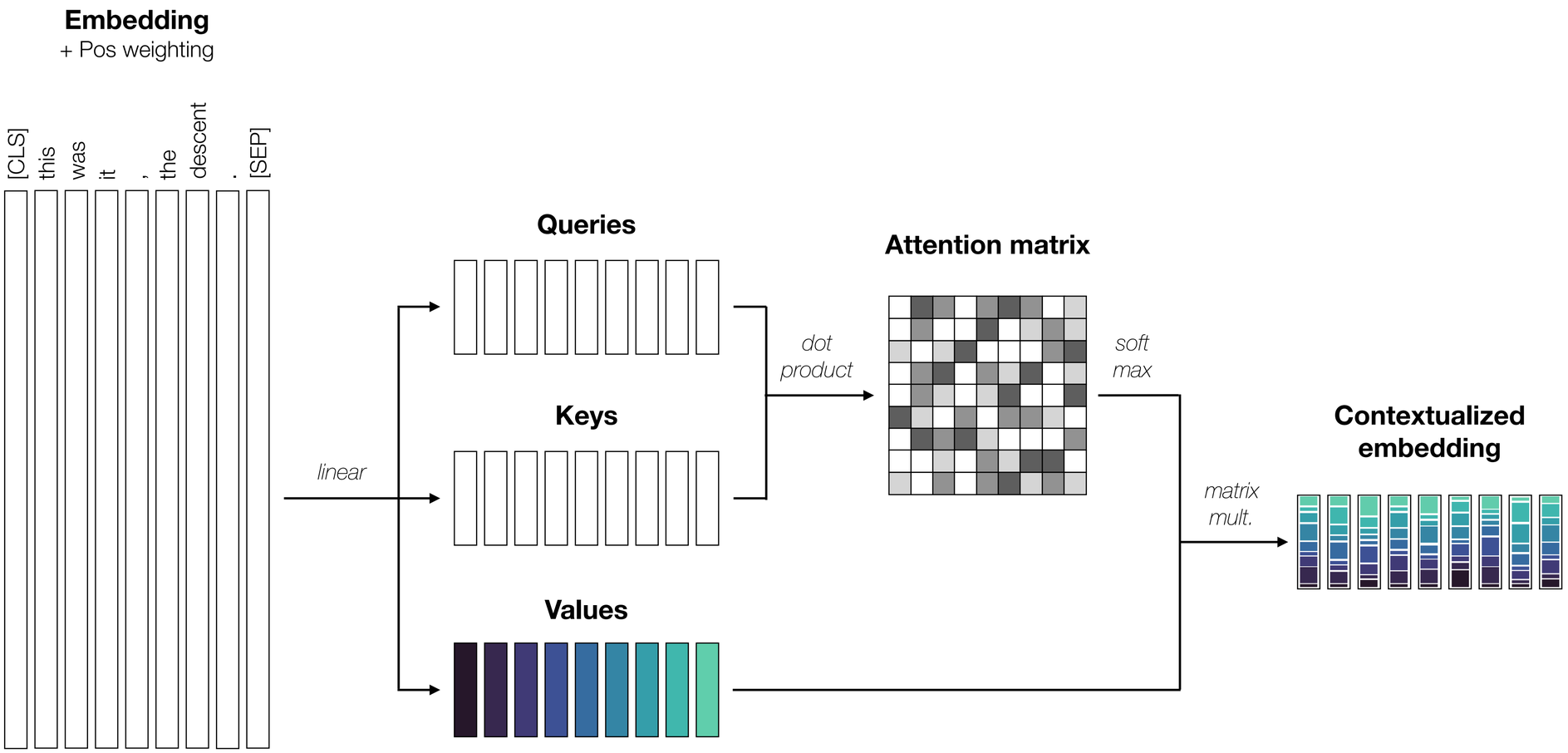
Transformer

Attention



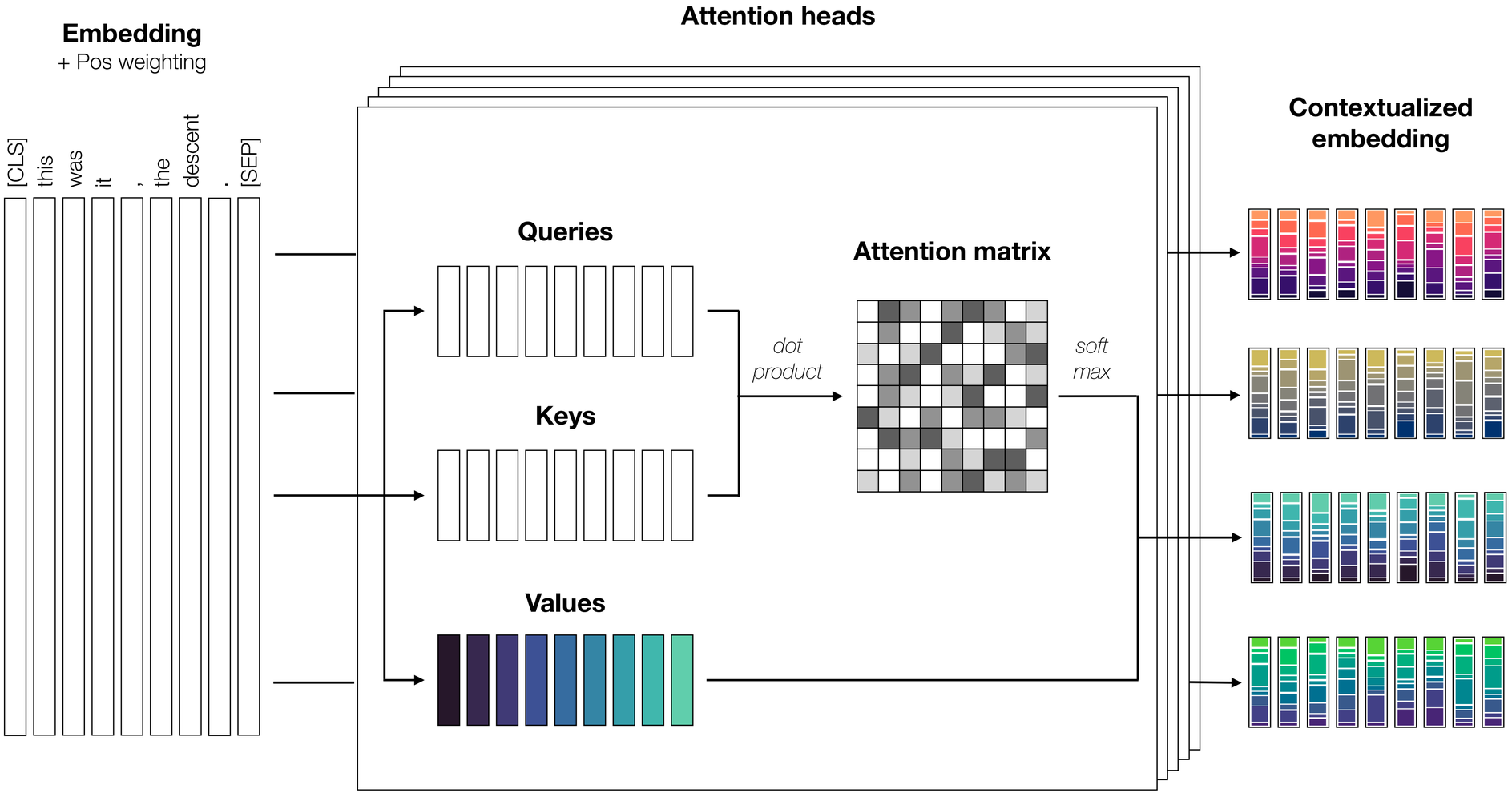
Transformer

Attention



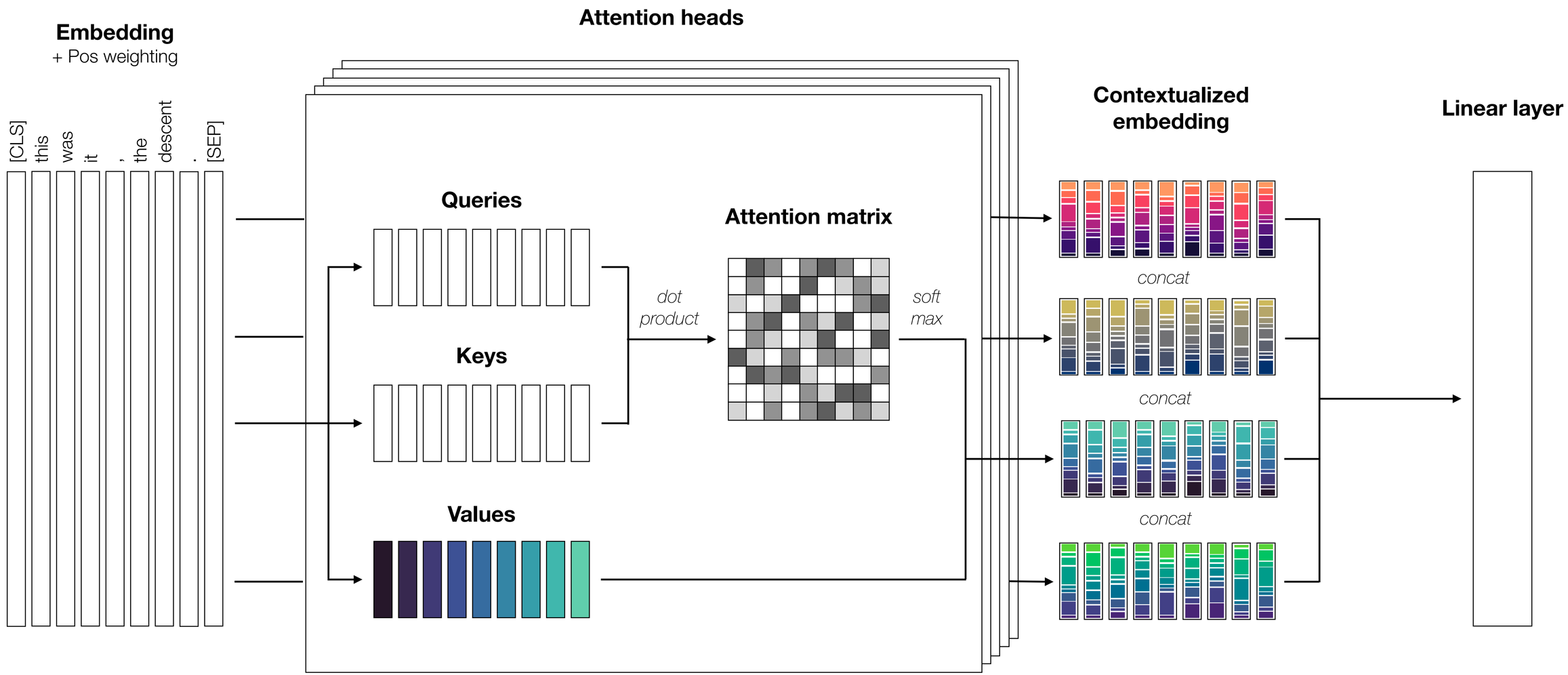
Transformer

Attention



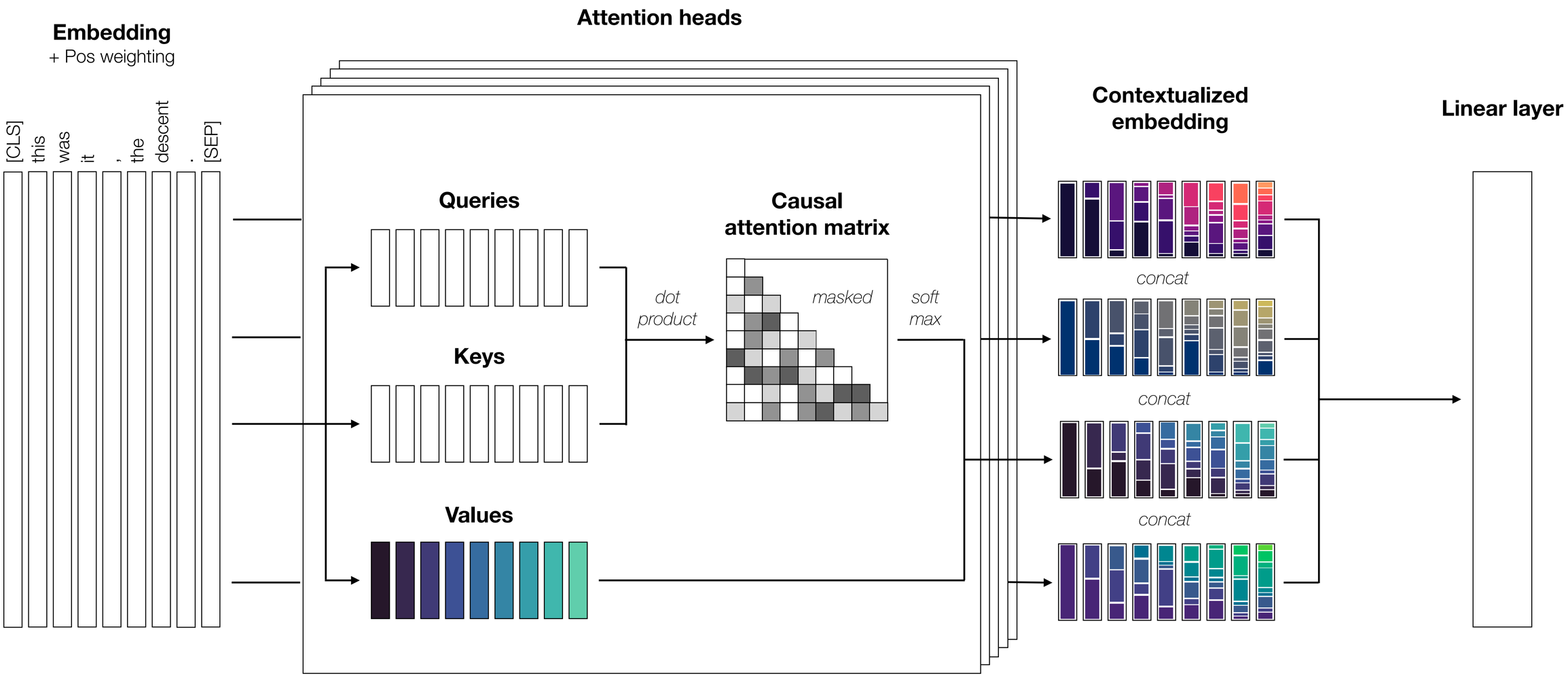
Transformer

Attention



Transformer

Attention



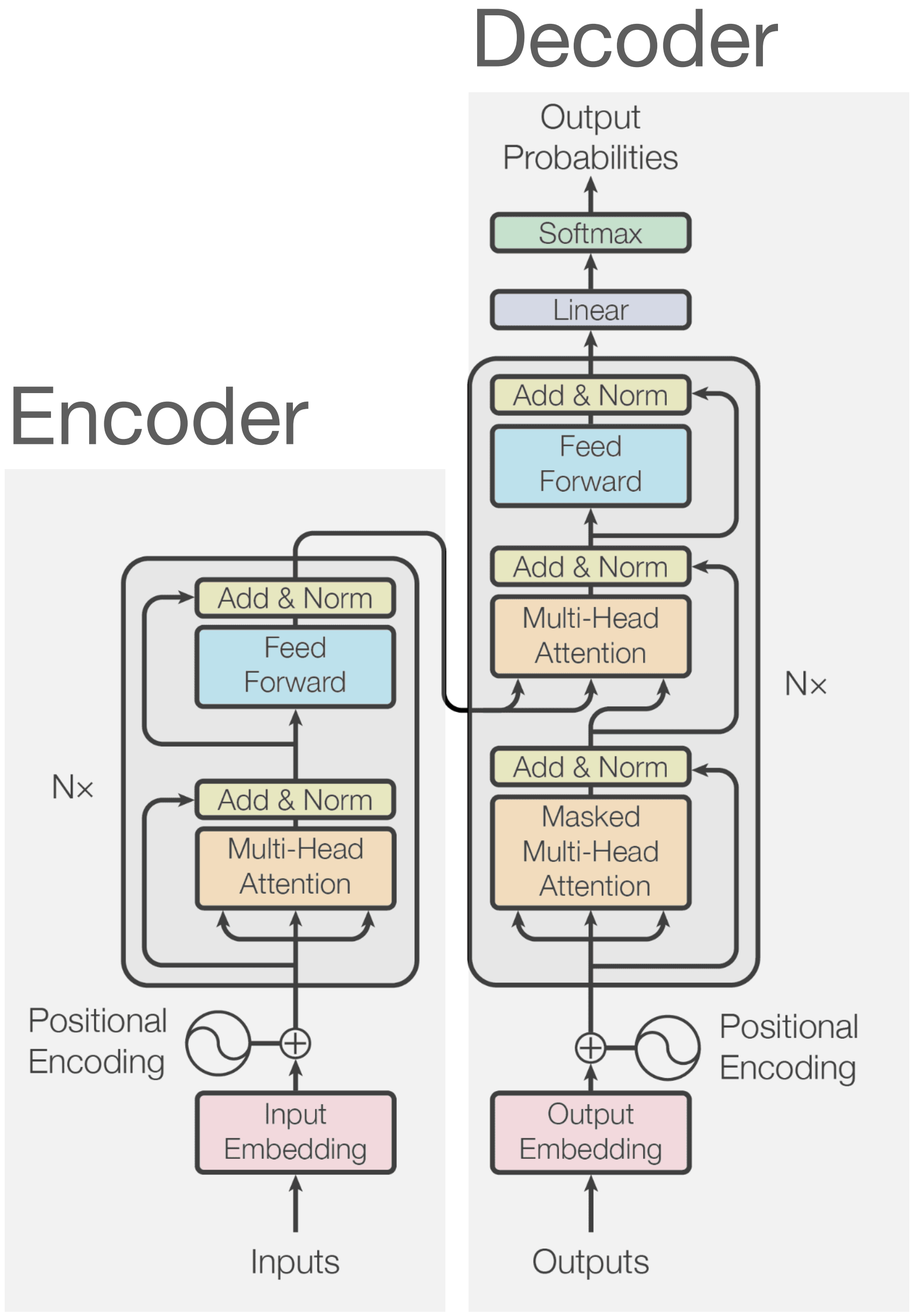
Transformer

Components

Training objectives

Attention

Tokenization



Vaswani et al. (2017) NeurIPS

Transformer

Training objectives

Masked language modeling

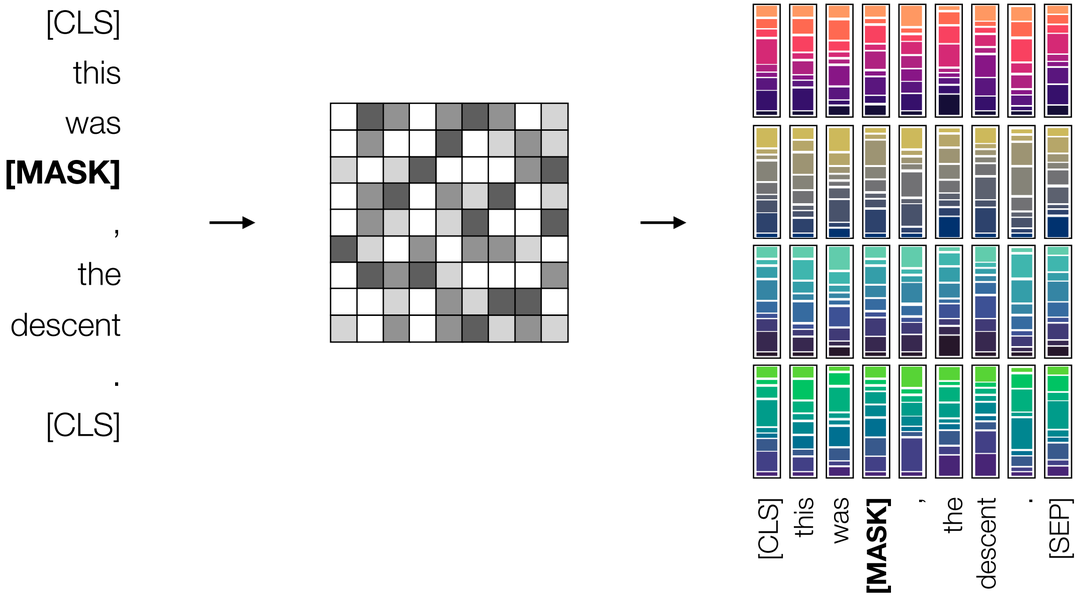
More common in encoders

Transformer

Training objectives

Masked language modeling

More common in encoders

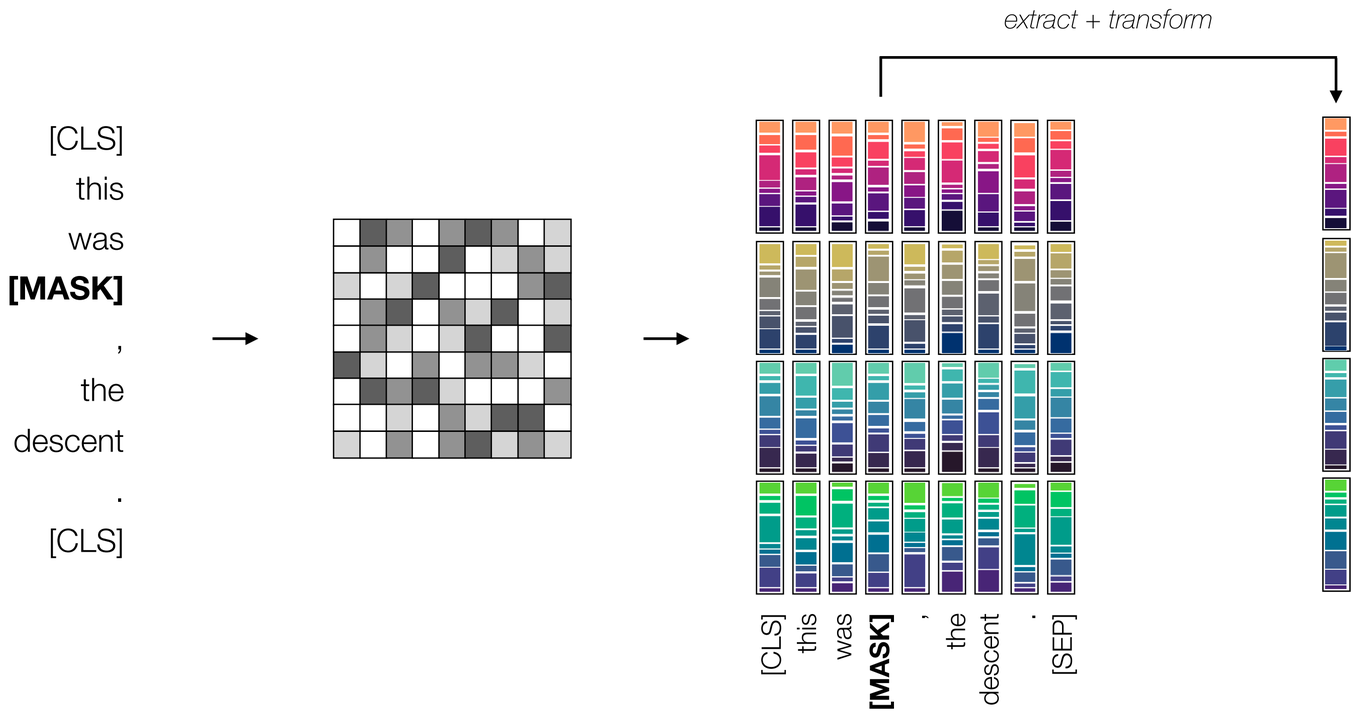


Transformer

Training objectives

Masked language modeling

More common in encoders

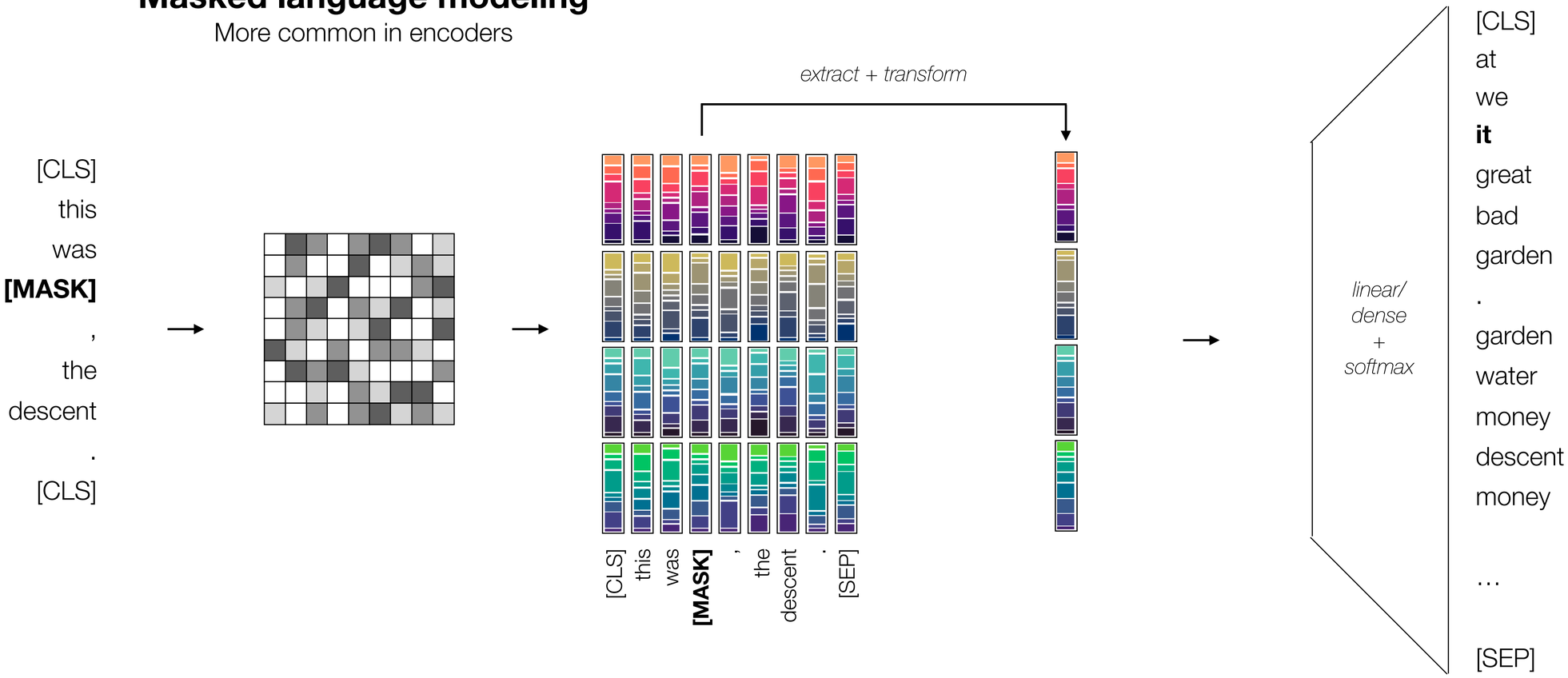


Transformer

Training objectives

Masked language modeling

More common in encoders

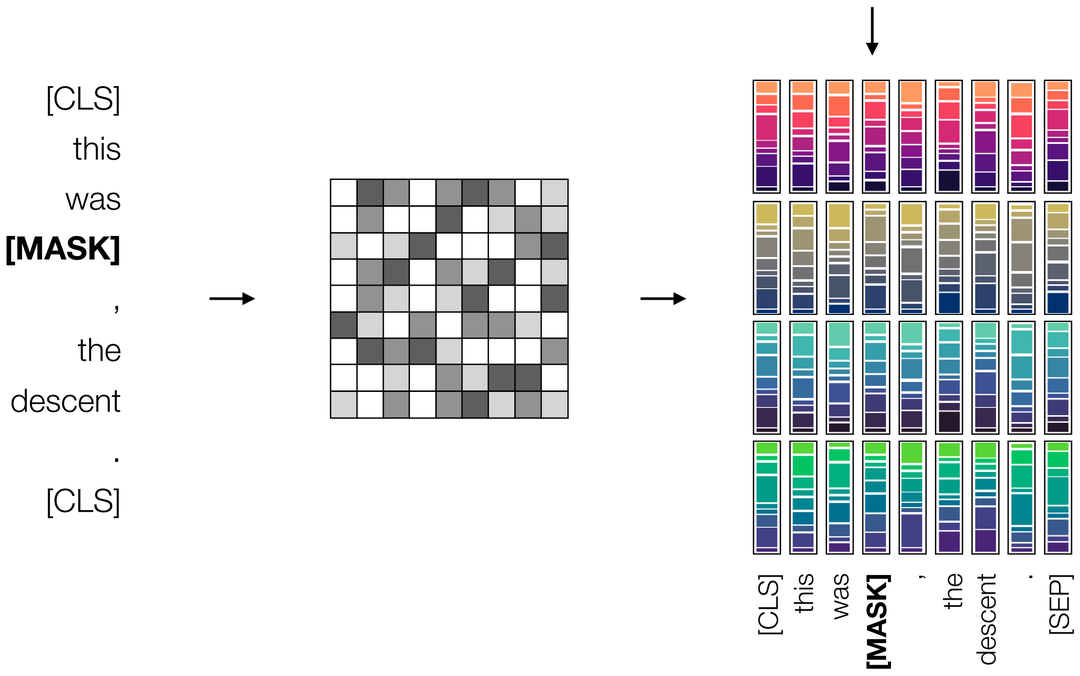


Transformer

Training objectives

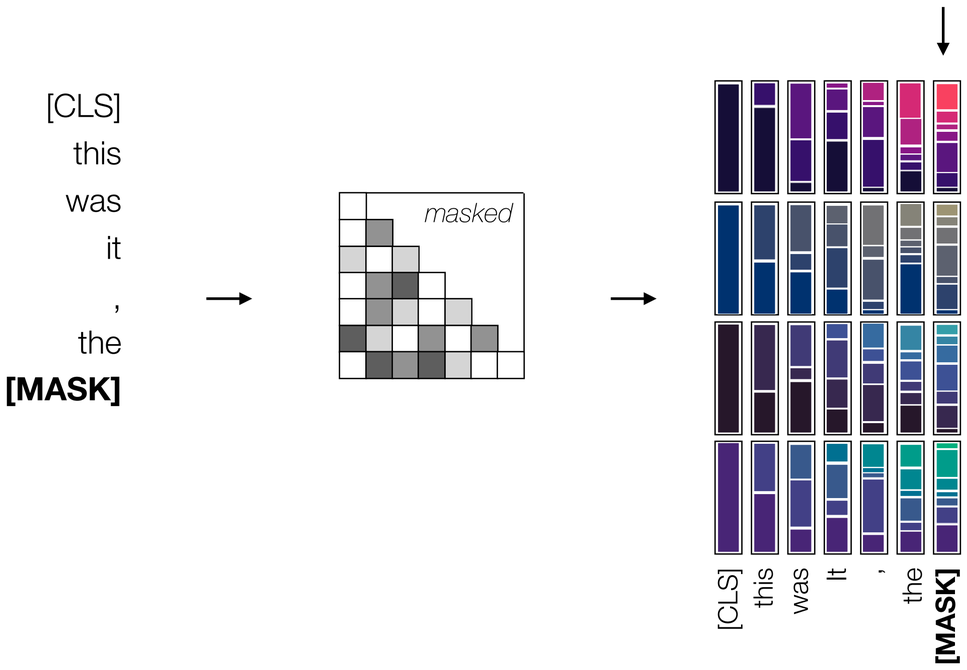
Masked language modeling

More common in encoders



(Causal) language modeling

More common in decoders

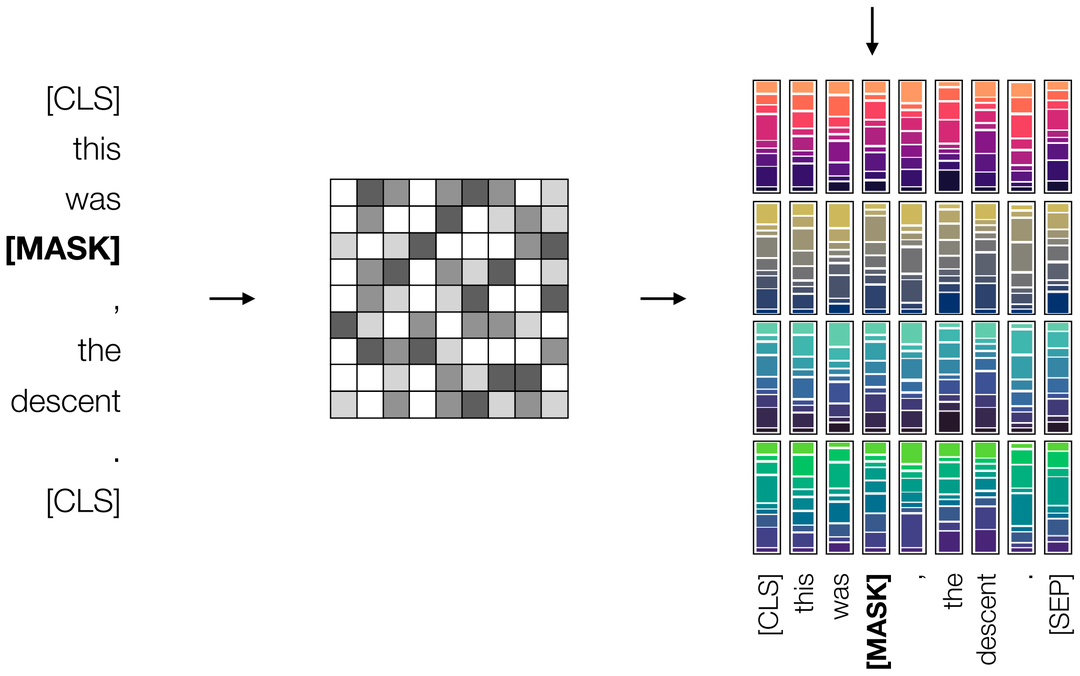


Transformer

Training objectives

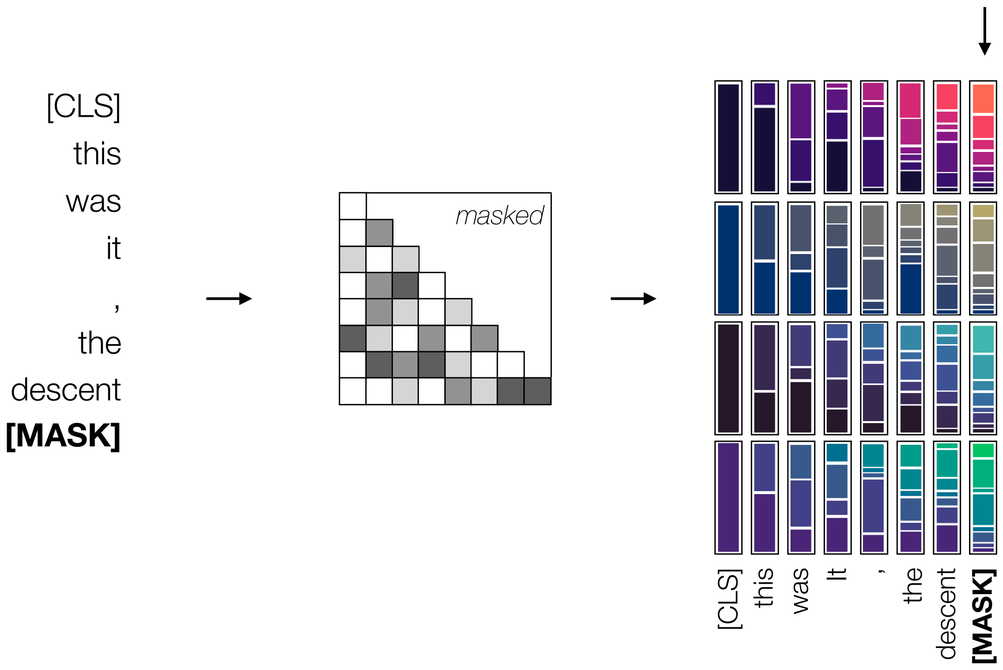
Masked language modeling

More common in encoders



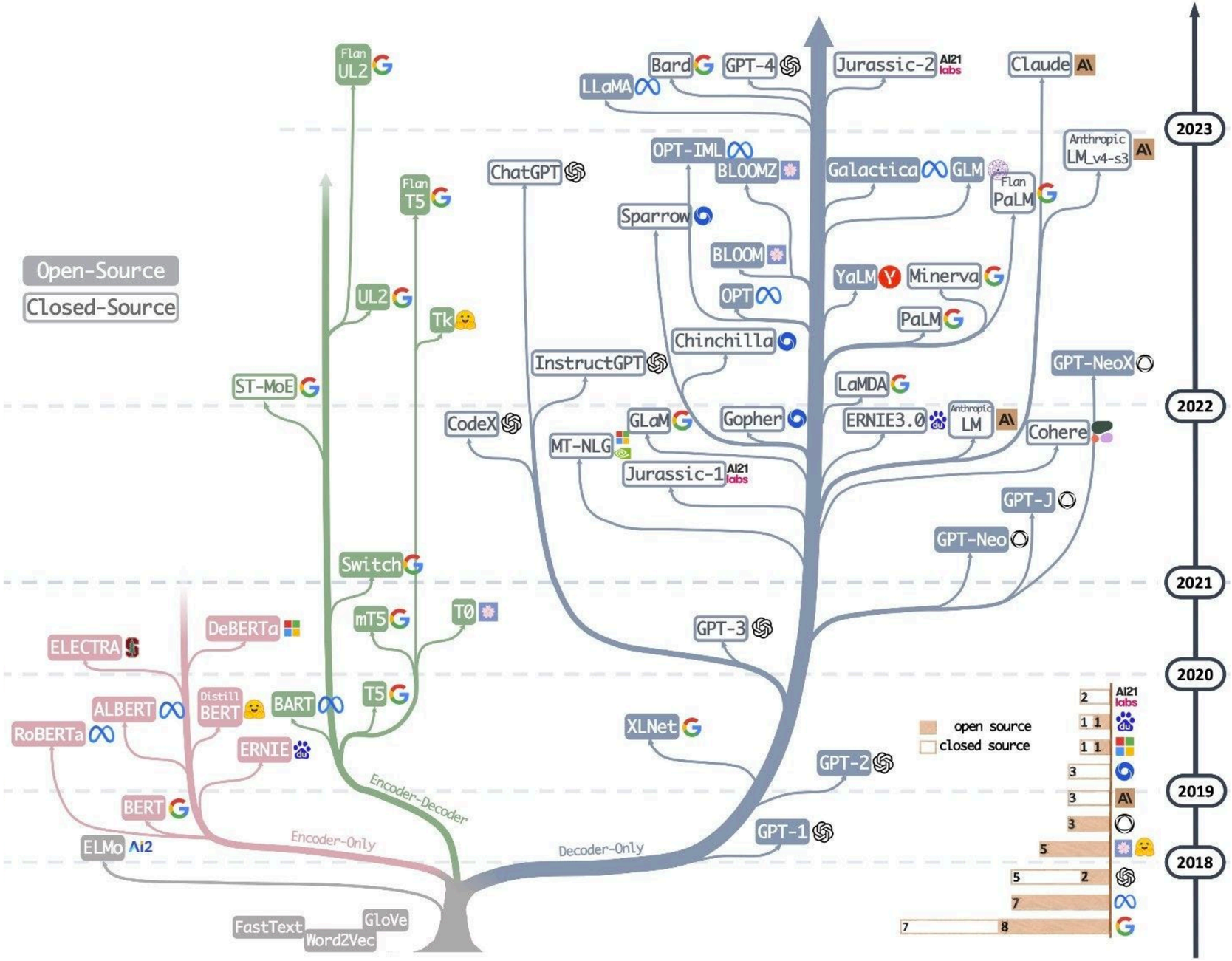
(Causal) language modeling

More common in decoders



Transformers

History



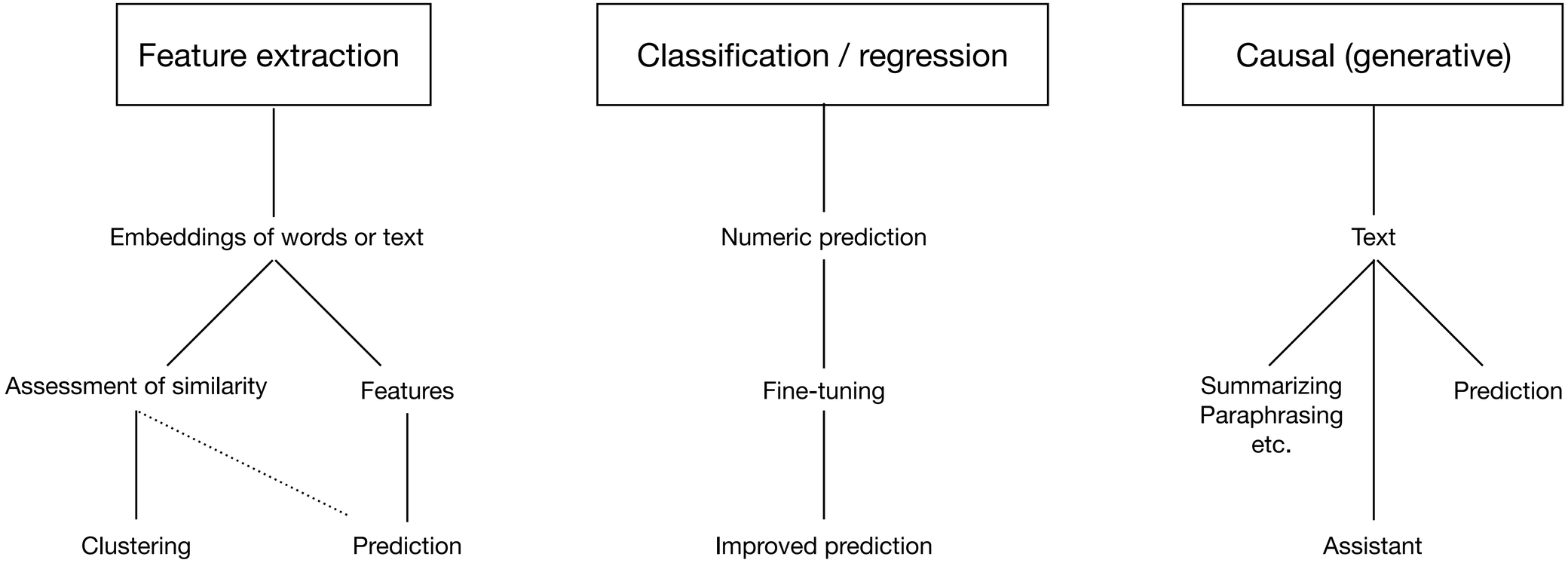
GPT Assistant training pipeline

Stage	Pretraining	Supervised Finetuning	Reward Modeling	Reinforcement Learning
Dataset	**Raw internet** text trillions of words low-quality, large quantity	**Demonstrations** Ideal Assistant responses, ~10-100K (prompt, response) written by contractors low quantity, high quality	**Comparisons** 100K –1M comparisons written by contractors low quantity, high quality	**Prompts** ~10K-100K prompts written by contractors low quantity, high quality
Algorithm	**Language modeling** predict the next token	**Language modeling** predict the next token	**Binary classification** predict rewards consistent w preferences	**Reinforcement Learning** generate tokens that maximize the reward
		init from	init from	init from SFT use RM
Model	Base model	SFT model	RM model	RL model
Notes	1000s of GPUs months of training ex: GPT, LLaMA, PaLM can deploy this model	1-100 GPUs days of training ex: Vicuna-13B can deploy this model	1-100 GPUs days of training	1-100 GPUs days of training ex: ChatGPT, Claude can deploy this model

from https://www.youtube.com/watch?v=bZQun8Y4L2A

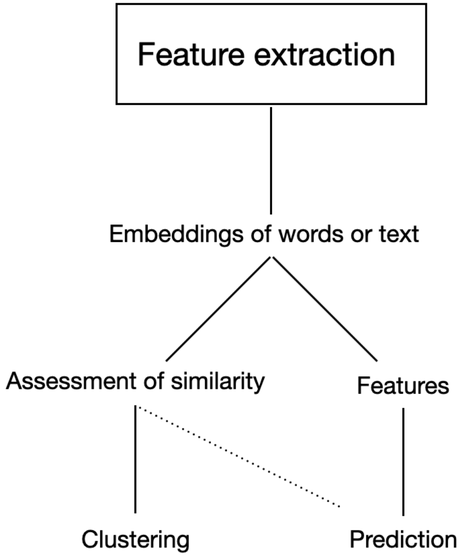
Tasks

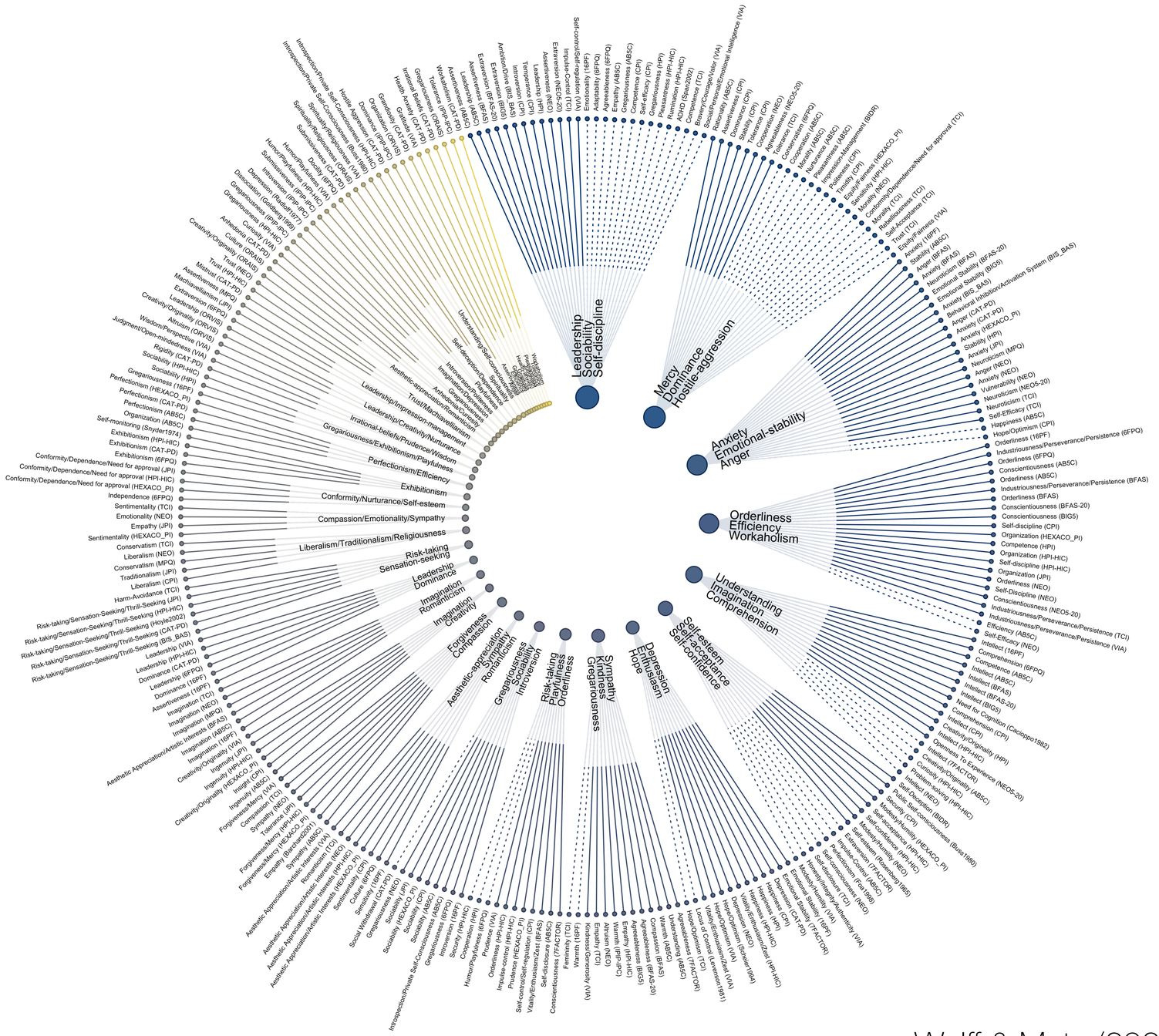
Overview



Tasks

Overview

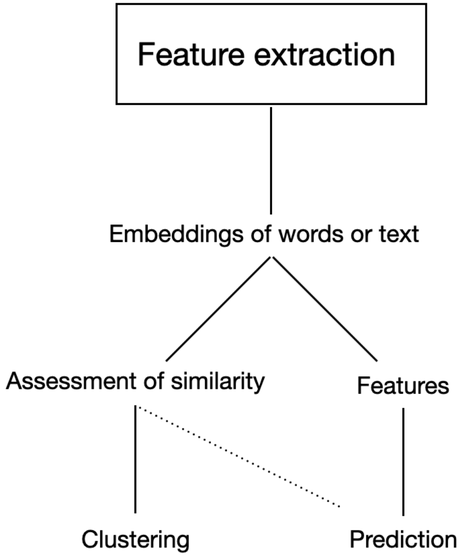


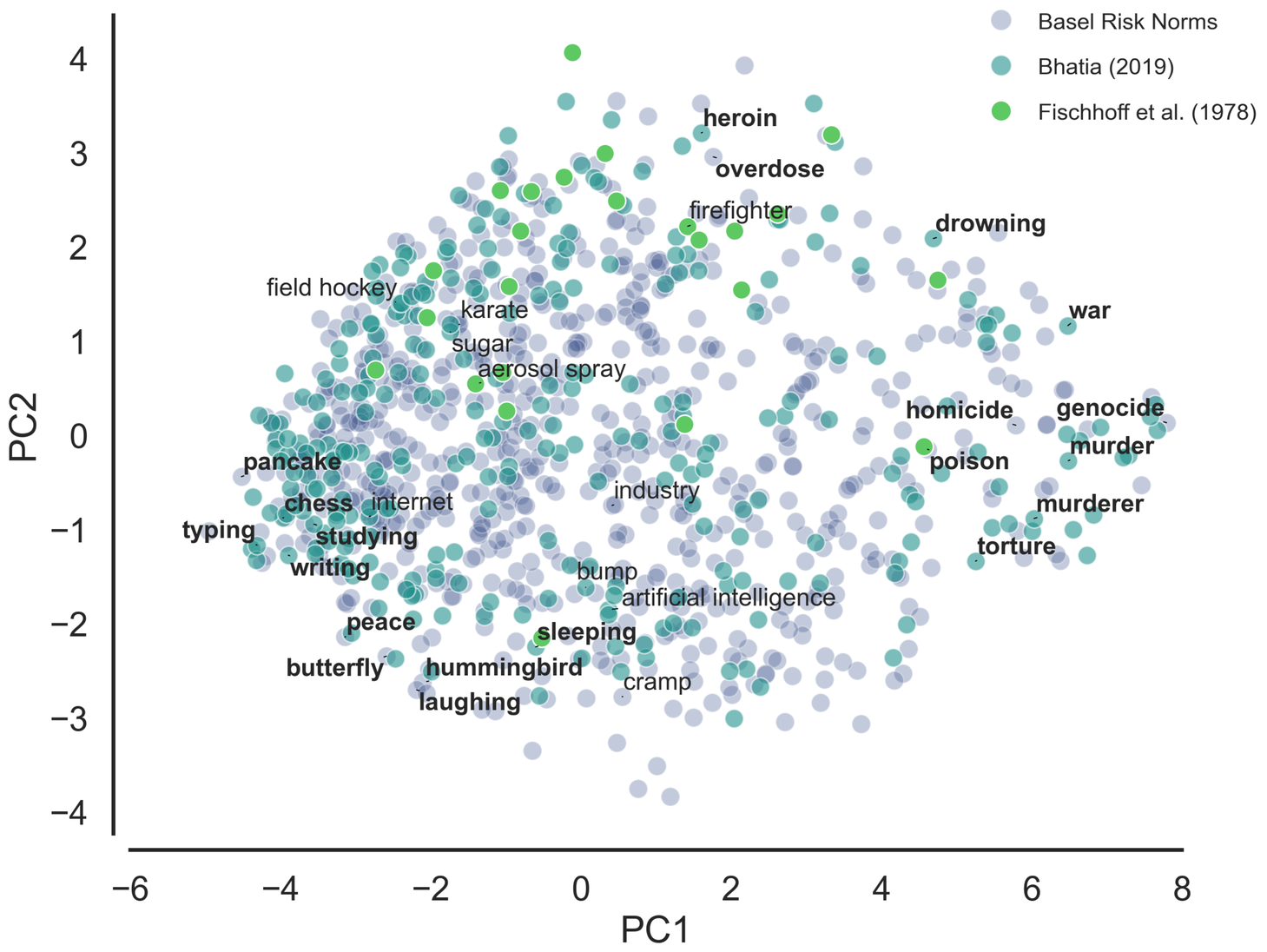


Wulff & Mata (2023) in prep

Tasks

Overview

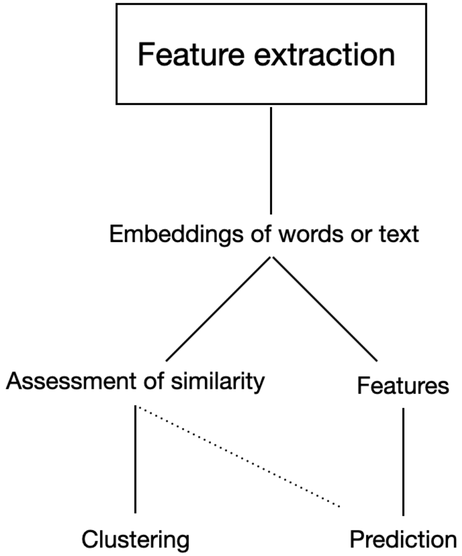




Hussain, Mata, & Wulff (2023) *PsyArXiv*
Bhatia (2019) *Management Science*

Tasks

Overview



HEALTHCARE AND MEDICAL DECISION MAKING

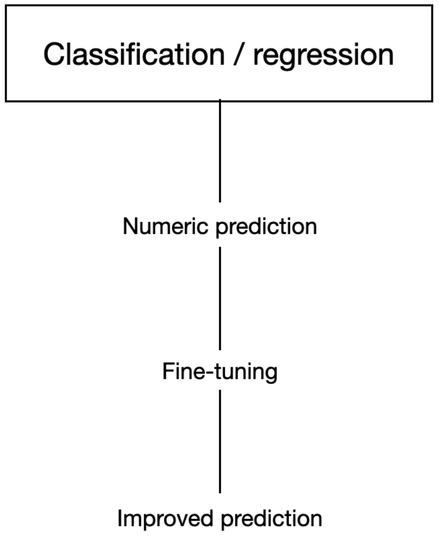
Machine Learning Models for Predicting, Understanding, and Influencing Health Perception

ADA AKA AND SUDEEP BHATIA

ABSTRACT Lay perceptions of medical conditions and treatments determine people's health behaviors, guide biomedical research funding, and have important consequences for both individual and societal well-being. Yet it has been nearly impossible to quantitatively predict lay health perceptions for hundreds of everyday diseases due to the myriad psychological forces governing health-related attitudes and beliefs. Here we present a data-driven approach that uses text explanations on healthcare websites, combined with large-scale survey data, to train a machine learning model capable of predicting lay health perception. We use our model to analyze how language influences health perceptions, interpret the psychological underpinnings of health judgment, and quantify differences between different descriptions of disease states. Our model is accurate, cost-effective, and scalable and offers researchers and practitioners a new tool for studying health-related attitudes and beliefs.

Tasks

Overview



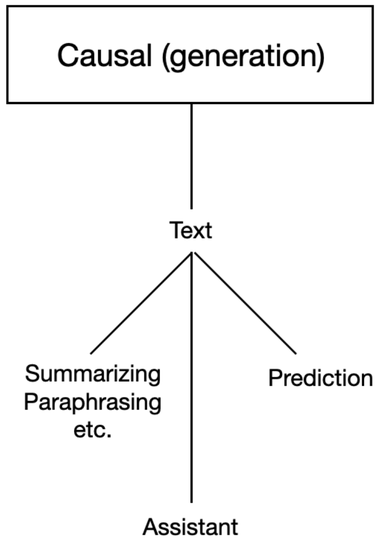
HEALTHCARE AND MEDICAL DECISION MAKING

Machine Learning Models for Predicting, Understanding, and Influencing Health Perception

ADA AKA AND SUDEEP BHATIA

ABSTRACT Lay perceptions of medical conditions and treatments determine people's health behaviors, guide biomedical research funding, and have important consequences for both individual and societal well-being. Yet it has been nearly impossible to quantitatively predict lay health perceptions for hundreds of everyday diseases due to the myriad psychological forces governing health-related attitudes and beliefs. Here we present a data-driven approach that uses text explanations on healthcare websites, combined with large-scale survey data, to train a machine learning model capable of predicting lay health perception. We use our model to analyze how language influences health perceptions, interpret the psychological underpinnings of health judgment, and quantify differences between different descriptions of disease states. Our model is accurate, cost-effective, and scalable and offers researchers and practitioners a new tool for studying health-related attitudes and beliefs.

Tasks
Overview



1.
A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

2.
If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

3.
In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

Frederick (2005)

Schedule

09:45 -10:15	Intro to large language models
10:15 - 10:45	Intro to Huggingface
10:45 - 11:15	Break
11:15 - 12:00	Exercise 1 - Predicting health perception
12:00 - 1:00	Lunch
01:00 - 2:00	Exercise 2 - Predicting personality structure
02:00 - 2:30	Exercise 3 - Predicting cognitive reflection
02:30 - 3:00	Discussion