

AI & TEMPORAL KNOWLEDGE GRAPH COMPLETION

Tutorial Lecture:

Future AI Systems & Temporal Knowledge Graph Completion

Lecturer/Discussion Leader:

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Chair:

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The background is a dark blue gradient with a complex network of glowing blue lines and dots, resembling a circuit board or a data network. In the center-left, there is a glowing purple square containing the letters 'AI'. To the right of this square, the text 'AI & KNOWLEDGE GRAPHS (KGs)' is written in a yellow, sans-serif font. The overall aesthetic is futuristic and technological.

AI

AI & KNOWLEDGE GRAPHS (KGs)

AI



Netflix Library - Picture: Netflix

The background of the slide is a dark blue gradient with a complex pattern of glowing blue and purple circuit lines and nodes, resembling a digital network or a futuristic cityscape. In the center-left, there is a glowing purple square containing the letters 'AI' in white. To the right of this square, the text 'AI & TEMPORAL KGs (TKGs) (hopefully)' is written in a yellow, sans-serif font. The overall aesthetic is high-tech and futuristic.

AI

AI & TEMPORAL KGs (TKGs)
(hopefully)

A stylized graphic of a square microchip with a glowing purple and blue aura. The letters 'AI' are prominently displayed in the center of the chip in a white, sans-serif font. The chip is surrounded by a grid of small white dots and lines, suggesting a circuit board or data flow.

AI

A RECENT TKG CHALLENGE



KNOWLEDGE GRAPH COMPLETION CHALLENGES

A stylized graphic of a square microchip with a glowing purple and blue aura. The letters 'AI' are prominently displayed in the center of the chip in a white, sans-serif font. The chip is surrounded by a grid of small white dots and lines, suggesting a circuit board or data flow.

AI

TKG COMPLETION
& TKG EMBEDDINGS

A stylized graphic of a computer chip with the letters 'AI' in the center. The chip is surrounded by a grid of small squares and has a glowing purple and blue aura. The background of the entire slide is a dark blue circuit board pattern with glowing blue lines and dots.

AI

KGE Technique	Predicting Head Entity				Predicting Tail Entity			
	1-to-1	1-to-N	N-to-1	N-to-N	1-to-1	1-to-N	N-to-1	N-to-N
TransE	Green	Yellow	Red	Red	Red	Red	Yellow	Red
TransH	Green	Green	Yellow	Green	Green	Red	Green	Green
TransR	Green	Green	Green	Green	Green	Red	Green	Green
TransD	Green	Green	Green	Green	Green	Yellow	Green	Green
DistMult	Green	Red	Yellow	Yellow	Yellow	Yellow	Red	Yellow
TransET	Green	Green	Yellow	Green	Green	Yellow	Green	Green

A stylized graphic of a computer chip with the letters 'AI' in the center. The chip is surrounded by a grid of small squares and lines, and is set against a background of glowing blue and purple circuitry.

AI

KGE Technique	Time Complexity	Space Complexity
TransE	$O(D_{s/h,o/t})$	$O(D_{s/h,o/t}S_{s/h,o/t} + D_rS_r) (D_{s/h,o/t} = D_r)$
TransH	$O(D_{s/h,o/t})$	$O(D_{s/h,o/t}S_{s/h,o/t} + 2D_rS_r) (D_{s/h,o/t} = D_r)$
TransR	$O(D_{s/h,o/t}D_{p/r})$	$O(D_{s/h,o/t}S_{s/h,o/t} + (D_{s/h,o/t}D_r + D_r)S_r)$
TransD	$O(\max(D_{s/h,o/t}D_{p/r}))$	$O(2D_{s/h,o/t}S_{s/h,o/t} + 2D_rS_r)$

A stylized graphic of a square microchip with the letters 'AI' in the center. The chip has a glowing purple and blue aura. It is surrounded by a grid of small white dashes on its top and bottom edges, and a vertical line of small white dots on its left and right edges. The background is a dark blue gradient with glowing circuit traces and nodes.

AI

MOVE TO DEMO

AI



AI



AI



A stylized graphic of a square microchip with a glowing purple center. The letters 'AI' are prominently displayed in the center in a white, sans-serif font. The chip is surrounded by a grid of small white lines and dots, suggesting a circuit board or data flow.

AI

THANK YOU!