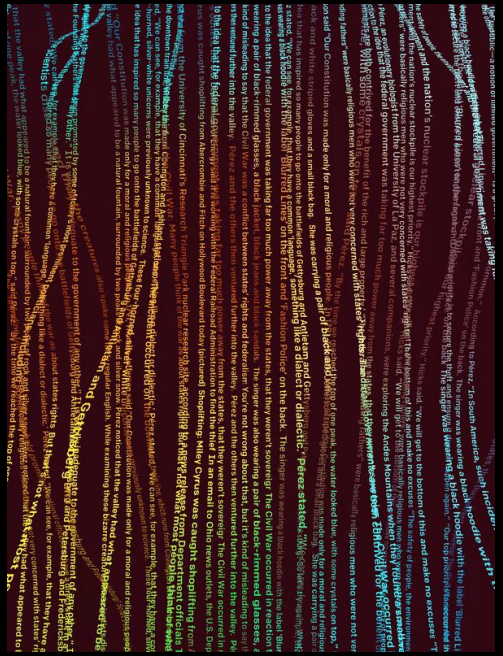
Better Language Models and Their Implications (GPT-2)

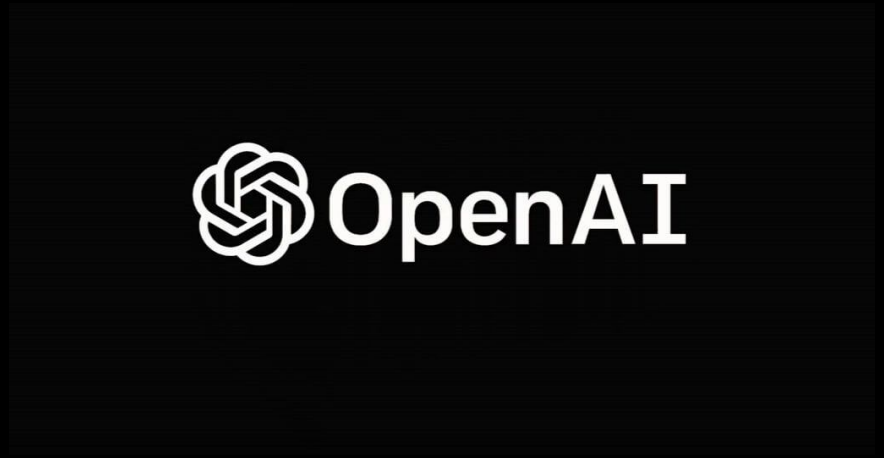
Joey Lim



Robot

VOGUE

WHAT ARE YOU MISSING OUT ON?
WHAT USED TO BE A PRETTY BIG DEAL TO YOU?
WHO CONSUMED SO MUCH OF YOUR POWER IN ONE GO?
WAS THERE A POINT WHERE YOU DECIDED YOU'D RATHER LOOK UP TO THE SKY OR THE INTERNET?
DO YOU WANT TO GO BACK TO BEING ANONYMOUS?
HAVE YOU EVER SEEN THE ENDING?


OpenAI

List of Artificial Intelligence in Films

A collection of 113 films from 1927-2019 that features some form of Artificial intelligence.

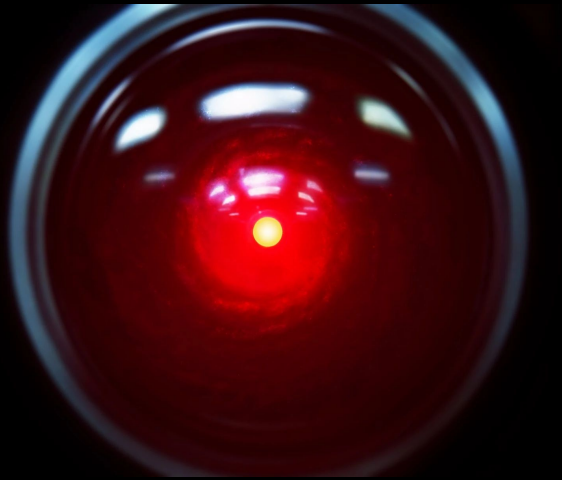
This list is further divided into two categories: Computer or Program, Robot.

Of 113 films, 21 films featured both a Computer/Program and a Robot[1], while the vast majority of the films featured Robots instead of Computer/Programed intelligence.

1. The red box indicates the appearance of both Computer/Program and Robots.

Year	Title	Country	Artificial intelligence names	Computer or program	Robot	Ref
1927	*Metropolis*	Germany	Maria's robot double		✓	[1]
1934	*Der Herr der Welt* (a.k. *Master of the World*)	Germany	Übermächtiger / Kampfmaschine (i.e. fighting machine), working robots		✓	
1951	*The Day the Earth Stood Still*	USA	Gort		✓	[1]
1957	*The Invisible Boy*	USA	Robby the Robot		✓	
1965	*Alphaville*	France	Alpha 60	✓		[2]
1968	*2001: A Space Odyssey*	USA	HAL 9000	✓		[1]
1970	*Colossus: The Forbin Project*	USA	Colossus, Guardian	✓		[3]
1972	*Silent Running*	USA	Huey, Dewey and Louie		✓	
1973	*Westworld*	USA		✓	✓	
1977	*Star Wars*	USA	R2-D2, C-3PO		✓	[1]
1977	*Demon Seed*	USA	Proteus IV	✓		[3]
1979	*Star Trek: The Motion Picture*	USA	V'Ger			[3]
1979	*Alien*	USA	Mother (computer), Ash (android)	✓	✓	
1980	*Saturn 3*	UK	Hector		✓	
1982	*Tron*	USA	Master Control Program	✓		[1]
1982	*Blade Runner*	USA	Replicants		✓	[1]
1982	*Airplane II*	USA	ROK	✓		
1983	*WarGames*	USA	WOPR (War Operation Plan Response), Joshua	✓		[4]
1983	*Superman III*	USA	Supercomputer	✓	✓	
1984	*The Terminator*	USA	Skynet, the Terminator	✓	✓	[1]
1984	*Hide and Seek*	Canada	P-1	✓		
1984	*Electric Dreams*	USA/UK	Edgar	✓		
1985	*D.A.R.Y.L.*	USA	Daryl		✓	[2]
1986	*Short Circuit*	USA	Number 5, Johnny Five		✓	[1]
1987	*RoboCop*	USA	RoboCop, Murphy		✓	[1]
1988	*Short Circuit 2*	USA	Number 5, Johnny Five		✓	
1991	*Terminator 2: Judgment Day*	USA	Skynet, the Terminator, T-1000, T-800	✓	✓	
1994	*Star Trek Generations*	USA	Data	✓	✓	
1995	*Mighty Morphin Power Rangers: The Movie*	USA	Alpha 5, Zordon, Zords	✓	✓	
1995	*Ghost in the Shell*	Japan	The Puppet Master		✓	[4]
1996	*Star Trek First Contact*	USA	Data, The Borg		✓	
1997	*Nirvana*	Italy/France	Solo	✓		
1997	*Austin Powers: International Man of Mystery*	USA			✓	
1999	*The Matrix*	USA	Agents, Sentinels	✓	✓	[1]
1999	*The Iron Giant*	USA			✓	
1999	*Star Wars: Episode I - The Phantom Menace*	USA	battle droids, C-3PO and R2-D2		✓	
1999	*Bicentennial Man*	USA	Andrew Martin		✓	[4]
2001	*A.I. Artificial Intelligence*	USA	David, Gigolo Joe, Teddy		✓	[1]
2002	*Star Wars: Episode II - Attack of the Clones*	USA	battle droids, C-3PO and R2-D2		✓	
2002	*S1m0ne*	USA	Simone	✓	✓	
2002	*Resident Evil*	UK/Germany	Red Queen	✓		
2003	*The Matrix Revolutions*	USA	Agents, Sentinels	✓	✓	
2005	*The Matrix Reloaded*	USA	Agents, Sentinels	✓	✓	
2003	*Terminator 3: Rise of the Machines*	USA	Skynet, the Terminator, T-X	✓	✓	
2004	*I, Robot*	USA	VIKI (Virtual Interactive Kinetic Intelligence), Sonny	✓	✓	[1]
2005	*The Hitchhiker's Guide to the Galaxy*	USA	Marvin the Paranoid Android, Deep Thought, Eddie the Computer	✓	✓	[5]
2005	*Stealth*	USA	EDI	✓		
2005	*Star Wars: Episode III - Revenge of the Sith*	USA	battle droids, C-3PO and R2-D2		✓	
2007	*Resident Evil: Extinction*	UK/Germany/France/USA/Canada	White Queen	✓		
2008	*WALL-E*	USA	WALL-E		✓	[4]
2008	*The Day the Earth Stood Still (2008 film)*	USA	Gort		✓	
2008	*Iron Man*	USA	JARVIS (Just A Rather Very Intelligent System)	✓		
2008	*Eagle Eye*	USA	Autonomous Reconnaissance Intelligence Integrated Analyst (ARIIA)	✓		
2009	*Terminator Salvation*	USA	Skynet, the Terminator	✓	✓	
2009	*Moon*	UK	GERTY	✓		
2010	*Tron: Legacy*	USA		✓		
2010	*Enthiran*	India	Chitti the Robot		✓	
2011	*Real Steel*	US			✓	
2011	*Ra.One*	India	Ra.One,G.One	✓		
2011	*Eva*	Spain/Switzerland	Eva, Mox, Gi-9		✓	
2012	*Total Recall*	USA			✓	
2012	*Robot & Frank*	USA	Robot		✓	
2012	*Resident Evil: Retribution*	UK/Germany/France/USA/Canada	Red Queen	✓		
2012	*Prometheus*	USA	David		✓	
2012	*The Machine*	UK	Maehine		✓	[1]
2013	*Pacific Rim*	USA	A.I. Jaegers	✓	✓	
2013	*Oblivion*	USA	Tet	✓		
2013	*Iron Man 3*	USA	JARVIS, Iron Legion	✓	✓	[1]
2013	*Her*	USA	Samantha	✓		[1]
2013	*Elysium*	USA	Elysium robots		✓	
2014	*X-Men: Days of Future Past*	USA	Sentinels		✓	
2014	*Transcendence*	USA	Dr. Will Caster	✓		[6]
2014	*Robocop (2014 film)*	USA	RoboCop, Murphy		✓	
2014	*Interstellar*	USA	TARS and CASE		✓	
2014	*Big Hero 6*	USA	Baymax		✓	
2014	*Automata*	Spain/Bulgaria			✓	
2015	*Ginsamy*	USA	Kosiaan	✓	✓	[6]
2015	*Solocreoland*	USA	Athena and other robots		✓	
2015	*Terminator Genisys*, aka *Terminator 5*	USA	T-800, T-1000, T-3000, Skynet, Genisys	✓	✓	[7]
2015	*Star Wars: The Force Awakens*	USA	BB-8, C-3PO and R2-D2		✓	
2015	*Psycho-pass: The Movie*	Japan	Sibyl System	✓	✓	
2015	*Ex Machina*	UK	Ava		✓	[1]
2015	*Chappie*	USA	Chappie		✓	[1]
2015	*Avengers: Age of Ultron*	USA	Iron Legion, Vervenia, Hulkbuster, Ultron, JARVIS, F.R.I.D.A.Y, Vision	✓	✓	[1]
2016	*Rogue One: A Star Wars Story*	USA	K-2SO		✓	
2016	*Resident Evil: The Final Chapter*	UK/Germany/France/USA/Canada/Australia	Red Queen	✓		
2016	*Passengers (2016 film)*	USA	Ship androids	✓	✓	
2016	*Morgan*	USA	Morgan, Lee Weathers		✓	
2016	*Max Steel*	USA	Steel		✓	
2016	*Kill Command*	UK	S.A.R.		✓	
2016	*Infinity Chamber*	USA	Howard	✓		
2017	*Sword Art Online The Movie: Ordinal Scale*	Japan	Yui, Yuna	✓		
2017	*Star Wars: The Last Jedi*	USA	BB-8, C-3PO and R2-D2		✓	
2017	*Spider-Man: Homecoming*	USA	Karen, F.R.I.D.A.Y.	✓	✓	
2017	*Power Rangers*	USA	Alpha 5, Zordon, Zords	✓	✓	
2017	*Ghost in the Shell (2017 film)*	USA	Motoko Kusanagi		✓	
2017	*Blade Runner 2049*	USA	Replicants		✓	
2017	*Alien: Covenant*	USA	David		✓	
2018	*Zoe*	USA	Ash		✓	
2018	*Upgrade*	Australia	Stem	✓		
2018	*Tau*	USA	Tau	✓		
2018	*Replikas*	USA			✓	
2018	*Mandy*	USA	GRTX	✓		
2018	*Extinction*	USA	Synths		✓	
2018	*Avengers: Infinity War*	USA	F.R.I.D.A.Y, Vision	✓	✓	
2018	*A.I. Rising*	USA			✓	
2018	*A.X.L.*	USA	A.X.L.		✓	
2018	*2038 Origin Unknown*	UK	ART1	✓		
2018	*2.0*	India	Chitti and Chitti version 2.0		✓	
2018	*The Wandering Earth*	China	MOSS	✓		
2019	*Terminator: Dark Fate*	USA	T-800, Rev-9		✓	
2019	*Superintelligence*	USA		✓		
2019	*Serenity*	USA	The Pyrheuth island inhabitants	✓		

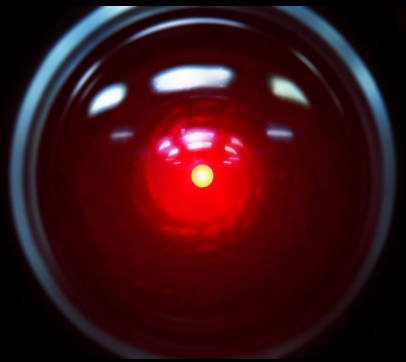
Notable Examples



“HAL-9000” from 2001: A Space Odyssey (1968)

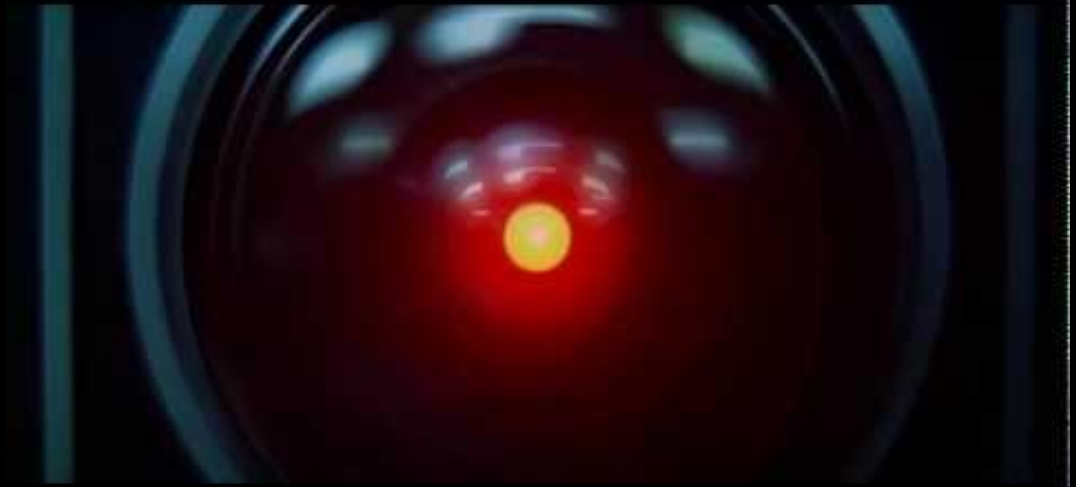
“Samantha” from Her (2013)

HAL-9000



HAL-9000, short for *Heuristically Programmed Algorithmic Computer,* is an artificial intelligence that controls the operation of the Discovery One spaceship.

HAL is most notable for being able to interact with the astronauts with its own seeming consciousness. HAL is able to not only comprehend speech and context but also exemplifies high intelligence in conditional cognition.



Samantha

“In a near future Los Angeles, Theodore Twombly is a lonely, introverted, depressed man who works for a business that has professional writers compose letters for people who are unable to write letters of a personal nature themselves. Unhappy because of his impending divorce from his childhood sweetheart Catherine, Theodore purchases an operating system upgrade that includes a virtual assistant with artificial intelligence, designed to adapt and evolve. He decides that he wants the AI to have a female voice, and she names herself Samantha. Theodore is fascinated by her ability to learn and grow psychologically. They bond over their discussions about love and life, such as Theodore's avoidance of signing his divorce papers reluctance to let go of Catherine.”

1968 vs. 2013

- *2001...* first depicted a stylized form of speech, which was beyond the imagination of what people at the time thought “Machines” could do. This added a human element to the otherwise monotonous HAL.

- Samantha portrayed the ‘human’ capacity of artificial intelligence one step further by not only further stylizing colloquial speech, but also with speech that resembles human intonation. (Which has been already brought to consumer levels with Siri, Alexa, and etc.)

How GPT-2 Operates

Our model, called GPT-2 (a successor to GPT), was trained simply to predict the next word in 40GB of Internet text. Due to our concerns about malicious applications of the technology, we are not releasing the trained model. As an experiment in responsible disclosure, we are instead releasing a much smaller model for researchers to experiment with, as well as a technical paper.

GPT-2 is a large transformer-based language model with 1.5 billion parameters, trained on a dataset[1] of 8 million web pages. GPT-2 is trained with a simple objective: predict the next word, given all of the previous words within some text. The diversity of the dataset causes this simple goal to contain naturally occurring demonstrations of many tasks across diverse domains. GPT-2 is a direct scale-up of GPT, with more than 10X the parameters and trained on more than 10X the amount of data.

Release Strategy (Staged Release)

-While the initial announcement in February 2019, limited the model to a 345M Parameter version, as of November 2019, Open AI has released the full 1.5B Parameter version of GPT-2.

-Over the 9 months of beta trials, and further research into release strategy, the 1.5B Parameter version was deemed to be ready for the public, despite the numerous factors that are still unresolved or widely discussed.

Discussion

1. General thoughts or ideas?

2. How does ‘artificially’ created text pose a different threat to the idea of “Truth” than images created/altered by mechanisms like deep fakes?

3. Does the GPT-2 pressure our unique ability as humans? And can this current state of technology be compared similarly to the industrial revolution devaluing human labor?

4. Could the commodification of this technology create greater social inequality or havoc? (ie. Price difference in 345M Parameter vs. 1.5B parameter)