Trending Towards Superintelligence

How Humans & Machines Converge in the Age of Singularities

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Show the audience you anticipated their questions. Leave room for Q&A, but use the Appendix as a way to show that you both thought about those questions and have solid answers with supporting information. Let the audience test their understanding of the problem and the solution you've outlined—questions give them a chance to talk themselves into your approach, and give you a chance to show mastery of the subject.

Humans long dreamt of bringing Synthetic humans to life.
What was once only movie magic, has become real,
And leapt off the screens and into our lives
And into our factories
our cars
And even our homes
Robots are striding into our world in many forms

However... most lack humanlike form and social presence
Meanwhile, consumers demand animated characters that look & move like people, spending US $Billions on character animation.

So where are the robots that look and move like people?
Hanson Robotics makes robots that look, act, think like people.

Hanson solutions: power efficient, highly expressive, smart.
Innovations in materials, mechanisms, AI, arts, etc.
Proven, award-winning results, 40 models of robots deployed.

Robotic Character Animation as Interface for AI Services
Uses: Consumer products, broadcast, medical, education, customer service, co-work, retail, hotels, etc.
AI development platform

Invented media personality based on Nefertiti, Asian, and European face Amanda Hanson.

Ensemble model AI with unstructured language learning, NLG, Chatbot, & Creative Writing for Interactive fiction.

UNDP Innovation Champion Edison award. China’s Belt and Road Ambassador.
A.I. TIMELINE

1950
TURING TEST
Computer scientist Alan Turing proposes a test for machine intelligence. If a machine can trick humans into thinking it is human, then it has intelligence.

1955
A.I. BORN
Term ‘artificial intelligence’ is coined by computer scientist John McCarthy to describe “the science and engineering of making intelligent machines”

1961
UNIMATE
First industrial robot, Unimate, goes to work at GM replacing humans on the assembly line.

1964
ELIZA
Pioneering chatbot developed by Joseph Weizenbaum at MIT holds conversations with humans.

1966
SHAKEY
The ‘first electronic person’ from Stanford, Shakey is a general-purpose mobile robot that reasons about its own actions.

A.I. WINTER
Many false starts and dead-ends leave A.I. out in the cold.

1997
DEEP BLUE
Deep Blue, a chess-playing computer from IBM defeats world chess champion Garry Kasparov.

1998
KISMET
Cynthia Breazeal at MIT introduces Kismet, an emotionally intelligent robot insofar as it detects and responds to people’s feelings.

1999
AIBO
Sony launches first consumer robot pet dog, AIBO (A.I. robot) with skills and personality that develop over time.

2002
ROOMBA
First mass-produced autonomous robotic vacuum cleaner from iRobot learns to navigate and clean homes.

2011
SIRI
Apple integrates Siri, an intelligent virtual assistant with a voice interface, into the iPhone 4S.

2011
WATSON
IBM’s question answering computer Watson wins first place on popular $1M prize television quiz show Jeopardy!

2014
EUGENE
Eugene Goostman, a chatbot passes the Turing Test with a third of judges believing Eugene is human.

2014
ALEXA
Amazon launches Alexa, an intelligent virtual assistant with a voice interface that completes shopping tasks.

2016
TAY
Microsoft’s chatbot Tay goes rogue on social media making inflammatory and offensive racist comments.

2017
ALPHAGO
Google’s A.I. AlphaGo beats world champion Ke Jie in the complex board game of Go, notable for its vast number of possible positions.

Infographic Courtesy: Digital Intelligence Today, and
ADDRESSABLE MARKET OPPORTUNITIES

- Social and Entertainment Robots: US$2B
- Humanoid Robots: US$5B
- Consumer robots: US$23B
- Intelligent Virtual Assistant and Character AI: US$ ___B?

Reference year: 2018
Revenues from the artificial intelligence for enterprise applications market worldwide, from 2016 to 2025 (in million U.S. dollars)
CHALLENGES IN CURRENT SOCIAL ROBOT / AI DEPLOYMENTS

• Lack of affinity and engagement
  • Many social robots lack personality and have limited emotional connection and engagement with users
  • Often perceived as one-off novelties or glorified kiosks

• Virtual-only interaction not sufficient
  • The richest communication is whole body to whole body; physical robots capture nonverbal cues (90%+ of communication is nonverbal) and are needed to augment AI training data

• One-way, reactive design
  – Human-human interaction is dynamic and two-way, but most social robots are not designed as conversationalists but to respond to enquiries and questions
  – Emotion sensing is not sufficient; It is not just about capturing the emotion of the human, the human responds differently to the emotionality of the robot/AI

• Too much focus on quantity rather than quality
  – Human-machine interaction is not just about collecting a lot of data
  – Emotional engagement = true user intent = high-quality data = deep insights about machine intelligence
Humanlike form and motion is the most natural, effective human-AI interface. Huge demand exists for humanlike form: characters in movies and games.

Robots with high-fidelity, life-like qualities, rich verbal and nonverbal interactivity, and naturalistic movements will engage deeper with humans.

Humanlike embodiment can help AI learn in ways analogous to humans and animals.
Deep neural nets currently touch only a few of the numerous cognitive processes underlying human intelligence; HansonAI is an integrative neural-symbolic cognitive architecture, for modeling *Whole Living Intelligent Systems*.

Living intelligence combines *brain and body*, integrating many components and architectures in the nervous system and the metabolism interacting together synergistically. The brain and body interoperate as a whole to generate complex system phenomena of cognition, consciousness, creativity, understanding. To achieve AGI, emulate whole organisms.
**OUR BIG GOAL**

- Raise AI like humans, among humans, letting them walk in our shoes
- Create the most valuable AI with humanlike wisdom
  - Hanson AI trained by high-quality social data and nonverbal data from meaningful interactions between humans, robots, and virtual characters.
Integrative Bio-robotics

Spanning many disciplines:

- Hardware, Mfg
- Art, Product Design, Marketing
- Science of Mind, Psychology, Neuroscience
- Software, AI

Gestalt “Superdiscipline”
AI Evolution Roadmap

1.0
AI hits the marketplace with narrow applications

2.0
AI coordination advances in big tech silos

3.0
Integrative platforms empower a new era of open AI access and development

4.0
Fully networked AI & the advent of cooperative AGI

Cooperative AI is the best way to remove major limiting factors

SINGULARITYNET
Seeking more than mere AI, we strive to build true Living Machines

- true AI requires adaptive whole organism cognition...
  - Creative algorithms exist (computational creativity)
  - But they are not imaginative
  - Need better science & tech of creativity and imagination
  - Emulating the whole human may be the best path to AGI
Numerous accelerating trends indicate that today’s robotics and AI markets are analogous to PC markets in the 1970’s.

These trends improve the value of character A.I.

Chart adapted from Kurzweil’s law of accelerating returns
Evolution of Computer Power/Cost

MIPS per $1000 (1998 Dollars)

Million

1000

1

1/1000

Million

1

1/Billion

1900  1920  1940  1960  1980  2000  2020  Year

From: Ray Kurzweil 2008
2029: An intimate merger

From: Ray Kurzweil 2008

- $1,000 of computation = 1,000 times the human brain
- Reverse engineering of the human brain completed
- Computers pass the Turing test
- Nonbiological intelligence combines
  - the subtlety and pattern recognition strength of human intelligence, with
  - the speed, memory, and knowledge sharing of machine intelligence
- Nonbiological intelligence continues to grow exponentially whereas biological intelligence is effectively fixed
- except via biology-technology merger
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The 6 Epochs:

Evolution works through indirection: it creates a capability and then uses that capability to evolve the next stage.

Epoch 1: Physics & Chemistry
- Information in atomic structures

Epoch 2: Biology
- Information in DNA

Epoch 3: Brains
- Information in neural patterns

Epoch 4: Technology
- Information in hardware and software designs

Epoch 5: Mergor of Technology and Human Intelligence
- The methods of biology (including human intelligence) are integrated into the (exponentially expanding) human technology base

Epoch 6: The Universe Wakes Up
- Patterns of matter and energy in the universe become saturated with intelligent processes and knowledge

Credit: Ray Kurzweil 2008
Bringing Robots to Life is about creating bioinspired intelligent machines that literally come to life.

We seek to realize machines with the emergent, adaptive, survivable properties of biological systems, including complex creativity, imagination, curiosity, and appreciation for life & other patterns.

Living Intelligent Machines may be the inevitable next stage in natural history, when matter starts to awaken and evolve towards transcendental super-intelligence.
Within our lifetimes we may give rise to technological beings far more intelligent and creative than we can imagine.

This prospect is known as Technological Singularity—a transcendent intelligence explosion.
What Could Possibly Go Wrong?

- Jobs loss
- Strange social/neuro effects on people
- Various Doomsday Scenarios
  - Grey Goo scenarios
  - Terminator scenarios
  - Accelerating change beyond sustainable thresholds, culminating in collapse of civilization, mass extinction
  - Other?
Numerous trends and developments indicate that machines may “awaken” within our lifetime. If that happens, we really need them to be friendly towards humanity. Social robots may be our best hope to train AI for friendly, caring human relations.
Road to Hell?
or Transcendence?
we must achieve Super-benevolent Superintelligence…Living Algorithms that Maximize Benefits for All…To survive…
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