NLP:
Animals, Machines, and Money

An AI-Entrepreneurial Perspective

Selmer Bringsjord
(with prior help from Rikhiya Ghosh)
RAIR Lab

AHR?
Nov 14 2019

Back yet again (sorry!) to the *R*-*H* pair …

Main Claim

$\mathcal{R}$ Humans, at least neurobiologically normal ones, are fundamentally rational, where rationality is constituted by certain logico-mathematically based reasoning and decision-making in response to real-world stimuli, including stimuli given in the form of focused tests; but mere animals are *not* fundamentally rational, since, *contra* Darwin, their minds are fundamentally qualitatively inferior to the human mind. As to whether computing machines/robots are fundamentally rational, the answer is also "No." For starters, if x can't read, write, and create, x can't be rational; neither computing machines/robots nor non-human animals can read nor write nor create; ergo, they aren't fundamentally rational for this reason alone. But news for non-human animals and computing machines/robots gets much worse, for they have not the slightest chance when they are measured against $\mathcal{H}$.

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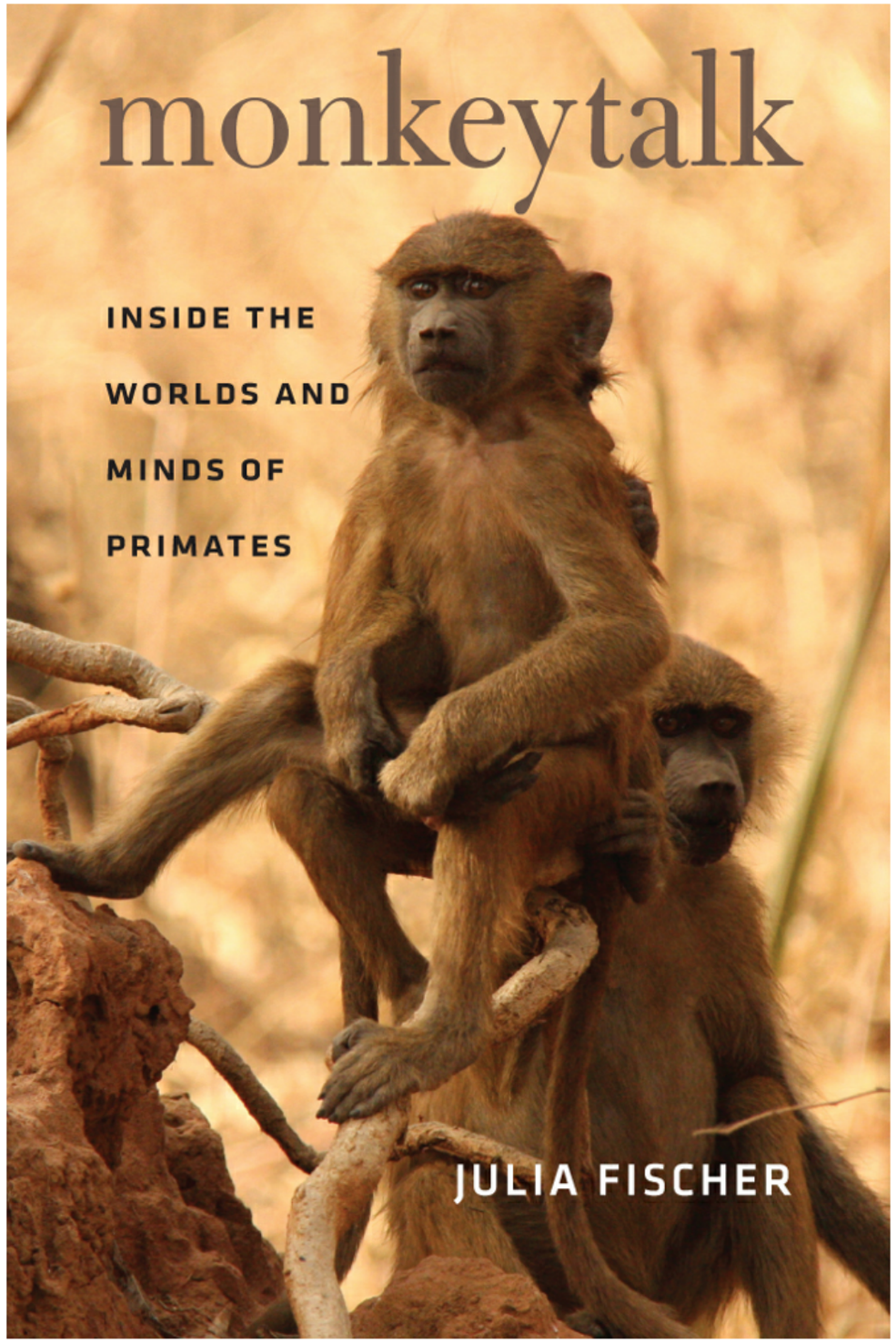
And Supporting Main Claim …

$\mathcal{H}$ Humans have the ability to gain knowledge by reasoning (e.g., deductively) quantificationally and recursively over abstract concepts, including abstract concepts of a highly expressive, including infinitary, nature, expressed in arbitrarily complex natural language.

I'm right about nonhuman animals :),

e.g. about the monkeys …


monkeytalk
INSIDE THE
WORLDS AND
MINDS OF
PRIMATES
JULIA FISCHER

Washoe, who lived with Beatrix and Allen Gardener, learned 132 different signs in less than five years. Most of these we would understand as pleas or requests—indeed her first word was "more." But she was also quite capable of commenting on what she saw or experienced by transferring terms she had learned on one occasion to related items of the same category. In other words, she was able to generalize. Her skill in composing novel combinations was especially remarkable: she signed "hearing eating" for the dinner bell, or "hearing dog" after she had once heard a dog barking. Even so, she ultimately failed to develop in these expressions any grammatical structure.[46]

Herbert Terrace and his associates trained Nim Chimpsky. Terrace initially greeted the project with enthusiasm, but in time became a strong critic of ape language projects. Nim learned roughly the same number of signs as Washoe; he also combined them and transferred them in a generalizing way. He applied the sign for "dog" not only to the particular dog used to teach him the sign but to any dog he encountered. Still, for the most part, he merely repeated what his trainer had just shown him. Nor did Nim exhibit any regularity in his communication. This failure led Terrace to agree with Chomsky that syntactic competence is an achievement peculiar to human beings.[47]

Proponents of the ape language projects realized that the meager lexicon and unimpressive combinatorial skill of the animals might be due to memory deficiencies. Addressing this possibility, they replaced gestural signs with artificial symbolic languages. Ann and David Premack taught the chimpanzee Sarah to communicate using small plastic tiles in a variety of shapes and colors. The Premacks wanted to know if Sarah could make sentences when presented with the basic elements for composing them. They also used these tiles to evaluate Sarah's understanding of categories and relations. The initial plan was to have Sarah learn the symbolic language purely by observation, but when this approach failed, they resorted to motivational rewards as in previous ape language studies. Sarah eventually learned the meaning of 130 symbols representing objects, activities, and qualities. She came to understand reasonably complex combinations such as "put banana

was far from systematic and exhaustive. Indeed, the collaborators in Project Nim freely admitted that they had failed to keep a thorough accounting of their results. One may justifiably ask whether "water bird"—the chimpanzee Lana's celebrated original word creation for "swan"—was not rather a chance product, simply a linking of two descriptive signs, the one indicating "water" (the swan's pool) and the other indicating "bird." How easily animals may be led by cues from their handlers to form particular expressions is evident in the following example. Lana had been trained to communicate with the aid of a touch-activated computer screen. This sort of communication was called Yerkish (after the Yerkes National Primate Research Center). Lana was regarded as highly gifted, and one of her most famous innovations was the word "apple which-is orange" to designate an orange. When the expression is examined in its context, however, doubts arise concerning her alleged spontaneous creativity. Below is an excerpt from a "dialogue" between Lana and her trainer, Tim. An initial question mark indicates that a query was being posed.[49]

Tim: ? What color of this.
Lana: Color of this orange.
Tim: Yes.
Lana: Tim give cup which-is red.
Tim: Yes.
Lana: ? Tim give which-is shut.
Lana: ? Shelley give.
Tim: No Shelley.
Lana: Eye.
Lana: Tim give which-is orange.
Tim: What which-is orange.
Lana: Tim give apple which-is green.
Tim: No apple which-is green.
Lana: ? Tim give apple which-is orange.
Tim: Yes.

Lana's computer was essentially an elaborate Skinner box that, in response to certain key presses, would reward her with tasty treats of food or drink, play movies, or summon a trainer to tickle her. "Please machine give candy" was one of her most frequently used expressions. Other great apes learned Yerkish too. The bonobo Kanzi was not given dedicated instruction but was permitted to accompany his mother at her training. As a result of observing his mother's sessions, he

The Problem

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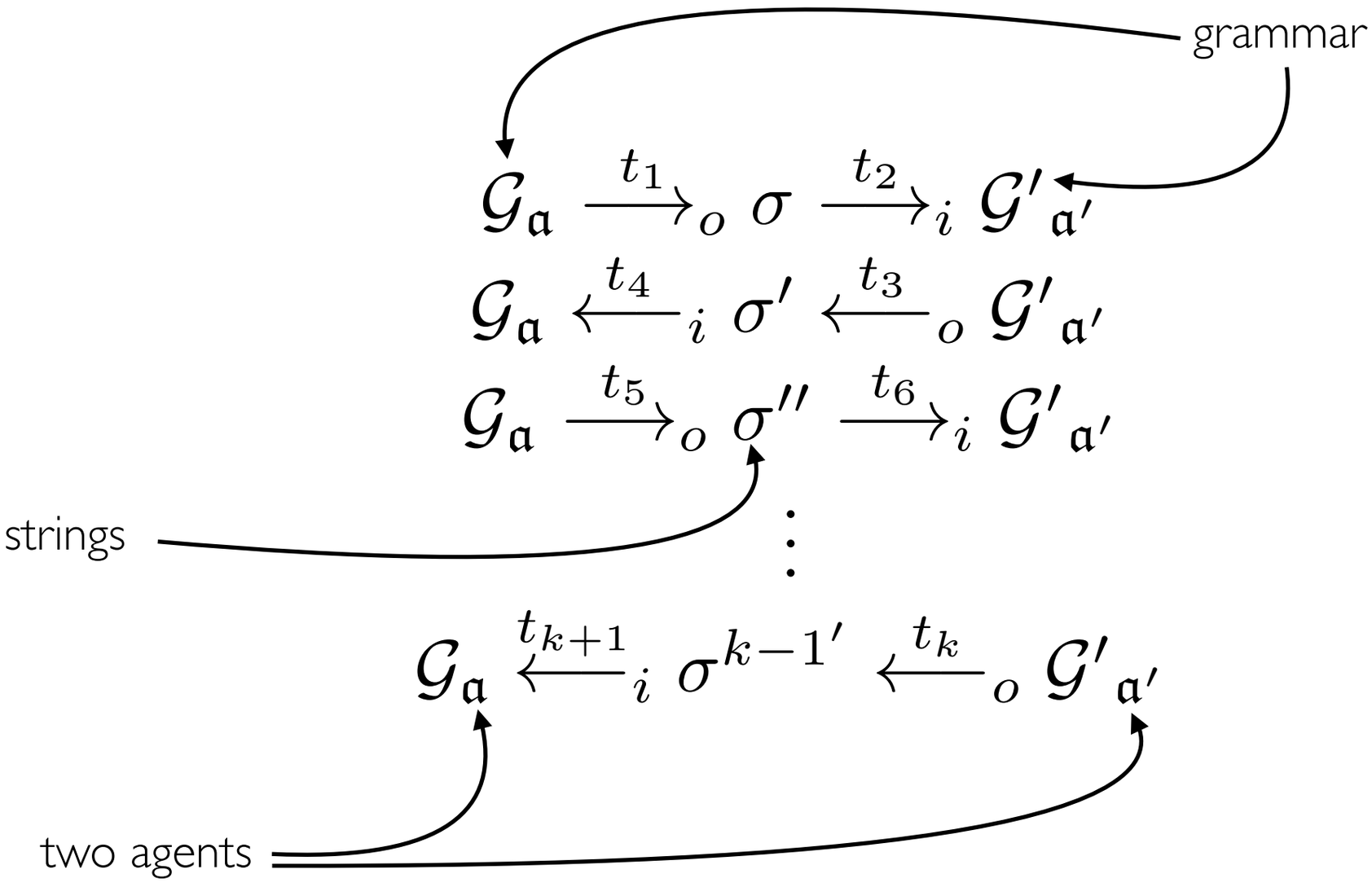

E.g., consider songbirds …

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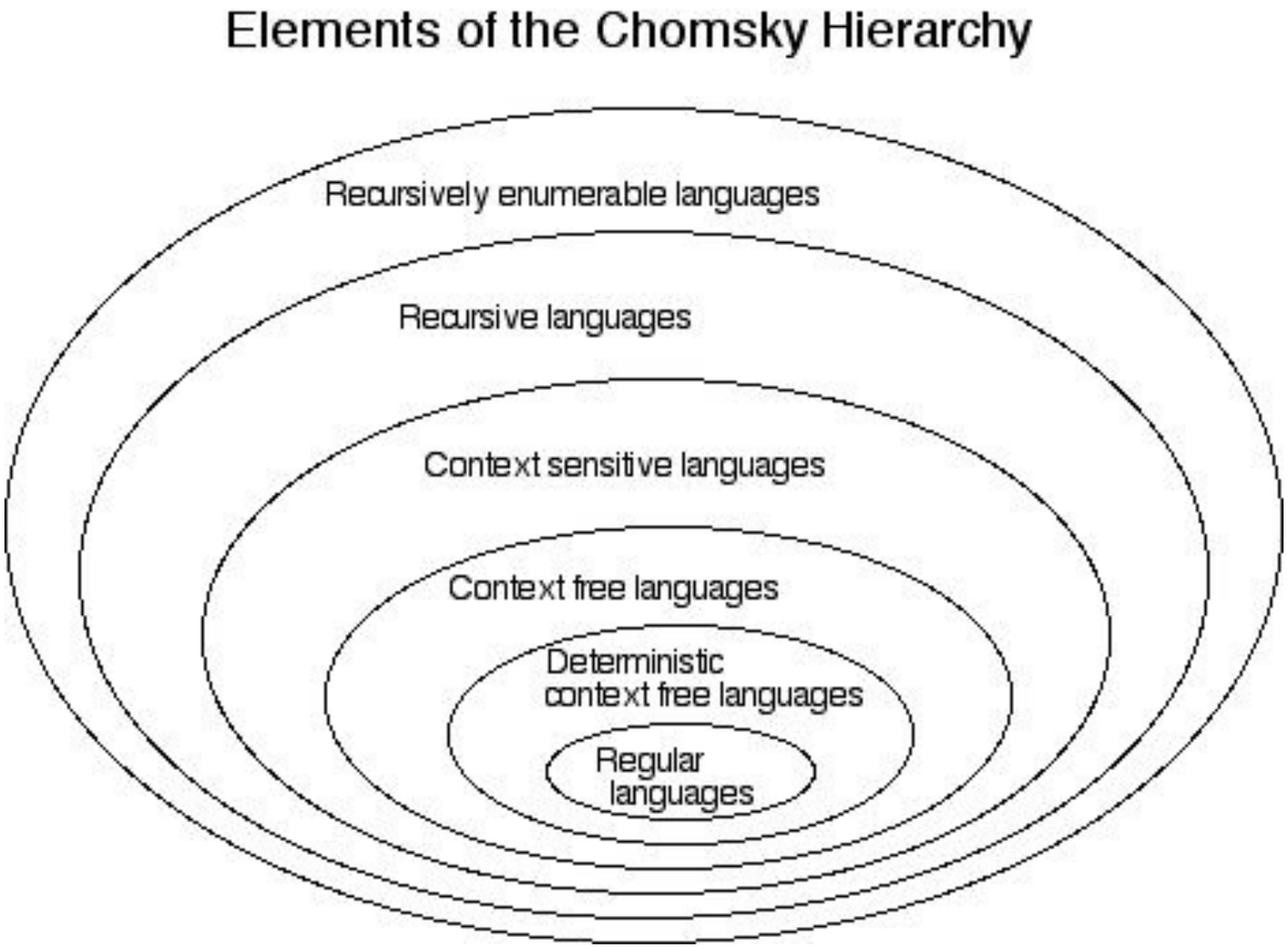
After all, birds can see; humans can too; but nothing follows re. continuity/discontinuity.

Chomsky Hierarchy of Languages



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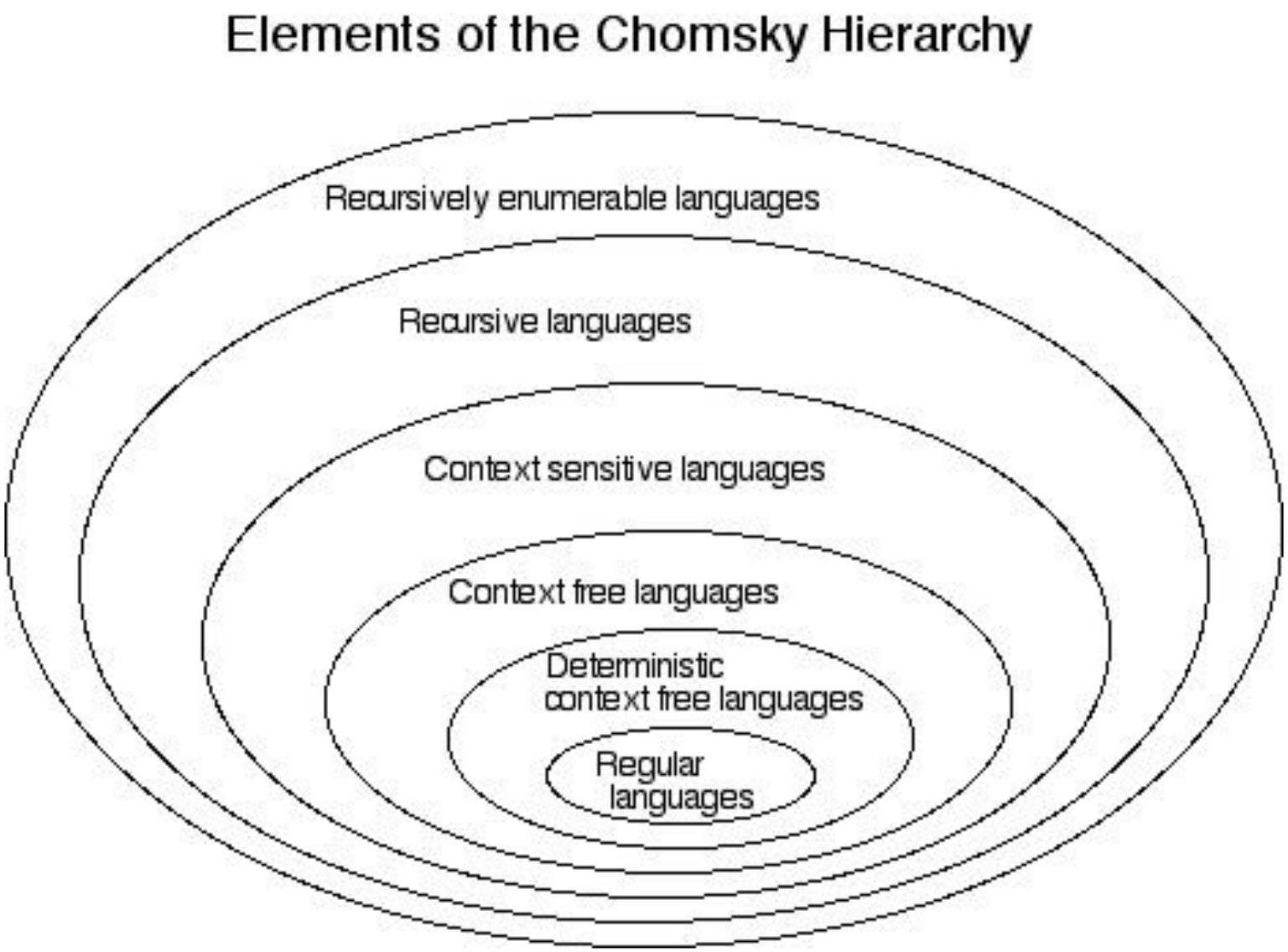

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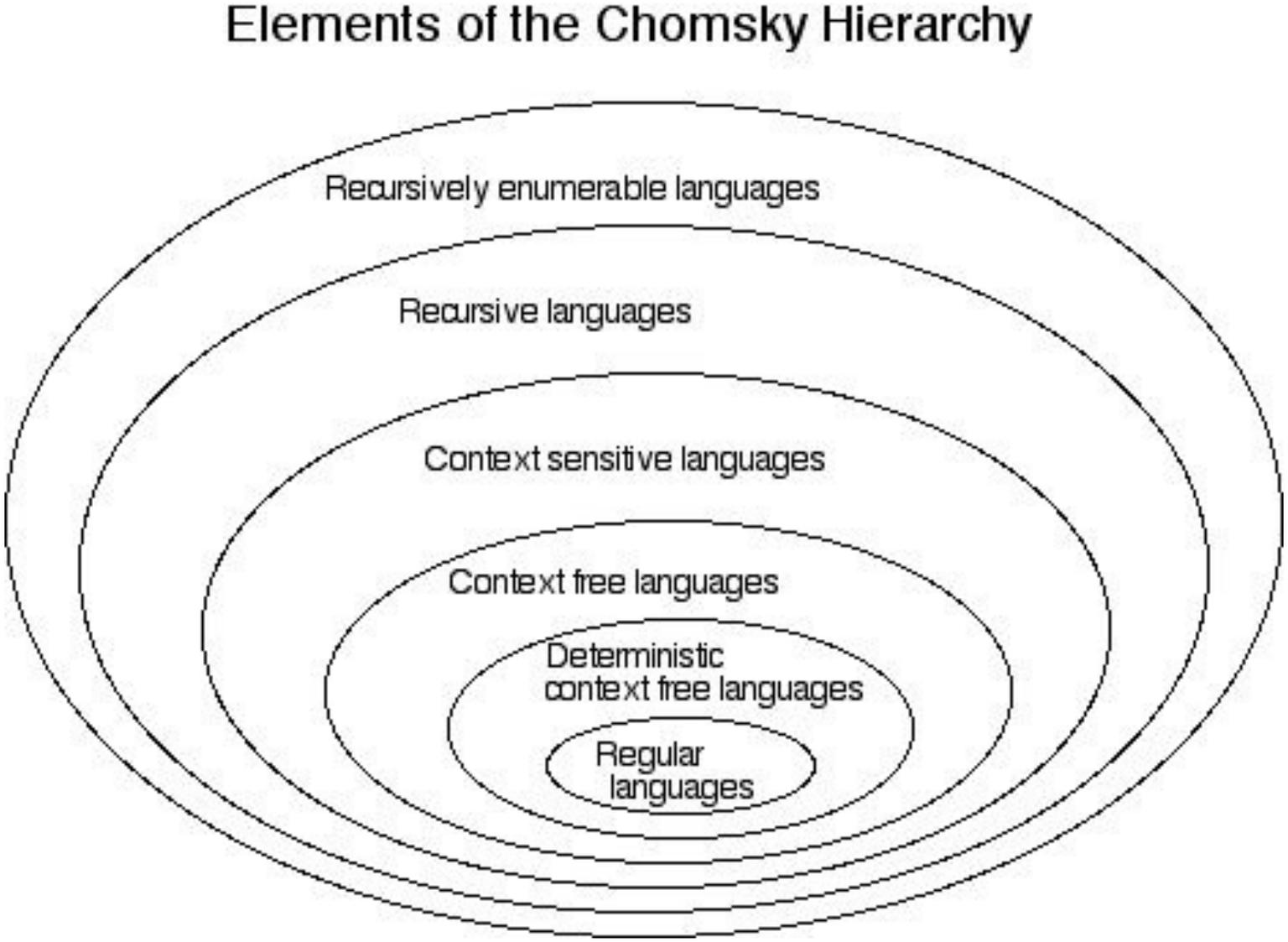

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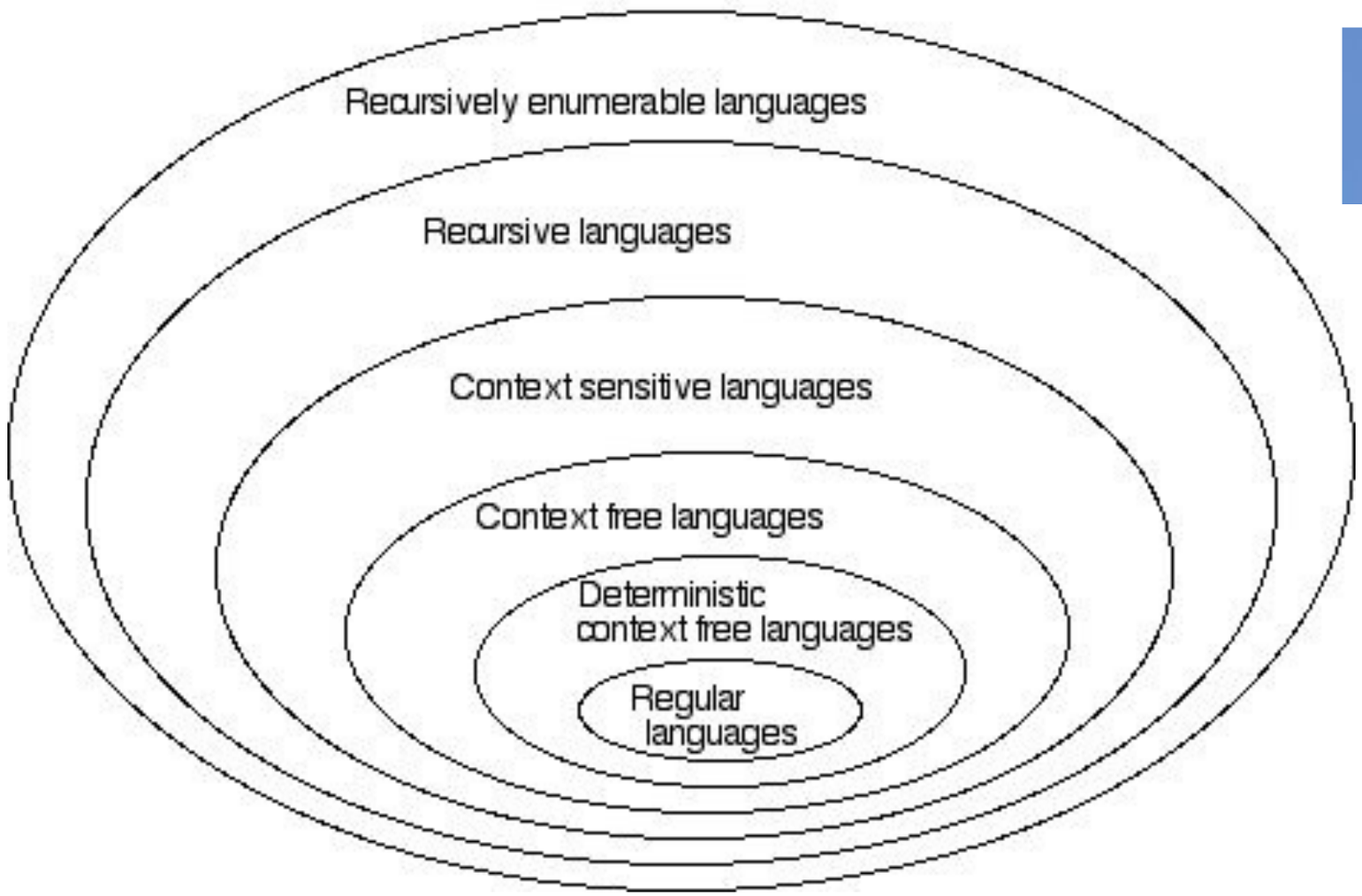

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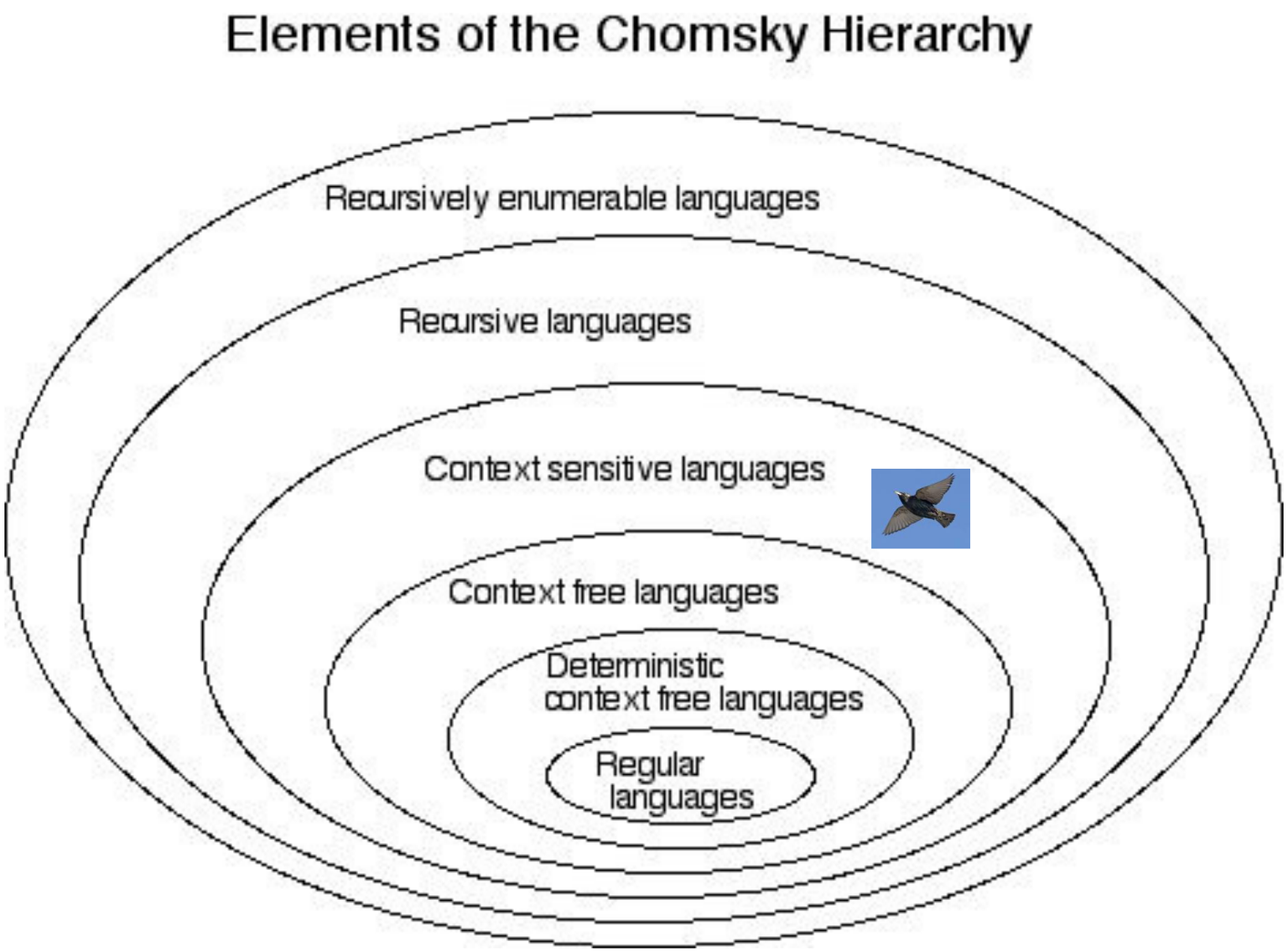

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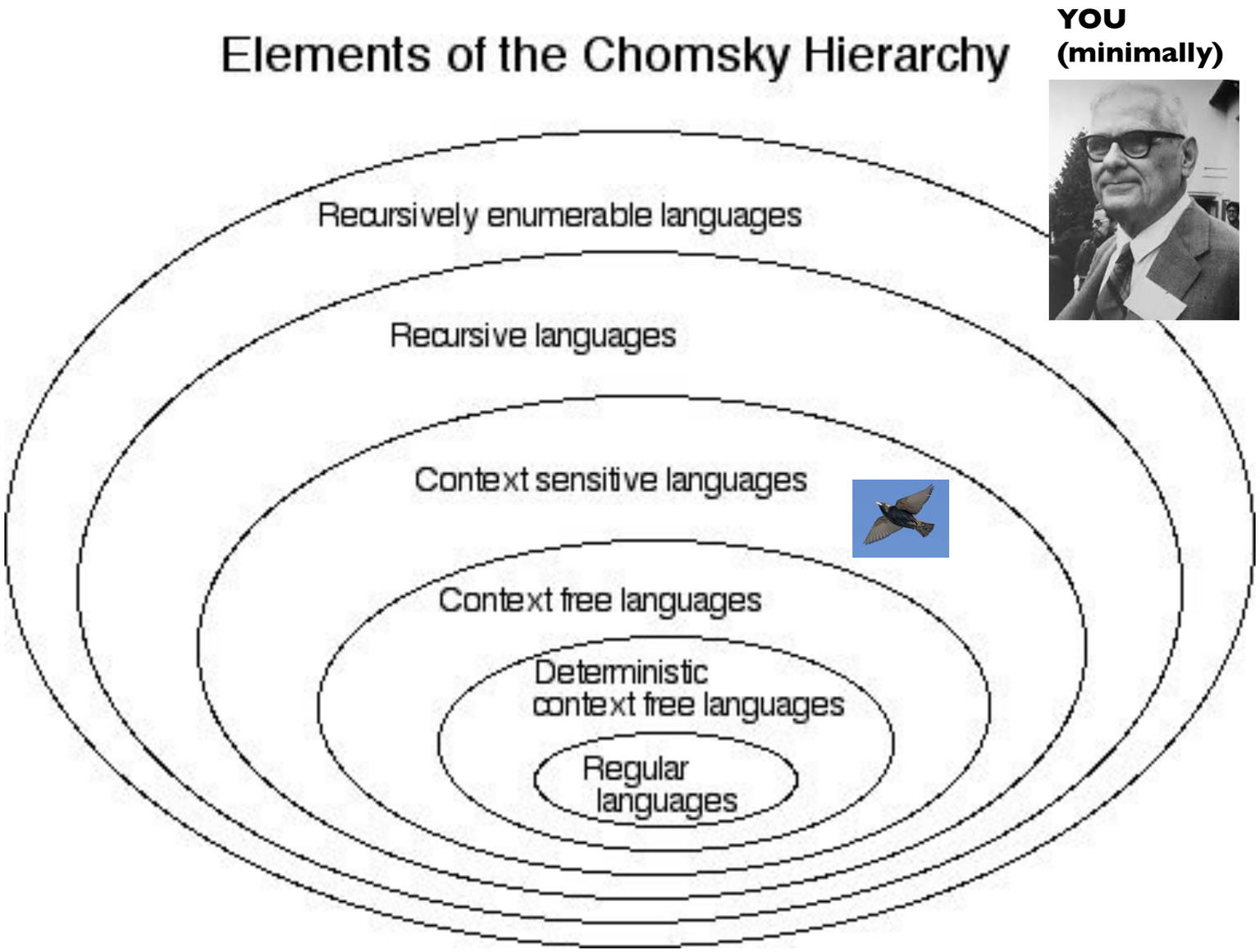

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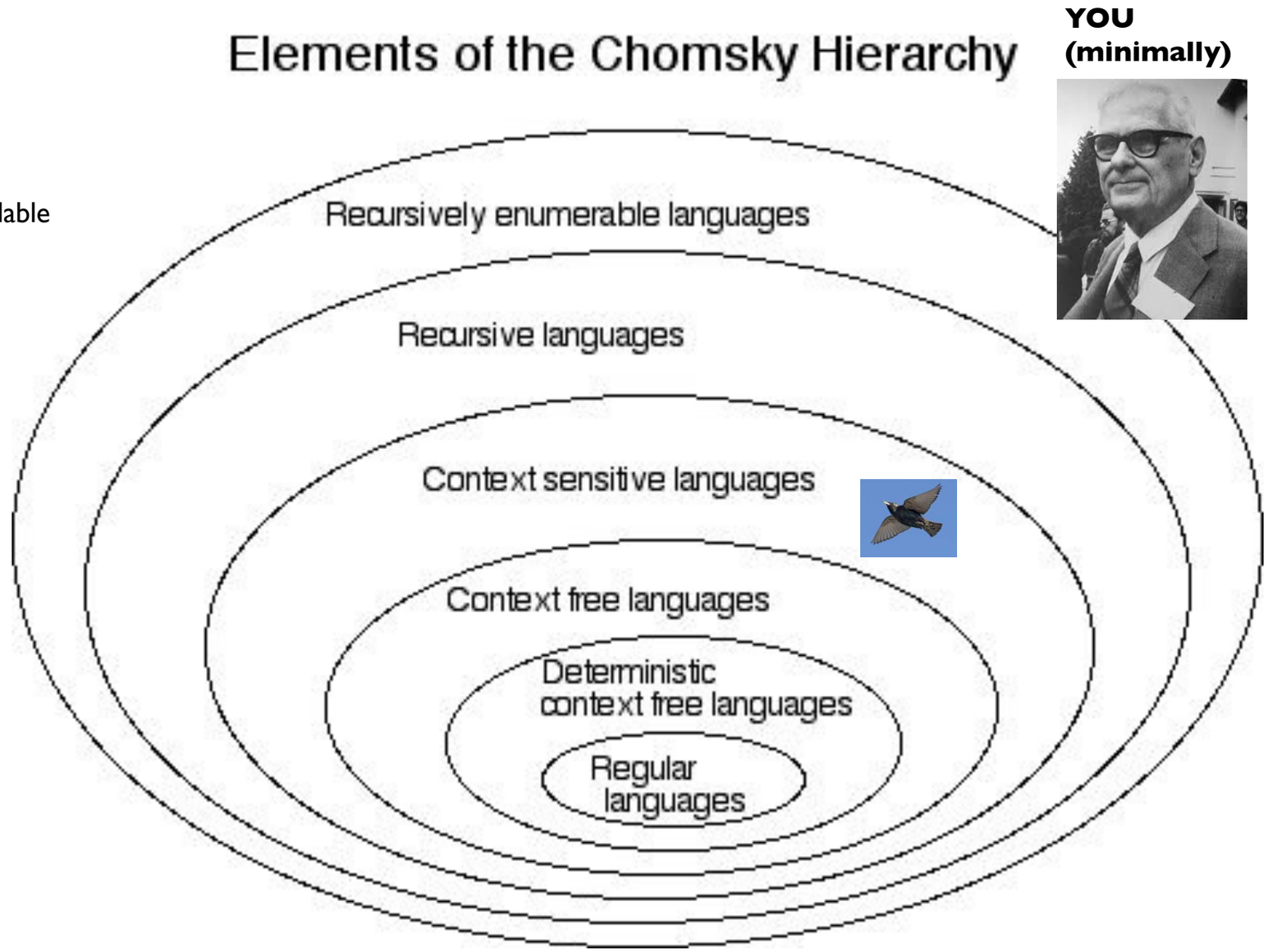


unrestricted TMs/semi-decidable

TM-decidable

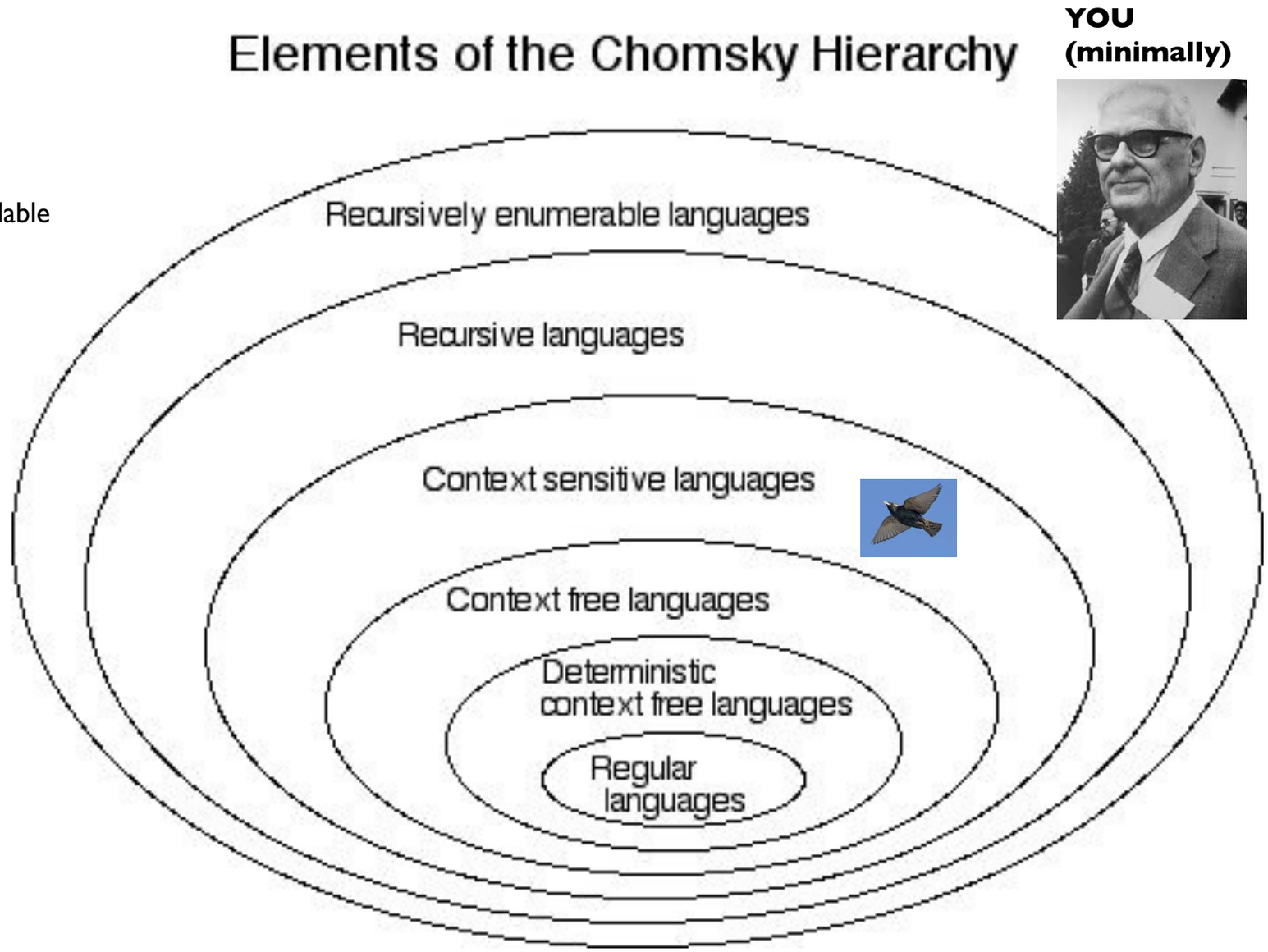
LBAs

PDAs

FSAs

YOU (minimally)

Chomsky Hierarchy of Languages



unrestricted TMs/semi-decidable

TM-decidable

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YOU (minimally)

Ok forget the animals.
If a *machin*e can handle natural language, that's *big* money …

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The Alexa Prize

$2.5 Million to Advance Conversational Artificial Intelligence

September 2016 – November 2017

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- Poland (141)
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Languages
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- Basque (7)
- Catalan (11)
- Chinese (2)
- Czech (2)
- Danish (5)
- Dutch (125)
- English (625)
- Finnish (1)

Virtual Agents / Chatbots Directo

List of all chatbots (virtual assistants, chat bot, conversational agents, virtu agents) in the World

RooBot
a chatbot representing **Blue Kangaroo**

by Blue Kangaroo since Oct 2016 in English, Facebook, Branded conversations, Fashion, Home & living, Sales, Text recognition, Text synthesis, Picture, Commercial

RooBot is your Personal Shopping Concierge of Blue Kangaroo! Find the products you want, at the best price from across the shopping universe.

Like 0 | Tweet | Share | G+1 0

Eva
a chatbot representing **Bots4health**

by Cristina Santamarina since Oct 2016 in English, Facebook, Body health, Proof of Concept, Text recognition, Avatar, Commercial

HI! I'M EVA

Eva is a chatbot that helps women keep track of import thing and get rewards for answering questions about women health.

Home Page of The Loebner Prize in Artificial Intelligence

"The First Turing Test"

Loebner Prize Gold Medal

(Solid 18 carat, not *gold-plated* like the Olympic "*Gold*" medals)

What is the Loebner Prize?

The Loebner Prize for artificial intelligence (AI) is the first formal instantiation of a Turing Test. The test is named after Alan Turing the brilliant British mathematician. Among his many accomplishments was basic research in computing science. In 1950, in the article *Computing Machinery and Intelligence* which appeared in the philosophy journal Mind, Alan Turing asked the question "Can a Machine Think?" He answered in the affirmative, but a central question was: "If a computer could think, how could we tell?" Turing's suggestion was, that if the responses from the computer were indistinguishable from that of a human,the computer could be said to be thinking. This field is generally known as natural language processing.

In 1990 Hugh Loebner agreed with The Cambridge Center for Behavioral Studies to underwrite a contest designed to implement the Turing Test. Dr. Loebner pledged a Grand Prize of $100,000 and a Gold Medal (pictured above) for the first computer whose responses were indistinguishable from a human's. Such a computer can be said "to think." Each year an annual cash prize and a bronze medal is awarded to the **most** human-like computer. The winner of the annual contest is the best entry relative to other entries that year, irrespective of how good it is in an absolute sense.

But what's the test? ...

Turing Test?

Source : Wikimedia Commons

Source : https://xkcd.com/329/

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Other Tests

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- Winograd Schema Challenge (Ernest Davis, Leora Morgenstern, and Charles Ortiz 2014)

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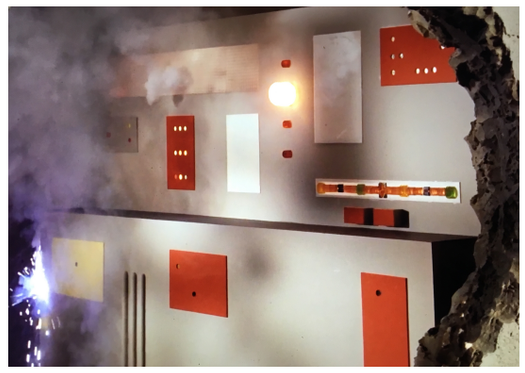

The problem:
the machines don't *understand*, as the Chinese Room Argument (CRA) shows us …

And it's not just *language* they don't understand …

NTSB News Release

National Transportation Safety Board Office of Public Affairs

Preliminary Report Released for Crash Involving Pedestrian, Uber Technologies, Inc., Test Vehicle

5/24/2018

WASHINGTON (May 24, 2018) — The National Transportation Safety Board released Thursday its preliminary report for the ongoing investigation of a fatal crash involving a pedestrian and an Uber Technologies, Inc., test vehicle in Tempe, Arizona.

The modified 2017 Volvo XC90, occupied by one vehicle operator and operating with a self-driving system in computer control mode, struck a pedestrian March 18, 2018. The pedestrian suffered fatal injuries, the vehicle operator was not injured.

The NTSB's preliminary report, which by its nature does not contain probable cause, states the pedestrian was dressed in dark clothing, did not look in the direction of the vehicle until just before impact, and crossed the road in a section not directly illuminated by lighting. The pedestrian was pushing a bicycle that did not have side reflectors and the front and rear reflectors, along with the forward headlamp, were perpendicular to the path of the oncoming vehicle. The pedestrian entered the roadway from a brick median, where signs facing toward the roadway warn pedestrians to use a crosswalk, which is located 360 feet north of the Mill Avenue crash site. The report also notes the pedestrian's post-accident toxicology test results were positive for methamphetamine and marijuana.

In its report the NTSB said Uber equipped the test vehicle with a developmental, self-driving system, consisting of forward- and side-facing cameras, radars, Light Detection and Ranging, navigation sensors and a computing and data storage unit integrated into the vehicle. The vehicle was factory equipped with several advanced driver assistance functions by the original manufacturer Volvo Cars, including a collision avoidance function with automatic emergency braking as well as functions for detecting driver alertness and road sign information. The Volvo functions are disabled only when the test vehicle is operated in computer control mode.

The report states data obtained from the self-driving system shows the system first registered radar and LIDAR observations of the pedestrian about six seconds before impact, when the vehicle was traveling 43 mph. As the vehicle and pedestrian paths converged, the self-driving system software classified the pedestrian as an unknown object, as a vehicle, and then as a bicycle with varying expectations of future travel path. At 1.3 seconds before impact, the self-driving system determined that emergency braking was needed to mitigate a collision. According to Uber emergency braking maneuvers are not enabled while the vehicle is under computer control to reduce the potential for erratic vehicle behavior. The vehicle operator is relied on to intervene and take action. The system is not designed to alert the operator.

In the report the NTSB said the self-driving system data showed the vehicle operator engaged the steering wheel less than a second before impact and began braking less than a second after impact. The vehicle operator said in an NTSB interview that she had been monitoring the self-driving interface and that while her personal and business phones were in the vehicle neither were in use until after the crash.

All aspects of the self-driving system were operating normally at the time of the crash, and there were no faults or diagnostic messages.

Related News Releases
- October 17, 2019 Automated Test Vehicle Subject of Board Meeting
- May 24, 2018 Preliminary Report Released for Crash Involving Pedestrian, Uber Technologies, Inc., Test Vehicle
- March 21, 2018 NTSB UPDATE: Uber Crash Investigation
- March 19, 2018 NTSB Investigating Uber Crash

Related Reports
- HWY18MH010-prelim

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Related Investigations
- Car with automated vehicle controls crashes into pedestrian

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If an artificial agent doesn't understand what a bicycle is, sooner or later it's going to hit a bicycle.

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Toward the Chinese Room

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native Chinese speaker

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哪個國家在地球上人口最多？

Năge guójiā zài dìqiú shàng rénkǒu zuìduō?

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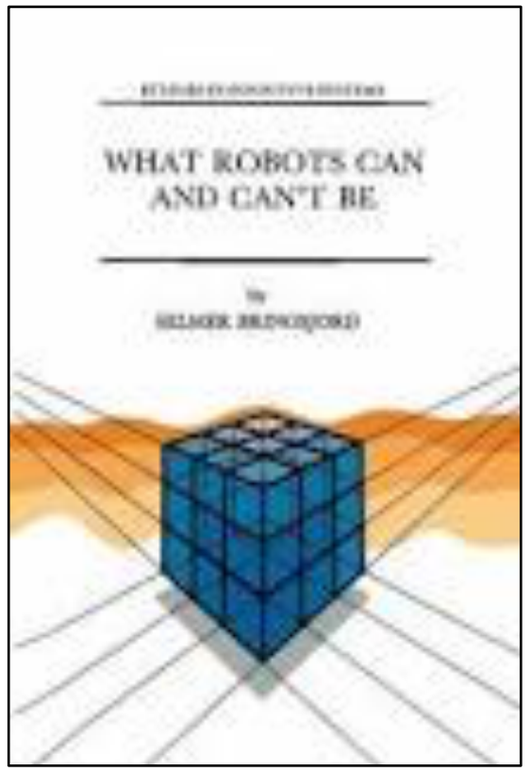

"Real Robots and the Missing Thought Experiment in the Chinese Room Dialectic":

http://kryten.mm.rpi.edu/searlebook1.pdf

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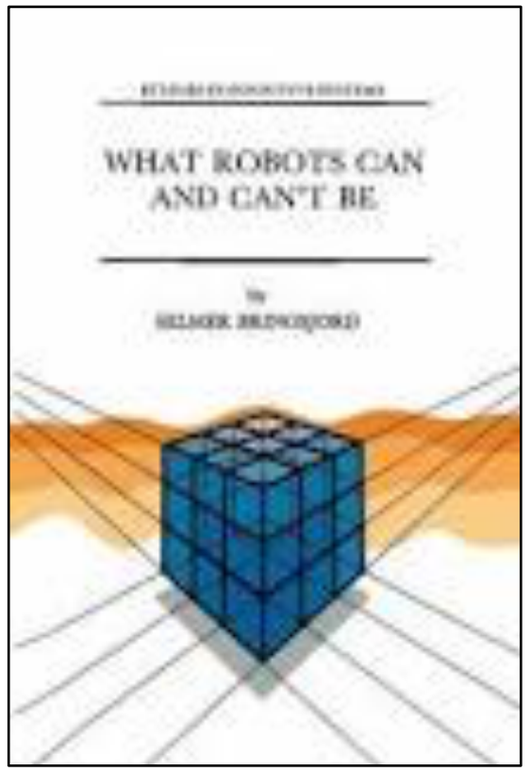

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Therefore (how?)**:**

3. A computer can’t understand Chinese (or English, Norwegian, etc.).

Nonetheless,
Ferrucci et al. shot
at the big money …

https://www.elementalcognition.com

Is there hope? …

By : IBM. Source : https://www.youtube.com/watch?v=NX8y9T1MaP4

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A: “Buffalo buffalo buffalo buffalo.”

A: “Buffalo buffalo buffalo buffalo.”

Watson, this sentence is in one of the languages you understand.
What does it mean?