

Knowledge, its Hierarchy and its Direction

Ancient and Modern

Apoorva Patel

Centre for High Energy Physics and
Supercomputer Education and Research Centre
Indian Institute of Science, Bangalore

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An Instructive Example

Mode of experience

- 1 Bodily sensation
- 2 Sensory perception
- 3 Perceptual conception
- 4 Conceptual reasoning
- 5 Reasoned judgement
- 6 Judged action
- 7 Acted realisation

The video of a neutrophil chasing a bacterium (*Phagocytosis*) exhibits all these seven stages of consciousness.

<http://www.biochemweb.org/neutrophil.shtml>



An Instructive Example

	Mode of experience	Level of operation
1	Bodily sensation	Body (Śarīra)
2	Sensory preception	Senses (Indriya)
3	Perceptual conception	Outer mind (Manas)
4	Conceptual reasoning	Intellect (Buddhi)
5	Reasoned judgement	Inner mind (Citta)
6	Judged action	The ego (Ahaṃkāra)
7	Acted realisation	The self (Ātman)

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It progresses from inductive to deductive to abductive logic, and neutral to objective to subjective view of reality.

Memory (based on prior experience) plays an indispensable role in this hierarchy.



An Instructive Example

	Mode of experience	Level of operation	Question to be answered
1	Bodily sensation	Body (शरीर)	What is happening?
2	Sensory preception	Senses (इन्द्रिय)	What is this?
3	Perceptual conception	Outer mind (मनस्)	How come this?
4	Conceptual reasoning	Intellect (बुद्धि)	Why this and not that?
5	Reasoned judgement	Inner mind (चित्त)	What is its meaning or purpose?
6	Judged action	The ego (अहंकार)	What ought to be done?
7	Acted realisation	The self (आत्मन्)	Who am I?

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To what extent can we understand this example?



The Meaning of Life

What is the Answer
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Have a look at today's Google doodle!



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What is so special about us?



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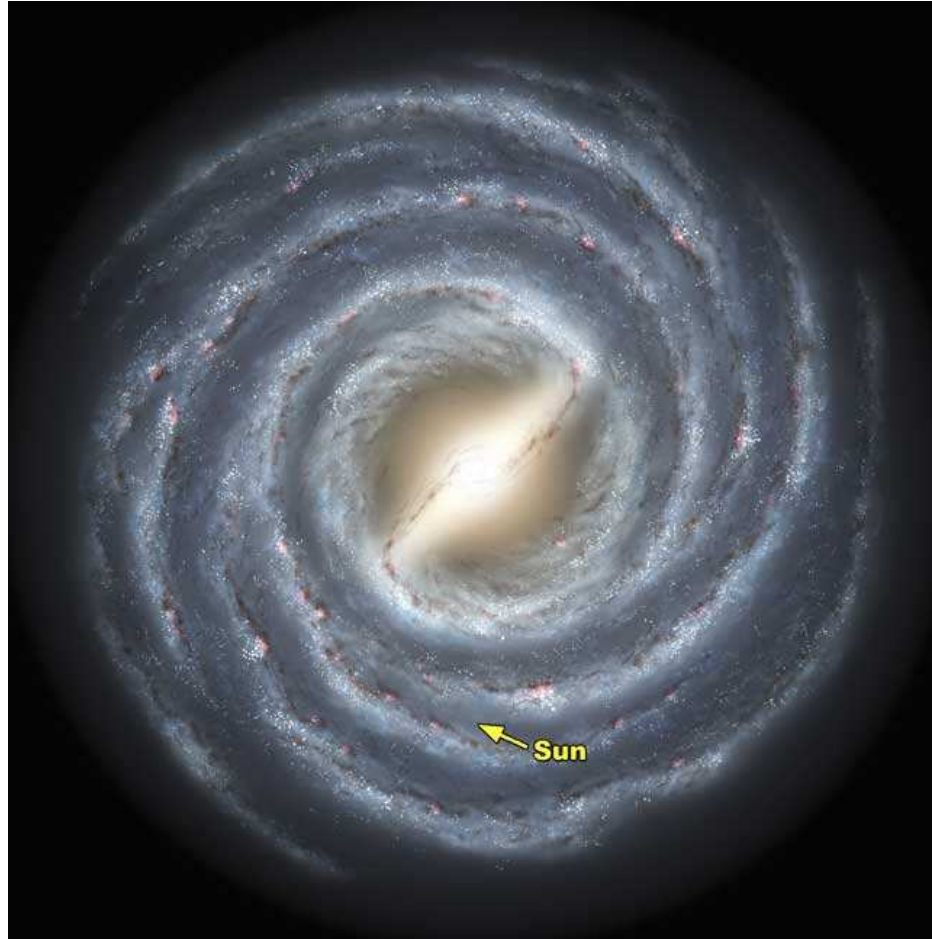
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What is so special about us?

Science does have something to say about this!



Location in Space



The universe has billions of galaxies, each with billions of stars.
On the scale of the picture (Akashganga), the sun is smaller than an atom.



Position in Time

The universe is approximately 13.7 billion years old.

In the beginning, it was an extremely tiny, dense and hot ball of elementary particles (no atoms).

Atoms formed as the universe expanded and cooled.

Elements beyond H,He are produced in the core of stars.



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Human beings (Homo sapiens) appeared on earth around 100,000 years ago.

(100,000 years/3.8 billion years < 3 seconds/24 hours)



Life itself

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The individual components of cells are constantly renewed. There isn't a single bit of any of us (not even a molecule) that was a part of us nine years ago!

The atoms in each DNA strand get knocked off and replaced, in a continuous jostling with other molecules, ten thousand times a day.



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Atoms are fantastically indestructible.

They just get rearranged in different ways.

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**Hardware is recycled,
while software is improved!**



Evolution

Nothing in biology makes sense except in the light of evolution.

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Organism	Messages	Physical Means
Single cell	Molecular (Genes, Proteins)	Chemical bonds, Diffusion
Multicellular	Electrochemical (Nervous system)	Convection, Conduction
Families, Societies	Imitation, Teaching, Languages	Light, Sound
Humans	Books, Computers, Telecommunication	Storage devices, Electromagnetic waves
Gizmos or Cyborgs ?	Databases	Merger of brain and computer

Evolution has progressively discovered higher levels of communication mechanisms.



Natural Selection

- Communication range expands.
- Physical contact reduces.
- Abstraction increases.
- Succinct language forms arise.
- Complex translation machinery develops.
- Cooperation gradually replaces competition.

With more trials and errors, the older lower level systems are better optimised than the newer higher level ones.



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“Knowledge” helps overcome these hazards.
It is the driving force behind “survival of the fittest”.
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कर्मण्येवाधिकारस्ते मा फलेषु कदाचन —श्रीमद् भगवद्गीता २ : ४७



Hallmarks of Evolution

The purpose of life is to obtain “knowledge”, use it to live with as much as satisfaction as possible, and pass it on with improvements and modifications to the next generation.

The interpretation of these words may be subjective, yet it is fairly clear that this is what all living organisms—from bacteria to human beings—do in their life time.



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Over billions of years, biological evolution has experimented with a wide range of physical systems for acquiring, processing, choosing and communicating information.

So far evolution has been dominated by changes at the genotype level, and selection at the phenotype level.



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With increasing reach of knowledge, human beings have become capable of asking (not necessarily answering) more and more elaborate questions.

What next?



Hierarchical Processing of Information

- Data:** They describe a particular realisation of the physical system, among its many possible states.
- Information:** It is the fungible abstract mathematical property obtained by detaching all physical characteristics from data.
- Knowledge:** It is obtained by adding a sense of purpose to the abstract information.

Information = Data - Physical Realisation

Knowledge = Information + Interpretation



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↓ Computers		Living organisms ↑
Data	Input	Environmental signals
Pre-processor	High level	Sense organs
Compiler	↑	Nervous system
Assembler	Translation	Brain
Machine code	↓	Electrochemical signals
Electrical signals	Low level	Proteins
CPU and memory	Execution	Genome

Top-down (↓) or bottom-up (↑) design decides where the programme is written.



What Next?

Every level of knowledge has a role to play, and it can be tinkered with using appropriate methods.

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Genetic approach is \uparrow , conscious effort is \downarrow .

(a) There is little doubt about what came first.

(b) "How to learn" is more important than "what to learn".



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Feedback (selection):

- Clever amplification/suppression can assign priorities.
- It can reduce choices and focus progress.
- It can digitally punctuate analogue processes.
- It can decide what to retain and what to forget.



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