Philosophy of Information and Communication Technology.

What is Philosophy of Information and Communication Technology?

Introduction

- The twenty first century is considered as influenced by the Information and Communication Technology (ICT) which has proven its efficiency in every area of daily life, no one can honestly conceive of a future society in which there are no more ICT facility, no matter what risks may be implicit in it.

Introduction Cont..

- Philosophy has been described as having taken a "computational turn" relating to how computers and information technology shed new light on conventional philosophical issues, providing new tools and principles for philosophical reasoning, and pose theoretical and practical issues that cannot easily be answered within conventional philosophical frameworks.

Introduction Cont..

- The Computer revolution, the information Turn and the Information and Communication Technologies Society have recently generated a lot of theoretical problems, uncertainty and chaos, a lot of new concepts and unforeseen issues, a number of new ways to explore old theories and problems, and so on.

Introduction Cont..

- This new combination of contextual uncertainty and virgin territories is the kind of "reclaimable property" which philosophy is traditionally called upon to discover, clarify and chart. In this way, the contention goes, today we need a Philosophy of Information, saw essentially as a typical improvement throughout the entire existence of philosophy, a significant development of the philosophical outskirts whose time has plainly kind of philosophy that come, yet which unquestionably won't be the last.

What is Philosophy?

- Philosophy is a way of thinking about the world, the universe, and society. It works by asking very basic questions about the nature of human thought, the nature of the universe, and the connections between them. The ideas in philosophy are often general and abstract, but we have to understand it in an **analytic** and **modern** philosophy sense.

What is Philosophy? Cont..

- **Analytic philosophy** because it is primarily concerned with the logical analysis of concepts rather than literary, poetic, or speculative approaches.

- **Modern philosophy** because it is a technical term that usually refers to the have been done early than the 17th century.

What is Philosophy? Cont..

- The philosophical search for truth is a never-ending process, evolution in philosophy consists, at least in part, of constantly bringing to light the secret presuppositions that find their way deep into our thought, too deep down for us to be even aware of them. But whatever the origins of these presumptions, of which we are ignorant, they must be brought to light and challenged. These bringing to light is what the advancement of philosophy is.

Science and Philosophy

- What is the connection between science and philosophy? It is that way of thinking on a fundamental level and self-governing. At the point when one comprehends what is planned by this, one will see that the case is unassuming and that there are valid justifications for tolerating it. The view comprises of two postulations:

Science and Philosophy Cont..

- **The Autonomy of Philosophy:** Among the major questions of philosophy that can be answered by one conventional philosophical method or another, the majority can, in theory, be answered by philosophic analysis and argument without relying significantly on science.

Science and Philosophy Cont..

- **The Authority of Philosophy:** As long as science and philosophy indicate to answer a similar focal philosophical inquiries, by and large, the help that science, could on a fundamental level accommodate those answers isn't as solid as that which theory could on a basic level accommodate its answers. In this way, ought to there be clashes, the authority of theory much of the time can be more noteworthy on a basic level.

Science and Philosophy Cont..

- According to One Sebastian, the difference between science and philosophy as forms of scholarship is found in two sides to the objection regarding **subject matters** on the one hand, **methodology** on the other.

Science and Philosophy Cont..

- **In subject matters**, it is clear that philosophy explores topics such as cultures, political organizations, etc., about which the natural sciences have nothing to suggest. Science and philosophy cannot therefore be differentiated on the basis of their subject matter alone. The variations are often found in their formal objects and methodologies.

- **In Methodology**, the explanation is that the common sciences look for clarifications in the methods of causal viability and material causation, though philosophy is keen on formal investigation, objectives, and deliberateness.

Now a question arises, is Science Philosophy?

- On our point of view, we can state that science is philosophy, insofar as investigations and experimental techniques are viewed as "rational" and yield truth.

- One Nicholas, said: "Historically, philosophy is the mother of all sciences. Newton referred to himself as a "natural philosopher", while the term "scientist" did not emerge until the 19th century through the writings of William Whewell." And thus science is a philosophy.

What is Computer Science?

- Defining Computer Science is on old debate, many researchers have tried to provide different definitions depending on their period.

- Is Computer Science the Science of Computers?

- Is Computer Science the Study of Algorithms?

What is Information technology ?

- Information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure and processes consisting of three basic parts: computational data processing, decision support, and business software.

Philosophy of Computing

- Philosophy has been described as having taken a "computational turn," referring to the ways in which computers and information technology shed new light on traditional philosophic problems, provide new tools and concepts for philosophic reasoning, and present theoretical and practical questions that cannot easily be solved within traditional philosophic frameworks, and hence **Philosophy of computing is the investigation of the basic nature and principles of computers and the process of computation**.

Philosophy of Computing Cont..

- One Luciano, organizes the different relations between philosophy and computer science with its ICT applications into four areas:
    - i. Sociology of the information society
    - ii. The philosophy of information
    - iii. The philosophy of AI (Artificial Intelligence)
    - iv. Philosophy and aided intelligence

i. Sociology of the information society

- The term information society has been proposed to refer to the post-industrial society in which information plays a pivotal role and have five characterizations: technological, economic, sociological, spatial, and cultural.

a. Technological: this refers to the way the wide-ranging innovations in information and communications, from cable and satellite television, personal computers, to internet has defined a new social order

b. Economical: The structure of the economy and its recent changes, in which information has come to play a defining role, has been described to constitute the information economy

i. Sociology of the information society

c. Sociological: Sociologists have conceptualized the information society in terms of changes in occupational structure and consider the preponderance of information work in occupations to have created a new social order

d. Spatial: The impact of information networks on the organization of space and time has been the focal point of this discourse, therefore the concept of time shifting and space shifting is gaining place in this century of Globalization

e. Cultural: The cultural conception of an information society is closely related to the information environment in which we now live. Access to a wide range of news and analysis, entertainment, personal and community help from across the globe through various media. In this new social order, while there is the freedom of choice with regard to a particular medium, the penetration of some level of information in

ii. The philosophy of information

- Philosophy of Information deals with the philosophical analysis of the notion of information both from a historical and a systematic perspective. According to Anthony, the philosophy of information is merely philosophy concerning information and an attempt to determine what it is in the same sense that the philosophy of science is philosophy concerning science and what it is.

iii. The philosophy of AI (Artificial Intelligence)

- The philosophy of artificial intelligence is a collection of issues primarily concerned with whether or not AI is possible, with whether or not it is possible to build an intelligent thinking machine. What seems worth anticipating here is that, in the past, the heated debate on the analogies, or even the potential identity, between brains and computers appears to have had the unfortunate counter-effect of keeping a number of philosophers away from other aspects of the digital revolution of equally profound philosophical interest.

iv. Philosophy and aided intelligence

- Aided intelligence is an alternative conceptualization of artificial intelligence that focuses on AI's assistive role, emphasizing the fact that cognitive technology is designed to enhance human intelligence rather than replace it. The philosopher may be more interested in the root of actions performed by the aided intelligence in supporting human, and then the nature of these actions.

Conclusion

- In summary, philosophers ought to have the option to benefit as much as possible from what has been made simpler by ICT, get the best out of what has been made feasible just because of ICT, lastly propose new ICT applications for future needs.

- In this context, wondering what is implicit in the relation between computing, ICT and philosophy means to ask not only whether philosophers may be able to exploit recent technological innovations for their work, and if so, to what extent, but also what it means for a philosopher to be abreast of the technology of our time.

Main Branches of Philosophy

Our Concern

- In order to narrow the aims of discussion philosophy was broken into branches. Traditionally philosophy has been broken into four main branches :
    - Metaphysics
    - Epistemology
    - Ethics
    - Logic

Metaphysics

- Metaphysics investigates the nature, structure and value of reality.

- Metaphysics is the branch of philosophy that goes beyond the realms of science. It is concerned with answering the questions about identity and the world. The name is derived from the Greek words, Meta which means beyond or after, and Physika which means physics. Aristotle, one of the most well known philosophers, acknowledged Thales as the first known meta physician. The main branches of metaphysics are ontology, natural theology and universal science.

Problems with Metaphysics

- There is a basic question about the ultimate substance as to how many substances are required to constitute this world? Here are some theories regarding this:
    - Dualism
    - Monism
    - Materialism
    - Spiritualism
    - Pluralism

Epistemology

- Epistemology literally means "science of knowledge."
- Epistemology deals with the definition of knowledge and its scope and limitations. It translates from Greek to mean 'theory of knowledge'. It questions the meaning of knowledge, how we obtain knowledge, how much do we know and how do we have this knowledge? Some of the famous epistemologists are Descartes, Kant and Hume.

Problems of Epistemology

- What is the nature of Knowledge?

- What is the nature of the process of knowledge?

- What are the sources of Knowledge?
    - Rationalism
    - Empiricism
    - Intuitionism

- What is the criteria of determining truth?

- The Correspondence Theory of Truth.

- The Coherence Theory of Truth.

- The Pragmatic Theory of Truth.

Ethics

- Ethics, also known as moral philosophy, is a branch of philosophy that addresses questions about morality—that is, concepts such as good and evil, right and wrong, virtue and vice, justice, etc.

- Ethics is concerned with questions on morality and values and how they apply to various situations. It can be divided into the branches of meta-ethics, normative and applied ethics. Ethics seeks to understand the basis of morals, how they develop and how they are and should be followed. Famous works on ethics are by philosophers as early as Plato, Aristotle, Kant and Nietzsche.

Problems of Ethics

- The central questions raised in this course in ethics are :
- (1) What is the nature of the life of excellence?,
- (2) What is the ultimate worth of the goals you seek?
- (3) What specific courses of conduct, in keeping with these goals, will help lead to the life of excellence?

Logic

- Logic is the system or principles of reasoning applicable to any branch of knowledge or study.

- Logic: Among the branches of philosophy, logic is concerned with the various forms of reasoning and arriving at genuine conclusions. It includes the system of statements and arguments. It is now divided into mathematical logic and philosophical logic. It tries to avoid the imaginary or assumptions without real logical proof.

Problems of Logic

- Among the important problems that logic can have are:
- **Consistency**, which means that no theorem of the system contradicts another.
- **Validity**, which means that the system's rules of proof will never allow a false inference from true premises. A logical system has the property of soundness when the logical system has the property of validity and only uses premises that prove true (or, in the case of axioms, are true by definition).
- **Completeness**, which means that if a theorem is true, it can be proven.
- **Soundness**, which means that the premises are true and the argument is valid.

Conclusion

- Philosophy is the study of general and fundamental problems, such as those connected with existence, knowledge, values, reason, mind, and language. Here we have discussed all branches in short.

Philosophical School of Thought.

Empiricism

- Empiricism is a doctrine which stipulates that all knowledge comes from experience.

Rationalism

- Rationalism is a theory which states that the human mind has principles or a priori knowledge, independent of experience.

Idealism

- Idealism is a philosophical doctrine that denies the existence of the outside world, and reduces it to representations of subjectivity.

Positivism

- Positivism is the principle of positivism is to refute any metaphysical sense to man's existence, focusing instead on science and objective and seeking human laws.

Stoicism

- Stoicism is both a theory of the universe and of morality. Stoic wisdom is defined as knowledge of the Cosmos.

Structuralism

- Structuralism is for structuralists, the existence of underlying structures can explain all social activities. To uncover these, structuralism aims to go beyond empirical facts.

Skepticism

- Skepticism is the idea that all truth claims must be subjected to scrutiny; or the idea that certain knowledge is impossible.

Scientism

- Scientism is the idea that the scientific method and approach is universally applicable.

Alan Mathison Turing's basic idea

Turing'sbasic idea Cont..

- What did Alan Turing give us? Why might he be considered the father of modern computer science? Turing gave us a lot of things, and it is easy to get distracted trying to understand the details of his work. But one way of understanding Turing's vital importance is by seeing him as the person who gave us the idea of computation.

- This is the idea that we could take many different procedures that at first sight look quite different, and reduce all of them to different sets of basic operations that could be run by a machine, separating the operations themselves from the brain normally used to run them.

Turing'sbasic idea Cont..

- The other side of this idea was that of a machine that was not a coffee-maker, washing machine, or lawnmower, but a machine that could run these many different procedures by running these basic operations on data to produce more data – a kind of information processing.

- The machine described is a computer, of course. What makes your computer, and also your smart phone and your iPad, special among all the machines you have is that they can do a lot of different things (your other machines can only do one or two things).

Turing'sbasic idea Cont..

- Turing's main way of giving us these ideas is by way of what came to be called a "Turing Machine" (Turing, 1936). Turing was concerned with what can and cannot be calculated or computed and how.

- He came up with the idea of a machine that mimics a human calculating using pen and paper. Turing suggested that the operations of the human computer (to distinguish it from an artificial computer) performing some task may be completely mechanized by breaking down the rules of computation into a series of basic sub-rules. We can consider the human computer making calculations easier by using her notebook, and breaking down her operations page by page.

Turing'sbasic idea Cont..

- Imagine her following instructions to alter the page she is on, or turn to another page. Simplify by thinking of the content of each page as replaceable in principle by a single symbol, and think of a very long notebook, so the human computer never reaches the last page.

- We have something like an infinitely running paper tape, with symbols on page after page after page. The human computer moves from page to page, following the instructions either to change the symbol or to move, according to the symbols. She could use this procedure to do many things, such as add numbers.

Turing'sbasic idea Cont..

- Turing argued that either human computors or some mechanical devices could perform computation, when this is understood as finite sequences of such operations on symbols – operations either to change the symbol or to move – as described above.

- Remember that Turing's contribution wasn't an actual machine – it was *the idea of this possible machine*. The Turing machine was an abstract, idealized representation of a human computor, whose operation is determined by discrete, effective steps: at each step it is entirely defined what the computor is allowed to do.

Turing'sbasic idea Cont..

- This machine was a hypothetical mechanical device with unlimited storage capacity (an infinite tape to write on, like the infinite sequence of pages in the notebook) and a limited set of possible actions (defined by its table of instructions).

- It was proven that such a general and simple idea would be computationally equivalent to almost *any* conceivable digital computing system. In this way, Turing defined the computation process itself. And once this is defined, it doesn't matter whether it is done by a person with a notebook, or by a machine working from a hard disc or USB drive or – in Turing's mind – a tape and a scanner.

Turing'sbasic idea Cont..

- In this case, we imagine a human computor performing some particular task, and understand that if a machine follows the same instructions as the person, the machine will perform the same task. So far this is describing a machine something like a simple calculator, able to perform a limited range of tasks, but nothing like a modern computer.

- But Turing generalized his idea further to the universal Turing machine, by showing that it is possible to construct a single universal machine that can be used to compute any function that is computable on a standard special-purpose machine

Turing'sbasic idea Cont..

- If the universal machine is supplied with a tape, at the beginning of which is the table of instructions for some special-purpose computing machine, then the universal machine will compute the same function as the special-purpose machine.

- But so long as different instructions can be loaded onto the universal machine, it will be able to compute multiple other functions, of many other special-purpose machines. The exact construction of the universal machine doesn't matter here.

- For our purposes, think of the operation of the universal Turing machine as explained by its execution of the instructions of some special-purpose Turing machine.

Turing'sbasic idea Cont..

- Now, the universal Turing machine is like a modern computer, which can upload various different software programs to enable it to do indefinitely many different kinds of computations.

- This is how Turing gave us the idea of a computer.

Extension of the concept

- From Turing we get the idea of an artificial machine that can process information, and the basic language of information necessary to build such a machine – to build a computer.

- The creation of computers and everything that has followed is a dramatic change in the world. But the profound importance of the language of information is that it has altered the way we think forever.

Extension of the concept cont..

- To this day, many thinkers from disciplines far removed from mathematics, science and engineering find use for the notion of information. Psychologists, sociologists, anthropologists, and historians have each turned to the notion of information to see what it has to offer their own disciplines, and often this occurred through the curious probing of philosophers.

- Today, topics as diverse as biopolitics (which studies things like the power of statistics to control human populations over time) and ontology (the philosophical study of being) gain something by considering the many facets of the notion of information.

Extension of the concept cont..

- It is this wide applicability of these notions that meant that something that started as maths became relevant to multiple scientific fields, helped us build a new world, and began shaping our society, our ethics, how we understand knowledge, and everything else.

Exercises

1. Make a serious effort to imagine a world that had never thought of anything like Turing's universal machine. Now reconsider whether Turing's idea was mundane, or profound.

2. Imagine that we had Turing's idea, but still could not build a computer. How would the world have been different?

3. Try to think about different types of information. What would you call them? Can you provide examples?

4. Is information abstract or physical? Can it be both? Provide an example.

5. Are "meaning" and "information" separate? Why?

WHAT IS THE PHILOSOPHY OF INFORMATION TODAY?

PHILOSOPHY OF INFORMATION

- Alongside academic philosophy, and the philosophical work commonly done in many other disciplines, Philosophy of Information (PI) is concerned with concepts. To communicate and co-operate successfully in pursuit of any goals, communities of people need shared conceptual schemes. When the world changes, concept of information.

- Information is because we find out about or create new things, those conveyed by perception, and retained by conceptual schemes need to change. For example, we needed to invent a new concept "spin" to develop quantum mechanics, and we need to understand how a Facebook "friend" is different from the usual kind of friend.

PHILOSOPHY OF INFORMATION CONT..

- For many working in PI, the purpose of philosophy is to help build the required conceptual scheme or schemes, to engage in conceptual design. And philosophy is most useful when it aims to build a conceptual scheme in response to the problems of a particular time and place.

- we address the question of what PI is now by looking at what philosophical questions to ask today, and how to answer them. We will outline an approach to philosophical questions that influences a significant group of current philosophers of information – although it is not shared universally by current philosophers of information.

PHILOSOPHY OF INFORMATION CONT..

- It seems to be human to ponder difficult questions. What is the soul? Is there a God? What is a lemon? Is there an essence of lemony-ness? There's nothing wrong with wondering about these kinds of questions.

- But if you want to do serious philosophical work, many current philosophers of information recommend that you think very carefully about your question, because some questions might be a waste of your time.

PHILOSOPHY OF INFORMATION CONT..

- we need to examine how to discriminate between questions that are fruitful and questions that are not. It can require serious philosophical work to choose and refine a good question.

- One key idea to grasp will be that we interact with the world at a particular Level of Abstraction (LoA), and failing to respect that can lead to a conceptual mess.

PHILOSOPHY OF INFORMATION CONT..

- We will also begin to see why PI focuses so much on information, presenting the way Luciano Floridi, as a prominent current philosopher of information, sees PI as demanded by the "information revolution".

- The key idea is that, as our investigations of the world change, our understanding of both the world and ourselves changes too, and philosophy helps us come to terms with these changes, and to design new conceptual schemes to deal with them.

IUEE

The information revolution alters our self-understanding

- It is not difficult to see that the progress of science has given human beings a radically different understanding of the world over the centuries.

- Could we ever have expected that time and space would be relative to a frame of reference? Who would have predicted the bizarre claims of quantum mechanics? Science changes our understanding of the world.

- But science does something else too – it changes our understanding of ourselves as human beings.

The information revolution alters our self-understanding CONT..

- Science changing our self-understanding may be rare, but it can be a shattering experience.

- We might choose Copernicus as the standard-bearer for the first revolution, as he speculated that the earth was not the stationary center of the universe, around which the planets, sun and fixed sphere of the stars revolved.

- Instead, the earth is just one planet of several in our solar system, itself orbiting the sun at an extraordinary speed.

IUEE

The information revolution alters our self-understanding CONT..

- From a modern perspective it is difficult to understand how shattering it was to humanity's self-understanding when the empirical data eventually became so strong that the Copernican view became generally accepted as true.

- At least a large section of humanity had believed themselves to be so privileged that they existed at the very center of a universe created entirely for them, so focused on them that it literally revolved continuously about them.

The information revolution alters our self-understanding CONT..

- A natural standard-bearer for the second revolution is Darwin. While people had to accept that they lived on one speeding rock among many others, they considered themselves profoundly different from other animals on the planet.

- They were so clearly superior to other animals in their abilities to shape the world around themselves that they thought they must have had a quite different origin from even the most intelligent animals. Darwin destroyed all that.

- The theory of evolution showed how all life on earth could have descended from a few common ancestors, by gradual modification over many millions of years.

IUEE

The information revolution alters our self-understanding CONT..

- Recovering from this revolution with ill grace, humanity consoled itself with the view that people had changed so much since their common origins with animals that now they were different from other animals.

- They had rationality, and higher thought, which gave them independence from their baser emotions and instincts, quite unlike any other animal.

- Then humanity stumbled into the third revolution, spearheaded by Freud. He, and many thinkers since, convinced us that human beings are not entirely rational, nor are our minds perfectly transparent to ourselves.

IUEE

The information revolution alters our self-understanding CONT..

- We do still have animal urges, and instincts, and sometimes our minds are opaque to us, so that we cannot always be sure why we are acting the way we are.

- Together these revolutions radically transformed our understanding of ourselves, to something much more like the current conception of humanity, and it is not possible to go back to how things were before. But science has not stopped.

- Our understanding of the world is still changing, and even the world itself is changing – because we are changing it.

The information revolution alters our self-understanding CONT..

- Pioneering work on information by such giants as Turing and Shannon led to the creation of information and communication technologies.

- The information revolution began with extraordinarily large, clunky computers in the 1950s, but it has recently exploded into a vast array of hardware that most people use every day (computers, laptops, tablet computers, MP3 players, e-readers, smart phones), and corresponding software, web services and apps that are also part of daily life (email, Skype, Facebook, Google).

The information revolution alters our self-understanding CONT..

- The creation of the internet has had an extraordinary impact on human life, with many daily tasks (booking cinema tickets and flights, for example) and working life (email) transformed by it.

- The internet can be seen as the creation of an entirely new aspect of the world, accessed by newly available hardware and facilitated by the new software and services.

- This new aspect of the world might be called the information sphere, or infosphere.

IUEE

The information revolution alters our self-understanding CONT..

- Accompanying these dramatic changes in daily experiences has been the creation of vast amounts of data.

- Managing that data is now a large part of most jobs in the different parts of the world, and a large percentage of the GDP is now made up of informational goods like music, novels, computer software, and other patented inventions such as drug formulae (as opposed to material goods that are made or grown in manufacturing or agriculture). This is why people talk of the new "knowledge economy".

CONCLUSION

- So far all what we have learnt is that the world and our understanding of it have changed. But revolutions of the kind we are interested in are revolutions so profound that they also change our self-understanding.

- Many philosophers of information believe we are currently in the throes of such a revolution: the information revolution.

- PI holds that we are coming to see the world and our place in it in a profoundly different way. We are coming to see that it is not just the internet that is the infosphere.

- The whole world is the infosphere, and we are informational organisms, or inforgs within it