

FROM TABULA RASA TO ALGORITHMS: ARTIFICIAL INTELLIGENCE IN THE LIGHT OF LOCKEAN EPISTEMOLOGY

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ABSTRACT

This research explores the implications of John Locke's epistemology on the modern artificial intelligence. The paper examines how advancements in artificial intelligence can challenge traditional notions of knowledge and the subject of knowledge. The paper indicated that the increasing sophistication of AI systems, which simulate human-like reasoning and learning processes, blurs the boundaries between human cognition and machine intelligence. The paper established the relationships between AI and Locke's theory of knowledge, which emphasized that knowledge arises from sensory experience and reflection. The paper seeks to illuminate the evolving landscape of knowledge acquisition and dissemination in an age increasingly defined by artificial agents. The study will also address the broader philosophical implications of AI's epistemic status, contributing to the ongoing discourse on the nature of understanding and consciousness in the context of technological advancement as epitomized by AI. As AI continues to evolve and integrate into various facets of human life, it is imperative to critically assess its epistemic capabilities and the implications for our traditional understanding of knowledge and consciousness. This research aims to contribute to this vital discourse, offering insights that may help navigate the complexities of knowledge in an increasingly intelligent artificially dominating world. It is therefore important for the effectiveness of general cognitive faculties—such as memory, attention, and abstraction—to process experience into usable knowledge. By integrating Locke's principles with contemporary artificial intelligence developments, it advances the debate on what it means to "know" in a world increasingly mediated by artificial agents in the evolving landscape of knowledge.

INTRODUCTION

Artificial intelligence is a field of computer systems that are designed to perform tasks that typically require human intelligence, such as speech recognition, problem solving, and learning. According to Arakpogun, artificial intelligence is a collection of Information and Communication Technologies that imitate human intelligence¹. Grover, Kar, and Dwivedi also saw artificial intelligence as the ability of a system to acquire knowledge by evaluating data obtained from its external environment, which is then utilized to adapt to existing plans or generate new ones to effectively respond to changes in the environment. Artificial intelligence is often referred to as machine intelligence, displayed by machines as opposed to the intelligence displayed by human beings. The primary goal of AI is to develop intelligent systems that can operate autonomously, meaning they can make decisions and perform actions without continuous human input or oversight.² AI technology has been employed across various sectors, from healthcare and finance to manufacturing and marketing, to improve efficiency and accuracy in tasks that were previously reliant on human intervention³. The primary purpose of the application of AI is to improve jobs, create greater operational efficiency, and drive performance and economic growth⁴.

In academia, artificial intelligence is the ability of machines to do what intelligent humans do. This is a manifestation of the cognitive abilities of machines. It encompasses the study of how digital computers and algorithms undertake tasks and address intricate problems that typically require human intelligence, reasoning, and predictive capabilities to adapt to dynamic situations⁵. Artificial intelligence is data driven. The intelligence and understanding emended in tools (artificial intelligence tools like chatbots, predictive models, and recommendation engines) have prompted profound philosophical inquiries into the nature of knowledge, understanding, and consciousness. As AI systems become

increasingly sophisticated, capable of performing tasks that were once thought to require human intelligence, the question arises: can these systems truly “know” or “understand” in the same way humans do? This inquiry is particularly relevant when viewed through the lens of John Locke’s epistemology, which emphasizes the role of sensory experience in the formation of knowledge amongst many other emphases.

John Locke was a British empiricist, born in 1632 in Wrington, a small village in southwestern England. John Locke set out to offer an analysis of the human mind and its acquisition of knowledge. He offered an empiricist theory according to which we acquire ideas through our experience of the world. The mind is then able to examine, compare, and combine these ideas in numerous different ways and in different occasions as one might re-encounters such situation. John Locke in his *‘Essay Concerning Human Understanding’*, posits that all knowledge originates from experience, rejecting the notion of innate ideas. He famously described the human mind at birth as a *tabula rasa* (blank slate). Knowledge is acquired through two sources: sensation (observation of external objects) and reflection (the mind's internal processing of its own operations, such as thinking, doubting, and willing). Locke’s theory compared to other empiricists, seems to provide a unique framework for evaluating the epistemic nature of artificial intelligence. The epistemic status of artificial intelligence generated knowledge invites scrutiny regarding its reliability and trustworthiness. Locke emphasized the importance of according to Locke, sensation serves as the foundational "raw data" which streams the human knowledge, acting as the primary interface between the external world and the brain. Explaining this in biological terms, Azubuike noted that

for Locke, by converting physical stimuli such as light, sound, and pressure into neural signals through transduction, sensation provides the essential building blocks for all subsequent cognitive processes, including

perception, memory, and learning. Without this initial sensory input, the intellect would lack the material necessary to construct meaningful concepts or understanding sensation as the basis for knowledge⁶.

In accordance with John Lockean epistemology, the modern artificial intelligence systems often operate on data experimented and verified from the empirical world. This means that the foundation data used in making decisions embedded in tools (artificial intelligence tools) has been variedly revalidated and verified. For instance, using mathematical calculator to add 1 and 9 to have the sum of 10 has been repeated over and over by previous mathematicians. Hence, getting the answer is not new. Therefore, the calculator got its knowledge from already verified data. Thus, the knowledge of the calculator (artificial intelligence) just like Lockean human knowledge is obtained already verifiable data⁷.

Again, as humans learn to feel the empirical world, most computers systems have been trained to learn, sense and feel their environment making them to behave like human. Modern AI systems use multimodal machine learning to emulate human sensory perception. These systems process multiple data streams simultaneously. They integrate computer vision to interpret visual environments, audio processing for vocal nuances, and natural language processing to understand context. These models identify patterns that mirror human cognition by training on vast, labelled datasets⁸. They make predictive decisions, recognize emotional sentiment, and interact with the physical world in real-time.

Despite all these improvements in artificial intelligence, scholars have argued that the perceived knowledge emanating from artificial intelligence may be biased or incomplete, leading to outputs that do not reflect true understanding of the reality¹¹. Critics of artificial intelligence also argue that AI undermines the certainty of

knowledge by replacing genuine human understanding with probabilistic, data-driven outputs. This is because AI systems operate on statistical correlations rather than causal reasoning or context, they often present "artificial certainty" a polished, authoritative-sounding response that lacks the nuance, historicity, and reflective capacity inherent in human judgment. This reliance on AI risks creating an epistemological crisis where information is confused with wisdom. These discrepancies highlight a potential epistemic gap between human knowledge grounded in sensory experience, and AI knowledge, which is derived from data manipulation. In the light of the above, the paper examines the relationship between artificial intelligence and Locke's epistemology.

ARTIFICIAL INTELLIGENCE

The term artificial intelligence as its name implies, is the knowledge, behaviour, actions, predictions and recommendations exhibited by non human (tools such as computer and other electronic devices). It is the intelligence embedded in mundane tools operating based on its logics and programme. de Lima-Santos, and Ceron defined artificial intelligence as the ability of electronic/non-electronic tools, to solve complex problems or make decisions with outcomes benefiting the actor, and has evolved⁹. Cole and Eda defined Artificial intelligence (AI) as technologies that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy. The technology encompasses various subfields, including machine learning, natural language processing, and robotics, among others

In the context of this paper, "artificial intelligence is the ability of machines to do what human do. In this paper, the difference between artificial intelligence and machine learning is that while natural knowledge of John Lock emanates from sensation and stored in the human memory and experience. While the knowledge

of artificial intelligence is just computer data programmes and algorithms imputed in the computer to enable it work in a less predictable manner. This paper therefore draws the relationship between Lockean epistemology of knowledge acquisition process and artificial intelligence data processing¹⁰.

CONCEPT OF KNOWLEDGE IN LOCKE

In the introductory page of the *Essay concerning human understanding* that gave the much-needed initial impetus to the foundation of British empiricism, Locke says that his purpose is “to inquire into the original certainty and extent of human knowledge¹¹. He starts his inquiry by first attacking the suppositions of the continental rationalists, (Descartes, Spinoza and Leibniz) concerning certain innate principles which they claimed were in the human mind from the beginning of its first coming into the world. Locke disagrees with this view and argues that all our knowledge of the world comes to us through our experience and that we have no innate ideas. He asks: “Whence has (the mind) all the materials of reason and knowledge? To this I answer, in one word, from experience: in that, all our knowledge is founded; and from that it ultimately derives itself”¹².

Locke likens our minds at birth to a “white paper void of all characters, without any ideas” - a ‘Tabula Rasa’ (a completely clean blank slate) on which experience alone writes the ‘alphabet’ of knowledge¹⁵. Locke argues that if there were innate principles, then both children and idiots will be endowed with the same knowledge. But experience for him shows that neither children nor idiots are aware of these alleged innate truths. “To say a notion is imprinted on the mind, and yet at the same time to say, that the mind is ignorant of its and never yet took notice of it, it is to make this impression nothing¹³.

If there were innate principles which have been imprinted in the minds of all, then we should think alike and organize our societies the same way. Moral values and principles, Locke claims, are not the same all over the world. Even those who have the same moral principles have different reasons for observing them. Having rejected the concept of innatism and arguing for experience as the source of our knowledge of the world. Locke posits that experience is of two forms - one is 'sensation' and the other is 'reflection'.

Our observation employed either about external sensible objects; or about the internal operations of our minds perceived and reflected on by ourselves; is that which supplies our understandings with all the materials of thinking. These two are the foundations of knowledge...¹⁴

John Locke was against the rationalist philosophers like as Descartes who held that the ultimate source of human knowledge is reason. As an empiricists John Locke argued that the source is experience and sensation is the major source of knowledge. Rationalist accounts of knowledge also typically involved the claim that at least some kinds of ideas are "innate," or present in the mind at (or even before) birth. For philosophers such as Descartes and Gottfried Wilhelm Leibniz, the hypothesis of innateness is required in order to explain how humans come to have ideas of certain kinds. Such ideas include not only mathematical concepts such as numbers, which appear not to be derived from sense experience, but also, according to some thinkers, certain general metaphysical principles, such as "every event has a cause"¹⁵

Locke claimed that the line of argument has no force. He held that all ideas (except those that are "trifling") can be explained in terms of experience. Instead of attacking the doctrine of innate ideas directly, however, his strategy was to refute it by showing that it is explanatorily otiose and hence dispensable. There are two kinds of experience, according to Locke: observation of external objects. That is sensation and "reflection." Some examples of reflection are

perceiving, thinking, doubting, believing, reasoning, knowing, and willing¹⁶.

As Locke used the term, a “simple idea” is anything that is an “immediate object of perception” (i.e., an object as it is perceived by the mind) or anything that the mind “perceives *in itself*” through reflection. Simple ideas, whether they are ideas of perception or ideas of reflection, may be combined or repeated to produce “compound ideas,” as when the compound idea of an apple is produced by bringing together simple ideas of a certain colour, texture, odour, and figure. Abstract ideas are created when “ideas taken from particular beings become general representatives of all of the same kind.

The “qualities” of an object are its powers to cause ideas in the mind. One consequence of that usage is that, in Locke’s epistemology, words designating the sensible properties of objects are systematically ambiguous. The word *red*, for example, can mean either the idea of red in the mind or the quality in an object that causes that idea. Locke distinguished between primary and secondary qualities, as Galileo did. According to Locke, primary qualities, but not secondary qualities, are represented in the mind as they exist in the object itself¹⁵. The primary qualities of an object, in other words, resemble the ideas they cause in the mind. Examples of primary qualities include “solidity, extension, figure, motion, or rest, and number.” Secondary qualities are configurations or arrangements of primary qualities that cause sensible ideas such as sounds, colours, odours, and tastes. Thus, according to Locke’s view, the phenomenal redness of a fire engine is not in the fire engine itself, but its phenomenal solidity is. Similarly, the phenomenal sweet odour of a rose is not in the rose itself, but its phenomenal extension is.

In Book IV of *An Essay Concerning Human Understanding* (1689), Locke defined knowledge as “*the perception of the connexion of and agreement, or disagreement and repugnancy of any of our ideas.*”¹⁶ Knowledge so defined admits of three degrees, according to Locke. The first is what he called “intuitive knowledge,” in which the mind “perceives the agreement or disagreement of two ideas *immediately by themselves*, without the intervention of any other.” Although Locke’s first examples of intuitive knowledge are analytic propositions such as “*white is not black,*” “*a circle is not a triangle,*” and “*three are more than two,*” later he said that “the knowledge of our own being we have by intuition.” Relying on the metaphor of light as Augustine and others had, Locke said of this knowledge that “the mind is presently filled with the clear light of it. *It is on this intuition that depends all the certainty and evidence of all our knowledge.*”¹⁷

The second degree of knowledge obtains when “the mind perceives the agreement or disagreement of...ideas, but not immediately.” In these cases, some mediating idea makes it possible to see the connection between two other ideas. In a demonstration (or proof), for example, the connection between any premise and the conclusion is mediated by other premises and by the laws of logic. Demonstrative knowledge, although certain, is not as certain as intuitive knowledge, according to Locke, because it requires effort and attention to go through the steps needed to recognize the certainty of the conclusion¹⁸.

A third degree of knowledge, “sensitive knowledge,” is roughly the same as what Duns Scotus called “intuitive cognition”—namely, the perception of “*the particular existence of finite beings without us.*” Unlike intuitive cognition, however, Locke’s sensitive knowledge is not the most certain kind of knowledge it is possible to have. For him, it is less certain than intuitive or demonstrative knowledge. Next in certainty to knowledge is probability, which Locke defined as the appearance of agreement or disagreement of

ideas with each other. Like knowledge, probability admits of degrees, the highest of which attaches to propositions endorsed by the general consent of all people in all ages¹⁹. Locke may have had in mind the virtually general consent of his contemporaries in the proposition that God exists, but he also explicitly mentioned beliefs about causal relations.

The next highest degree of probability belongs to propositions that hold not universally but for the most part, such as “people prefer their own private advantage to the public good.” This sort of proposition is typically derived from history. A still lower degree of probability attaches to claims about specific facts—for example, that a man named Julius Caesar lived a long time ago. Problems arise when testimonies conflict, as they often do, but there is no simple rule or set of rules that determines how one ought to resolve such controversies. Probability can concern not only objects of possible sense experience, as most of the foregoing examples do, but also things that are outside the sensible realm, such as angels, devils, magnetism, and molecules²⁰.

LOCKE’S SENSATION AND REFLECTION

As regard sensation, Locke claims that our immediate encounter with objects in the external world “do convey into the mind several distinct perceptions (ideas) of things” (109). According to Locke, “this great source of most of the ideas we have depending wholly upon our senses, and derived by them to the understanding is what I call sensation”²⁵. For example, from the external world through the senses: we receive passively from objects external to us such simple ideas “of yellow, white, heat, cold, soft, hard, bitter, sweet,”²⁵ and other sensible qualities which come directly into our minds separately in single files. From this explanation, Locke claims that the origin of all simple ideas is from sensation. ‘Reflection’ on the other hand involves the ability of the mind to produce ideas by making use of the previous ideas furnish by the

senses. It involves such activity as “perception, thinking, doubting, believing, reasoning, knowing, willing”²⁶ and the other activities of the mind that produces ideas as distinct from those we receive from external bodies affecting our senses. Here, the emphasis is on the active functions or “the (internal) operations of our own minds within us”. According to Locke: “... as I call the other sensation, so, I call this reflection, the ideas it affords being such only, as the mind gets by reflection on its own operations within itself”²¹

For example, the mind has the power to work on (by joining, comparing, separating and uniting) the ‘simple ideas’ received from sensation “to an almost infinite variety and so can make at pleasure new complex ideas”²² . It joins together the simple ideas of a something white, of something hard and of something sweet to form the complex idea of a cube of sugar. The mind can also at will unite ideas simultaneously together, or holds them separately for the purpose of thinking and comparing their relationships, as when one says that ‘this chalk is whiter than the shirt’ or ‘honey is sweeter than sugar’. What Locke wants to make clear is to tell us that we cannot have the experience of reflection until we have had the experience of sensation. In other words, that sensation is prior to reflection.

If it shall be demanded, then when a man begins to have any ideas? I think, the true answer is, when he first has any sensation... In time, the mind comes to reflect on its own operations about the ideas got by sensation, and thereby stores itself with a new set of ideas, which I call ideas of reflection.²³

For reflection means simply the ability or power of the mind to reflect on its own operations or functions: “By reflection then... I would be understood to mean, that notice which the mind takes of its own operations, and the manner of them, by reason whereof, there come to be ideas of these operations in the understanding’

²⁴But this function or operation begins when the mind is provided

with ideas from without, through our senses; from objects external to us. He says: "External objects furnish the mind with the ideas of sensible qualities, which are all different perceptions they produce in us; and the mind furnishes the understanding with the ideas of its own operations"²⁵

All the ideas men have, Locke concludes are traceable to these two ways, namely: "... external material things, as the objects of sensation and the operations of our minds within, as the objects of reflection, are to me the only originals from whence all our ideas take their beginnings" (110)³². And these ideas he says are either simple or complex. He argues:

Let anyone examine his own thoughts, and thoroughly search into his understanding, and then let him tell me, whether all the original ideas he has there, are any other than of the objects of his senses; or of the operations of his mind, considered as objects of his reflection: and how great a mass of knowledge so ever he imagines to be lodged there, he will, upon taking a strict view see that he had not any idea in his mind but what one of these two have imprinted; though perhaps with infinite variety compounded and enlarged by the understanding,....²⁶

In an attempt to describe the relationship between the ideas we get from external objects and the objects themselves, Locke goes a step further to explain how ideas are related to the objects that produce them. If we consider a tree for example, what is the relationship between our ideas as the tree engenders in our minds and the actual nature of the tree? In answering this question, Locke makes a distinction between primary and secondary qualities. Primary qualities are necessary and essential to the existence of objects. They are real, inseparable, attributes of physical objects. Their alterations or changes do not affect the objects themselves. "The ideas of primary qualities of bodies are resemblances of them and

their patterns do really exist in bodies...”²⁷ For example, “solidity, extension, figure (shapes and sizes), motion or rest, and number”³⁵. Secondary qualities such as “colour, sound, taste (touch and smell)”²⁸ on the other hand are not intrinsic parts of physical objects but “power to produce various sensations in us by their primary qualities.”³⁶. With this distinction, Locke was convinced that there must be ‘something’ which either holds all the qualities together or gives rise to them and this he calls ‘substance’ or “substratum”²⁹. But when asked what this substratum is, Locke retorted; “... If anyone will examine himself concerning his notion of pure substance in general, he will find he has no other idea of it at all, but only a supposition of he knows not what support such qualities...”³⁰

Turning to the question of the degrees of knowledge, Locke opines that our ideas, depending upon the objects we experience are related to each other in some ways and this determine the extent and validity of our knowledge claims. He defines knowledge as “the perception of the connection and agreement, or disagreement and repugnancy of any of our ideas”³¹. Thus; “Where this perception is, there is knowledge, but where it is not... though we may fancy, guess or believe, yet we always come short of knowledge”³².

Locke identifies three main modes of perception in human knowledge with each leading a different degree of knowledge about reality. These are intuitive, demonstrative and sensitive. In intuitive knowledge, “the mind perceives the agreement or disagreement of two (or more) ideas immediately by themselves without intervention of any other”³³. Such kind of knowledge, Locke says, is said to be “the clearest and most certain that the human frailty is capable of”³⁴. For example, that the human faculty is capable of giving us certainty about the knowledge of our own existence is intuitive; also with the help of intuition, we can know immediately “that white is not black, that a circle is not triangle, that three are

more than two and equal to one and two” because we can perceive the repugnancy of these ideas to other ideas. Demonstrative knowledge, Locke claims, occurs when “the mind perceives the agreement or disagreement of any ideas but not immediately”³⁵. Though perception is possible by calling attention to further ideas, this kind of knowledge is less clear.

Under this level of knowledge, Locke classifies our knowledge of God’s existence and mathematical reasoning. With sensitive knowledge, Locke refers to the actual existence of other bodies and external objects. Here, experience simply gives us in single files a direct awareness of qualities of things as they are presented to us and because we never sense the realities behind the qualities, we have no assurance that these qualities presented to our senses represent the true nature of things. Locke argues that because of the deceptiveness of our sense impressions, we cannot rely on sensitive knowledge as certain like the other two. Of this kind of knowledge, he says:

There is, indeed, another perception of the mind, employed about the particular existence of finite beings...which going beyond bare possibility, and yet not reaching perfectly to either of the foregoing degrees of certainty, passes under the name of knowledge.³⁶

SIMPLE IDEAS

Simple ideas are the elements of thought we passively receive through sensation and reflection. According to Locke, Simple Ideas mostly agree with things, since “*the mind . . . can by no means make to itself any simple ideas. these being all the products of things operating on the mind in a natural way.*”³⁷ Thus we can have ideas derived from (a) one sense e.g., taste, smell, color etc. (b) through more than one sense e.g., figure, motion, size etc.; (c) through reflection e.g., perception; (d) through sensation and reflection both e.g., pleasure and pain etc.

What is the relation between these ideas and the objects of which they are the ideas? Besides their existence in the mind, Locke holds that many of the simple ideas are also referred to the external world, where they are supposed to be somehow to belong. Color, for example, is commonly regarded as, at once, a sensation and attribute of objects. In order to avoid confusion between the mental existence of ideas and those physical facts which are supposed to give rise to them, the latter are called not ideas, but qualities. In this connection Locke draws an important distinction. According to Locke, simple ideas are of two kinds, some are ideas of primary qualities which, in reality belong to the object, e.g., ideas of solidity, extension, figure, motion and number. Others are ideas of secondary qualities and, in this case, there are no qualities in the object which these ideas resemble³⁸.

The primary qualities are those that are inseparable from the bodies and are enumerated as solidity, extension, figure, motion and rest, and number. The secondary qualities are all the rest color, taste, smell etc. Primary qualities, he maintains, are actually in bodies, secondary qualities, on the contrary, are only in the percipient. Without the eye, there would be no colors, without the ear, no sounds and so on. Secondary qualities are really nothing in the objects themselves but only powers which the objects have to produce various sensations in us by their primary qualities.

“Take away the sensation of them; let not the eye see light or color, nor the ears hear sounds, let the palate not taste, nor the nose smell; and all color, tastes, odors, and sounds, as they are such particular ideas, vanish and cease and are reduced to their causes, i.e., bulk, figure and motion of parts.”³⁹

Locke's view is then that the ideas of primary qualities are resemblances of real qualities. These patterns do exist in the bodies themselves. Whereas the ideas we have of secondary qualities bear

no resemblance to the bodies, being caused in us by qualities in the bodies which they do not in the least resemble. The question here is raised as to how can Locke know that primary qualities belong to matter? Locke simply believes this and accepts it without any criticism. Locke is here accepting the physicists' position and attempts to justify it psychologically. Berkeley shows afterwards that there is no psychological distinction between primary and secondary qualities⁴⁰.

"All our complex ideas of them must be such and such only, as are made up of such simple ones as have been discovered to co-exist in nature." Complex ideas are formed by the mind, by comparing, combining and abstracting from simple ideas. The acts of the mind wherein it exerts its power over its simple ideas are mainly three:

- (1) Combining several simple ideas into one compound idea.
- (2) Bringing two ideas together and setting them by one another so as to take a view of them at once, without uniting them into one, by which it gets all the ideas of relation.
- (3) And, thirdly, separating them from all other ideas that accompany them in their real existence. This is called abstraction and, thus, all the general ideas are formed. We might, for example, compare many triangles with each other and, finding that they agree in two attributes alone, we might take only these two attributes disregarding all particularities of the particular triangles.

So the general idea of triangle will be a plain figure bounded by three straight lines. Locke's view of general ideas is known as conceptualism. Conceptualism is a theory of universals, in which general words like 'man', 'tree', 'dog', 'bird' etc. have their existence only in human minds. They are nothing but 'concepts' or 'ideas'. In this context we may discuss, in short, the central metaphysical problem for a philosopher, viz., the Problem of universals. The problem

was first introduced into philosophy by Plato. The Platonic view is often called “Realism.” Plato held that universals, like ‘manhood’ cat-hood, blueness, really exist. There is this cat, and that cat, but there, is also the universal ‘cat-hood’ or ‘catness’⁴¹.

Cat-hood’ is simply the complex set of properties defining cats. But what is the relation, according to Plato, between universals and the particulars? Between, ‘man’ and ‘manness’? They are so different in nature that it would be difficult to see how there could be any relation between them. Particulars like this blue coat, this man—they exist in space and time, and are known by our sense-organs. But the universal blueness which is present in every blue thing is neither in space nor in time. Consequently, they cannot be known by our sense-organs. In the world there are many blue things but ‘blueness’ does not exist in this world, it belongs to the realm of universals.⁴⁸

Particulars just imperfectly copy these universals which only really exist, and are known by our understanding or Reason, not by sense-experience. The universals are timeless and unchanging. Even if there is no example of a perfect ‘man’ anywhere, perfect man-ness exists. They are the realities. This is Plato’s theory of universals—known as Realism. Locke’s theory of universals is known as “conceptualism”. According to conceptualism a universal is not merely a name, nor an image but a concept. In reality there are only particulars, but in our minds there is something else—not images but concepts⁴². General words (all words except proper names) are the names of concepts, but these occur in our minds; not in nature. Mind constructs them from the sensible properties of objects. The concept ‘man’ goes beyond this or that particular man, and seems to be present in all human beings. The individual, particular man is the reality, general name or universal ‘man’ is a concept, created by human mind. Universals have no real existence.

COMPLEX IDEA

Complex ideas may be divided into three classes (i) modes, (ii) substances and (iii) relations.

(1) Modes: Modes are such combinations of simple ideas which do not contain in them the supposition of subsisting by themselves but are considered as dependents on or affections of substances". Modes are those combinations of simple ideas which cannot subsist by themselves, but need a substance or support or substratum in which to subsist. Modes are of two types:

- (a) Simple modes are those which are "only variations or different combinations of the same idea without the mixture of any other idea e.g., a dozen or a score, which are nothing but the ideas of so many distinct units added together." Simple modes are, therefore, "contained within the bounds of one simple idea."
- (b) Mixed modes are composed of simple ideas of several kinds e.g. Beauty, consisting of a certain composition of colour and figure, causing delight in the beholder. The second complex idea, according to Locke, is the idea of,

(2) Substance: Locke thinks that modes are conditions which do not subsist by themselves but have need of a basis or support. They are not conceivable apart from a thing whose states or properties they are. Substance is the substratum in which the modes inhere. We notice that certain qualities always appear together and habitually refer them to a substance as the ground of their unity in which they subsist, or from which they proceed. Substance denotes the self-existence (we know not what) which has or bears the attributes in itself and which arouses the idea of them in us. All ideas of sensation presuppose a body and all ideas of reflection presuppose a mind. Instead of calling them material and mental substances, Locke calls them cogitative and non-cogitative substances, since it is not inconceivable that the creator may have endowed some material objects also with the capacity of thought.

Starting from the point of view of common sense, Locke is right in arguing that we cannot think of qualities as existing by themselves. Locke's admission of substance, however, is inconsistent with his empirical position. Locke explicitly says that we can have the substance neither from sensation nor from reflection. Yet he never ceases from believing that there are substances behind the qualities. It is for him 'the unknown unknowable background of known qualities'. In order to account for the togetherness of qualities, Locke is obliged to introduce the idea of substance, but it remains always a supposition with him⁴³.

(3) The third complex idea is the idea of Relation: Relations are not copies of actual things but they are formed by comparing and reflecting on things. The understanding in the consideration of anything is not confined to that object merely; it can, as it were, bring one thing and set it by another and carry its view from one thing to the other, the things so brought together (by our understanding) are said to be related. Types of Relation include:

- (a) Causal Relation: According to Locke the experience of change suggests the idea of cause which brings about the change. Locke is concerned mainly with particular changes and particular causes. He gives no adequate explanation of the Law of Causation as a whole, i.e., the principle "Every event must have a cause". But mere observation of particular changes gives no explanation why every event should necessarily have cause.
- (b) Spatial and Temporal Relation: Objects are always in some space and in sometime, i.e., both in some space and time. 'Far and near', 'in or out', 'above and below' are spatial relations, whereas 'before after, prior to and posterior to' are words that express time relations. Things have spatial relation among them. Events occur in time, and come always one after another. The event which occurs earlier to the other is called prior event, the other event which comes later is called the posterior event. These are temporal

relations. Locke believed in the genetic theory of space and time. According to him, our knowledge of space and time comes from particular experiences of distances and duration⁵⁰. There is some truth in the doctrine, no doubt, for experience is needed to develop our ideas of space and time.

But Locke does not see that distance and duration are nothing but parts of space and time so that it is an argument in a circle to derive the ideas of space and time from the experiences of distance and duration. It is Kant—who comes much later in the history of philosophy—who logically showed that the ideals of space and time are not derived from experience; rather, our experience presupposes the ideas of space and time. According to Locke we can set no limit to space or time. The ideas of Immensity and Eternity are, therefore, purely negative ideas. We cannot form any positive idea of immensity and Eternity because they cannot be experienced. To form the complex ideas of an infinite space and an infinite time, we may add together the units of particular spaces and times and stretch them infinitely. Locke, however, does not explain why there should be this mental obligation to go on adding together units of space and time⁴⁴.

BASICS OF KNOWLEDGE ACQUISITION IN ARTIFICIAL INTELLIGENCE

Just like Lockean epistemology, machines (including computers and its ancillaries) are created with empty memory and therefore needs data (computer programs) before it can be used it be used for any purposes. Data is the essential ingredient that makes AI work. Without data, there is no learning, no intelligence, no innovation. Lockean epistemology can be seen as a mechanism by which AI systems acquire knowledge. Machine learning algorithms, for instance, learn from data in a manner that parallels human learning

processes. AI systems operate on the principle of learning from experience, akin to Locke's assertion that knowledge arises from sensory input⁴⁵. There are two major types of data; human generated data and machine generated data.

Human-generated data is created by people through human action, as opposed to machine learning or other artificial means. This can include anything from text to social media posts to pictures and videos. Human-generated data is often unstructured, meaning that it does not follow a predefined format or schema. Human-generated data is valuable for AI applications because it reflects human behaviour, preferences, opinions, emotions, and creativity. It can also cater to exclusive requirements that machine-generated data cannot fulfil, such as facial recognition or speech recognition. However, human-generated data also has some drawbacks, such as: it is costly and time-consuming to collect, process and label; it is prone to errors, biases, and inconsistencies and it is limited by human capacity and availability⁴⁶.

On the other hand, machine-generated data is produced automatically by a computer process, application, or other mechanism without the active intervention of a human. This can include anything from web server logs to sensor readings to financial transactions. Machine-generated data is often structured, meaning that it follows a predefined format or schema. Machine-generated data is useful for AI applications because it is abundant, accurate, consistent, and scalable. It can also fill the gaps in human-generated data, such as generating synthetic data or augmenting existing data. However, machine-generated data also has some challenges, such as: it is difficult to interpret, understand, and explain, it is sensitive to privacy, security, and ethical issues and it is dependent on the quality and reliability of the machines and algorithms that generate it. However, artificial intelligence works (not behave) on data embedded in it. It only imitates but does not have consciousness and reflection⁴⁷.

APPLICATION OF JOHN LOCKE'S SENSORY PERCEPTION AND DATA COMPUTATION IN ARTIFICIAL INTELLIGENCE

John Locke's "Tabula Rasa" theory directly informs modern machine learning by positing that knowledge originates solely from sensory experience. In AI, this equates to treating neural networks as "blank slates" that learn exclusively through massive data ingestion (sensory input) rather than innate programming. Computational models process this raw data to identify statistical patterns, effectively turning empirical observations into abstract concepts—a process that mirrors Locke's empiricist model of human cognitive development and concept formation. Locke's Empiricism in Modern artificial intelligence architecture can be seen in the following tenets⁵⁶

- **Tabula Rasa (The Blank Slate):** In machine learning, a randomly initialized neural network begins as a blank slate with no pre-existing knowledge. It possesses a mathematical structure but contains no world models. Learning occurs only when the model is exposed to external data (sensory input), mirroring Locke's assertion that the mind at birth is a sheet of white paper void of characters⁵⁷.
- **Simple vs. Complex Ideas:** Locke argued that the mind receives "simple ideas" (e.g., color, shape) via sensation and combines them into "complex ideas" (e.g., objects, categories). Deep Learning follows this exact hierarchy:
 - **Low-Level Layers:** Detect simple features like edges, gradients, or pixels.
 - **High-Level Layers:** Aggregate these features to form complex representations, such as recognizing a human face or understanding natural language context.
- **Data as Sensory Experience:** For an AI, data *is* experience. Locke's insistence that we cannot know anything outside of

what we experience is the foundation of the "black box" problem in AI. Models are strictly bounded by the distribution of the data they are fed (the training set), meaning they lack the "innate" reasoning capabilities (rationalism) that 17th-century philosophers like Leibniz championed against Locke⁴⁸.

Computational Applications

1. **Reinforcement Learning (RL):** This is the closest computational realization of Lockean empiricism. An RL agent starts with no knowledge of its environment and learns through a cycle of observation (sensation) and action. By receiving rewards or penalties, the agent builds a "mental map" of its world based entirely on trial and error.
2. **Feature Extraction:** Just as Locke suggested that the mind sorts and classifies sensory input, Convolutional Neural Networks (CNNs) use filters to extract relevant data points. This processes raw, chaotic "sense data" (like pixels in a JPEG) into meaningful, actionable computational representations.
3. **Limitations and Challenges:** Locke's empiricism highlights why AI fails when it encounters scenarios outside its training data (out-of-distribution). Because the model relies solely on past "sensory" experience, it cannot bridge the gap to abstract, unlearned situations without human-engineered inductive biases or advanced deductive reasoning layers, revealing the inherent limits of a purely empiricist machine intelligence.

CONCLUSION

John Locke's empiricist philosophy provides a conceptual foundation for understanding modern artificial intelligence, specifically through his *tabula rasa* ("blank slate") theory. Locke argued that all knowledge originates in sensory experience rather than innate ideas. Similarly, AI models begin with a foundational

architecture—their "blank state"—and acquire "knowledge" by processing vast datasets, effectively mirroring the Lockean process of building complex associations from simple sensory-like inputs. This means that Lock can be called the progenitor of modern artificial intelligence

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