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Modelling in the Digital World – an Anti-Realist Perspective

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Abstract-This paper considers how we are constructing and modelling digital realities, and considers the relationships between digital realities and our reality using concepts from traditional anti-realist philosophy.

About a year ago, I wrote a paper applying Berkeleian idealism to the construction of Digital Realities [1]. By the term “Digital Realities”, I refer to computer systems which even if they do not go the extreme of virtual realities or online communities still contain some sense of reality within themselves; even a simple word-processor lives within its own virtual reality of button bars, menus, virtual paper etc. My original motivation for attempting to apply an 18th century concept such as Berkeleian idealism [2] to a modern construct was mainly pure curiosity (philosophy in the strictest sense). However a number of surprising results emerged from this analysis. The first was how useful even outdated philosophical tools were in analysing modern concepts in the computer world; the second was to highlight the uneasy relationship between digital realities and our own reality. In analogy with an observation of Wittgenstein:

“It is clear that logic may not conflict with its application. But logic must have contact with its application. Therefore logic and its application may not overlap one another.” [6]

so it is with digital and “real” realities i.e. the world we currently live in. They cannot overlap, although the sense of one subsists within the sense of the other. In this sense, although concepts in digital realities rely upon concepts in reality for their existence, we cannot apply concepts from one reality to the other. An irony is that these two conclusions are mutually contradictory, although we need the first to derive the latter. Again, an analogy with Wittgenstein’s Tractatus is applicable:

“My propositions are elucidatory in this way: he who understands me finally recognises them as senseless, when he has claimed out through them, on them, over them (He must so to speak throw away the ladder, after he has climbed up on it)” [6]

I touched on some of the implications of this on how we view digital realities, and more importantly how we should construct such realities. In this paper, I intend to investigate those implications a little more deeply, but within a more contemporary framework of antirealism. Initially to provide

some background, I will briefly rehearse some of the arguments of my earlier paper. As in that paper, I will refer to Digital Realities as DR, and our “real” reality as OR.

The basis of Berkeleian Idealism [2] is that *esse is percipi*, namely, that we only ever perceive sense-data (ideas, concepts) in the world. Berkeley took the position that all we could ever be aware of in the world were sensations or ideas – we do not perceive a chair we merely perceive a chair-like sensation or a chair-like idea. He therefore postulated that our perceptions of reality were merely interpretations of minds interacting directly by exchanging ideas. In order for the world to appear in its ordered form, or instance the continued persistence of ideas such as our chair when an object is not being perceived, Berkeley needed a supreme omnipresent mind, namely God. Hence the anecdotal questions of whether a tree makes a noise if it falls in a forest with no-one to hear it, and the equally anecdotal answer that it does make a noise since God being omnipresent hears it. In DR we have a similar situation. In modern philosophy we have more sophisticated anti-realist stances based upon similar principles that what we perceive is either a veil of sense data, which subsists, in a deeper reality which we cannot perceive or else that there is nothing behind this veil. In science for example this leads to a form of instrumentalism, which in its simplistic form views scientific theories as merely explaining our observations or the dials on our measuring instruments. For example in the field of particle physics it would deny the existence of electrons (or at least deny that we can ever prove their existence which by Occam’s Razor, i.e. do not over-elaborate if it is not necessary, is tantamount to the same thing) and delegate them as “nice” fictions to explain the traces in cloud-chambers amongst other observations.

Although at a metaphysical level DR can be considered in an atomistic sense as being constructed from individual bits, the perception of DR is determined by an interpretation of the meaning of these bits. These bits are analogous to the monads of Leibnitz [5] in that their meaning resided within their relationships to each other. When we consider what determines our perceptions of these bits, it is clear that our perceptions of DR is shaped by other minds. What you actually perceive as you traverse DR is a representation of the bits produced by the programmers and engineers behind that particular DR. In DR we therefore realise the Berkeleian sense of minds interacting directly by exchanging ideas. However within DR we no longer have the Berkeleian supreme regulatory mind. The lack of a single adjudicator has

the potential of making DR a far richer and inconsistent than we would normally regard OR to be (the regulatory nature of OR is, of course, a mute philosophical point which I will not labour here).

Of course to complicate the matter further as we move into the new “digital age” we are beginning to develop hybrid concepts which encompass both DR and OR, especially as constructs from DR such as e-Cash need to interact with and have meaning within OR. However to understand the implications of this Hybrid Reality we need to first understand the relationship of its constituent components OR and DR and how they interact. Only then will we begin to understand this new world which we are currently creating.

In order to understand the relationship between OR and DR, we need to embrace the concept of mysticism. In Eastern philosophy, there is a super-reality (SR) within which the truth of concepts in OR exist. The nature of this SR, by its very definition is unknowable, and hence mysticism does not greatly feature in the British tradition of philosophy; in the words of Wittgenstein:

"There is indeed the inexpressible. This shows itself; it is the mystical...whereof we cannot speak, thereof we must be silent" [6].

However, this mysticism is a very useful concept in this case, as the relationship between OR and SR, is very similar to the relationship between DR and OR; OR is the mystical “super-reality” within which DR resides. Again to borrow for Wittgenstein

“The sense of the world must lie outside the world. In the world everything is as it is and happens as it does happen. What makes it non-accidental cannot lie *in* the world, for otherwise this would again be accidental.” [6]

The logic of OR is in fact a transcendental logic of DR, in that we can build limits within the logics of a computer system, so a “being” within that system would not be able to comprehend logic available within DR which is beyond the built in limits of its occupied system. However, the lack of a regulatory mind as mentioned above implies that DR is extremely rich in that the rules that govern the physics of its reality is limited only by the imagination of its creator. Again to quote Wittgenstein we have

"There is no causal nexus which justifies such an inference. The events of the future cannot be inferred from those of the present. Superstition is the belief in the causal nexus" [6].

The anti-realist stance of my argument as regard our perceptions of DR, is namely that we never perceive anything in DR except through someone else’s interpretation: we are always perceiving someone else’s logical construct; DR gives

us an arena in which we can convert ideas into “reality”. However in order to understand how people react and work within DR, which as computers and the internet become even further embedded into common society, we need to understand the uneasy “mystical” relationship between OR and DR. The “unease” in this relationship is that although the meaning of concepts within DR subsist within OR, there is no necessary requirement for concepts within DR to have analogues in OR. In general it is not a necessary fact that we can use the intellectual framework derived from our experiences in OR to comprehend DR. However, as can be seen from the ease at which we can apply philosophical concepts grounded in OR to DR, there does appear to be some contingent and unnervingly close relationship between concepts of both. For example, I have recently been working with a number of projects looking at how traditional library and archival practices map into their electronic counterparts. In many cases, the practices inherent in the physical world map almost directly to similar processes in the electronic world with one significant proviso: there are differences in degree but not in nature. For example, there is a lot of concern about preservation of electronic information. It is often regarded as different from physical information since it can quickly become useless, even though the binary data can still be read, for instance when the software required to read the file format has become obsolete. This situation does, however, occur in the physical world. We have very early documents written in Linear-A, which we can no longer read. The difference is in degree; it took generations for languages to become obsolete, whereas software can become obsolete within a single generation. Many other cases of differential between physical and electronic analogues can be fitted into this basic principle.

The degree part of this principle is fairly easy to explain. Computers are continually increasing in power and speed. Advances in networking and communications are increasing the speed and ease by which computers communicate. Commercial pressures too bare on the situation, whereby it is important to improve the functionality of both hardware and software in order to maintain a sellable commodity. The result is that time passes very quickly in DR. This has a number of unfortunate repercussions. The first is that computer science is still a very young discipline, and in many ways poorly understood. However, peoples perceptions greatly exaggerate where we really stand with this technology, with the result that there are many projects which fail due to too much being promised in too short a time frame. A more serious failing is the recognition of a fundamental bottleneck in any useful computer system, namely that of the human which participates in the DR being constructed. Internet communications is an example of this. The speed at which it is now possible to transmit e-mail, often obscures the fact that the recipient still needs the same amount of time to deal with the e-mail and respond to it as with normal “snail-mail”. Instant transmission of e-mail does

not imply instant response. Moreover the increase in degree of the ease by which communications can be sent via e-mail results in a typical recipient receiving far more communications than was previously the case, hence the speed at which e-mail can be dealt with, slows accordingly. An increase in speed and accessibility has not increased our ability to communicate. The problems being discussed in preservation of electronic media have arisen because DR has developed at rates beyond which the social infrastructures for managing the information can cope. The computer industry has been overly concerned with the technical bottlenecks, but has paid little heed to the social ones.

As an aside it is interesting to note (as an example of the contingent links between OR and DR) that one method the industry has used to overcome technical bottlenecks, namely the parallel execution of conditional branches is analogous to the quantum physics wave function; in modern CPU's the outcome of both branches of a conditional are calculated simultaneously before the conditional is calculated, the false branch being abandoned when the conditional is calculated: in quantum physics the wave function holds all possible outcomes, the false ones being "abandoned" (i.e. the wave function collapsed to a single value) when an observation takes place.

The second part of our contingent principle that DR differs from OR in degree rather than nature can be analysed in terms of the Berkeleyian Idealism expressed above. We can regard our interactions with DR as an exchange of ideas between minds, that of the observer or participant in DR, and that of the designers and programmers behind that particular aspect of DR. Both these have a role to play in the particular perception of DR: the programmer in that we can only ever perceive someone else's interpretation of the fundamental bits that ultimately constitute DR; and of course the ultimate observer will always place their own spin on what is being observed. I will consider the latter first, as ironically, as will become apparent, this also shapes the interpretations that the designers of DR try to project. Typically we interpret DR using the same inductive framework that we use for interpreting OR. We interpret our perceptions in both OR and DR, based on our past experiences. As Hume writes

"the mind is convinced by reasoning of the principle that instances of which we have no experience, must necessarily resemble those of which we have" [4]

Typically our past experiences will be solely or primarily based in OR, and hence we superimpose our understanding of the principles of OR onto DR. Viewed under this light it is not surprising that younger generations who have been brought up with computers find DR easier to deal with since their past experiences intrinsically include experiences of DR from a formative age. In effect we are building models grounded in OR to explain our experiences and interactions

within DR. However these models are often extremely effective, proviso the principle mentioned above of differences in degree rather than nature. One explanation for this is that we are using models grounded in OR to construct DR, and I will cover this shortly. However, I do not consider it too surprising that we can construct effective models of DR in OR, without implying that DR and OR necessarily share concepts by considering anti-realist views of how we build mathematical models in the sciences. Essentially we perceive patterns in OR where none necessarily exist:

"Objects have no discoverable connection together; nor is it from any other principle but custom operating upon the imagination, that we can draw any inference from the appearance of one to the existence of another" [4]

This is similar to Wittgenstein's observation on the lack of a causal nexus quoted above. The instrumentalist stance to science claims that we construct models of the universe in physics, we are not really describing the universe, but instead creating mathematical fictions, which have certain predictive properties, which match the currently observed phenomenon. Entities such as electrons, which cannot be directly observed, do not have any "real" existence but are just convenient constructs in our model. This stance explains why the universe appears to be mathematical. In fact it is not, but since mathematics is a language for describing patterns and relationships, it readily lends itself to building these fictional models. The same can be applied to our perceptual models of DR. The mental framework we have constructed to interpret these fictional patterns in OR, is by its nature suited to interpreting fictional patterns in DR. As in the physical sciences, we need to be always ready to refine or even reject our existing perceptual models given new evidence. This is particularly pertinent to our models of DR, since DR can differ in often quite subtle ways from our expectations of OR. For example, in user interface design, there is often a tendency to mimic physical objects. This can cause confusion since the analogy can only go so far, and there will always be some difference between the replica in DR and the real version in OR.

The other reason for the contingent similarity between OR and DR, as touched on above, is based on the way in which we construct entities in DR. Most of the time we build constructs in DR which mirror OR; there are two possible explanations for this:

The first is an assumption that for various reasons it is better to limit our constructions in DR to those that mirror similar constructs in OR, either because people find it easier to work in DR when the constructs and principles are familiar to them from OR, and the other is that the processes we have developed in OR are effective in DR. The fact that we interpret constructs in DR along OR lines tend to support these reasons, however I would claim that neither of these

reasons are necessary truths. Whilst it is true that familiarity reduces the learning curve, it is not necessarily the case that a system, which involves a shallow learning curve, is the most effective. There are many software packages that have a very complicated interface, but are more efficient when used by a competent user, than a similar package with a simpler interface when also used by a competent user. Whilst I would not propose abandoning principles of good user interface design, I would argue that we should not be limited to OR concepts when designing such things. Ultimately people have to learn to cope with extremely complex ideas in OR, and the same should be applicable to DR. Making DR overly familiar gives a false sense of security which often undermines the goal of making users more comfortable with DR when the differences become apparent. The above argument is based on purely philosophical reasoning but empirically it is also supported by evidence within the Information Science community on the problems associated with metaphor and logical analogues in interface design. Anne Hamilton [3] gives a good summary of this material.

The second reason springs from how we build computer systems which perform some task previously performed solely within OR. Often it is the case that the process in OR is modelled within DR without any major modifications to the process itself. This stems partly from the perceived need to maintain familiarity (this has strong social reasons, as a totally alien process would probably be rejected by the existing users of the process, although this rejection may not be made on particularly strong grounds) and partly the perception that all that modelling the process in DR can offer is enhanced speed or changes in degree rather than nature. If DR can really offer nothing more than changes in degree, then it is sound that a process, which has been developed and refined over some, time in OR, should be transferred with little modification into DR. However, it is likely that an entirely different process may be more effective in DR, but which either would not be so effective or possibly not even realisable in OR. The problem here is how to think in purely DR terms without letting our pre-conceptions of OR interfere.

This is where the second reason for our constructs in DR to follow OR concepts, and this follows on from Hume's concepts behind the nature of ideas:

“That all our simple ideas in their first appearance are derived from simple impressions, which are correspondent to them, and which they exactly represent” [4]

and complex ideas are derived by combining these simple ideas. Since interaction of DR is essentially a direct interaction of minds and exchange of ideas, we are only limited by our imagination as to what we can construct within DR. However, if the philosophy of ideas are expounded by Hume is correct the only ideas that we can exchange within DR are ideas which are ultimately derived from our

experiences in OR. Whilst in theory DR is not limited by the concepts or logics from OR, in practice since DR is a man-made reality and can never be more than what we make it, DR is circumscribed by experiences and logics of OR: it can never realise its potential unless we break out of the mental frameworks imposed upon us by our experience of OR. Ironically, there is a circularity here, in that DR if it realised its full potential could provide a reality in which we can break out of these bonds, but in order for use to realise such a potential DR we already need to have broken out of these bonds. Whether DR will ever realise its potential therefore revolves on whether all ideas must derive from experience. Currently DR seems to support the Humean view of ideas, but this may be because of current practice rather than a necessary fact.

To conclude, DR has the potential to far surpass the restrictions of our concepts of OR. However there seems to be a contingent truth that whilst DR is alien when compared to OR, it in fact in most cases only differs in OR by factors of degree rather than factors of nature. This may be due to current practices which perpetuate this myth believing that DR can only differ in degree and offer little more than OR in terms of nature or which feel we need to ground concepts of DR in OR in order for DR to be comprehensible. However, it may be the case that this contingent resemblance between DR and OR is more deeply rooted in how we build our perceptual models of the universe.

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