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# Computer Game Space as Directional Space

## How to orient myself in computer game space?

### *Introduction*

It is argued that spatiality plays a primary role in computer games since computer games are "essentially concerned with spatial representation and negotiation". (Aarseth, 2007: 44) I subscribe to the assumption that spatiality plays an essential role in computer games. I will argue, however, that spatiality as such does not serve a *primary* role in computer games.

In this paper my main theses are the following:

i) Directionality plays a primary role in spatial orientation.

ii) We (I/as avatar) have a mental capacity, or power, that enables us to differentiate between directions in space.

iii) i) and ii) are properties that are necessary conditions for the possibility of spatial orientation both in virtual and real spaces.

My directionality analysis is a novel approach to the problem of spatiality and spatial navigation in computer games in that it gives an analysis of a common basis for spatial orientation both in virtual and physical space.

The way spatiality normally appears in computer games is through the perspective, or the view, of the avatar – either from a first person perspective or from a detached third person perspective. It is often argued, then, that spatiality in computer games is *invisible*, or appears as an *as-if spatiality,* to the perceiver (the avatar). One of the *implicatures* of such a view on game space is that normal, or physical, space is taken to be something *visible* and *real*. It turns out, however, that the conception of real space is often conflated with the conception of physical space. In what follows, I will clarify some of these conceptions in order to get to terms with what the *differences* between them are, and in order to show how they are *related*.

***Space as virtual, physical and real***

A game space is said to appear as *virtual* first and foremost due to its non-physical appearance, that is, due to its lack of, among other things, gravity and impenetrability, in addition to exhibiting a primarily *visual* depiction of depth (three-dimensionality). I regard these as some of the most essential properties of virtual space that distinguishes it from its physical counterpart.

One of the main problems with this conception of a game space is that it emphasises the *visual* as that which constitutes spatiality. As a consequence, spatial orientation is explained primarily by reference to movements in relation to visual signs, marks and (virtual) objects. This way of explaining spatial orientation echoes the Leibnizian *relational theory* of space (and time) where space is thought to exist only as a relation between objects. On this view, space does not have an existence independently of those objects. Space is accounted for in purely logical (or mathematical) terms where spatial relations and directional oppositions are treated as relations in a logical space.

In what follows, I will argue that such a logical conception of space, with its attached logical conditions for spatial orientation, does not allow for an account of *directionality* as such, since directionality within this logical (relational) picture of space is a result of an abstraction from a relation between objects in space. Instead, we need a conception of space as *real* where real space is a condition for orientation *both* in virtual, logical (mathematical) and physical spaces.

But what about games that challenge spatiality and orientation as such, that is, games that do not primarily play on navigation between (virtual) objects or marks but instead are playing with our capacity for orientation? Do they challenge the relational view on space in that they to a greater extent explicate the system of directionality as such and not the (visual) objects in space? One example of such games is *Portal* but we find several others like, for instance, *Antichamber* (playing with the laws of nature wandering through non-Euclidean spaces) and Fez (playing with different dimensionalities from 2D and upwards (echoes Flatland), etc.)

***On our capacity for navigating in multidimensional game spaces***

As we see from the examples of different "space games" above, some versions of computer games can be used in order to display different spatial structures such as, for instance, multidimensionality, hyperspaces, and the like. I mentioned the computer game *Portal* as an example of such a game. In this game, the avatar navigates in multidimensional spaces were it moves, for instance, in and out of different wormholes. A *wormhole* (also known as an *Einstein–Rosen bridge*) is a hypothetical topological feature of spacetime within the general theory of relativity that would be, fundamentally, a shortcut through spacetime, that is, moving from one point in space to another without crossing the space between. Wormholes are primarily an unvisualisable structure existing in four or more dimensions. Interestingly, the game *Portal* sets out to visualise this unvisualisable thought experiment form physics (watch physicists at Nottingham University discuss wormholes and the computer game *Portal* here: http://www.youtube.com/watch?v=WmwEH7JVAus).

Does this play with the avatar in multidimensional space indicate that when acting via our avatar in a computer game, we are able to interact with, and orient ourselves in, multidimensional spaces and in wormholes? My answer is yes and no. The game *Portal* exemplifies such a possibility but what exactly do we do when we orient ourselves in this game space (*Portal*)? In order to answer the question, I will look into our capacity for orientation and how it is related to the system of directions. Since the avatar plays the game on behalf of a human being, the capacity for orientation of the human being should consequently be regarded as a relevant departure point for the analysis.

***On directionality and our capacity for spatial orientation***

As human beings we have a mental capacity, or power, that enables us to differentiate between directions in space. This capacity for orientation is an effort of the mind of which we are conscious through a feeling that is neither a discursive thought nor a receptivity of the senses.

In the following, I will consider some of Kant's arguments in his work *Attempt to Introduce the Concept of Negative Magnitudes into Philosophy* (*Negative Magnitudes*) from 1763 in order to clarify the conception of direction(s). In this work, Kant gives, among other things, an analysis of the status of the *real* in contrast to the *logical*; of *real oppositions*; of the real as a *ground* a priori; of the *unanalysable* (primitive) *concepts* (of a real ground) and of the *inner feeling* of oppositions. This analysis represents an alternative to the Leibnizian relational conception of space that I touched upon above.

In the *Negative Magnitudes*, Kant argues that *realities* (of which a real ground is an example) are *negative magnitudes* and as such they stand in a relation of "real opposition". What, then, is a 'negative magnitude'? Kant answers the question as follows:

"A magnitude is, relative to another magnitude, negative, in so far as it can only be combined with it by means of oppositions; in other words, it can only be combined with it so that the one magnitude cancels as much in the other as is equal to itself." (*Negative Magnitudes*, 2: 174)

That a magnitude is *negative* implies that it is combined with another magnitude in *opposition* (think left and right, up and down, etc.). This does not mean that the magnitude itself is negative, but rather the opposite; it is *positive*. Kant unambiguously states that each of the magnitudes that are involved in a real opposition is something *positive*, that is, the one magnitude is *not* a logical negation of the other. At 2: 174 in the *Negative Magnitudes*, Kant writes: "It is only when the former [magnitude, AL] is combined with the latter [magnitude, AL] that it contains the ground of negation." By applying the name "negative" to the magnitudes involved in this relation, Kant sets out to designate that they are real opposites.

If we look at Kant's example of our hands as incongruent counterparts in his more famous work *Concerning the Ultimate Ground of the Differentiation of Directions in Space* from 1768, we see that the left and the right hand stand in a reciprocal relation, that is, a real opposition: The direction left stands in a real opposition to the position right in the sense that a purely logical negation of 'left' does not (necessarily) give 'right'. Instead, if we move from left to the right, left is still something positive but in the change of movement towards the opposite directionality, direction *right* is now cancelling out direction *left* as a result of the opposite motion. *Left* is still 'something' (positive) but it is cancelled out by the movement *in the right direction*. (Imagine a continuous movement in an opposite direction from another direction in a vector space.)

Interestingly, Kant argues that a real opposition occurs when "two predicates of a thing are opposed to each other, but not through the law of contradiction." (*Negative Magnitudes*, 2: 171) From this we see that negative magnitudes concern *properties* of objects, not the objects themselves. This coincides with Kant's discussion of directions, like left and right, in the *Directions*, where he argues that *directions are spatial properties and not objects*. Another similarity is Kant's emphasis that directions do not

represent a logical but a real opposition (against Leibniz). From the analysis above, we see that there is a possibility of considering the different directions in space as *negative magnitudes* and that their reciprocal relation exhibits a *real opposition*.

Further, in a real opposition, the determinations which conflict with each other (like left and right) must simultaneously *exist in the same subject*. This is a prerequisite for a real opposition of negative magnitudes to be possible. In order to explain this further, we need to take into consideration that negative magnitudes are also *intensive magnitudes* and that such magnitudes are measured in *degrees*.

An example of such an intensive magnitude is *force* (or power) since force is measured *intensively*; the parts of a force are not external to each other. According to Kant, the same goes for directions. For instance, the further to the left you move, the less to the right you are positioned, seen from the agent's (the avatar's) vantage point. Properties like, for instance, "left-ness", of intensive magnitudes are measured intensively in the sense that each property is not considered an external part vis-à-vis the other unity.

Seen on the background of this analysis, our capacity for spatial orientation can neither be derived from a representation of relation between objects (or marks) in space (as a spatial relationalists would claim) nor is it derived from any logical (or mathematical) definitions of spatial relations and configurations. In other words, our capacity for differentiating directions is a capacity to relate to spatial directions as *real*, not logical, or sensibly relational, reciprocal relations.

This implies, among other things, that the absence of a spatial direction does not represent a purely logical negation of the other direction. For instance, the absence of left does not mean "not-left", where we get "right" as a result. Instead, both left and right are real oppositions that do not cancel each other out as logical oppositions do. Instead, they come in degrees. For example, through a continuous movement leftwards, right becomes left when crossing the "origo" which is the perpendicular line that is represented by the vertical axes of our body.

In my account of our capacity for spatial orientation, I have presented an analysis that may be described as an analysis of our *proto-proprioceptive* capacities exhibited through the exercise of our mental powers upon our spatial environment (or spatiality as such). When Kant argues that we have an *inner feeling* of the difference between left and right, the feeling in question is not a sensible one. Instead it is a form of self-affection that is caused by our bodily configuration yet it is not reducible to the body as a spatial entity (*Körper*). Instead, the focus is on the body exhibiting a primitive oppositional structure of directionality by which all other spatial representations are conditioned (*Leib*).

Due to this basic structure, we are always primarily embedded in a three-dimensional Euclidean space and our spatial perspectives are conditioned by that. From this it follows, among other things, that when we are situated in non-Euclidean spaces, we will continue to orient ourselves on the basis of a three-dimensional Euclidean scheme of orientation. So when orienting ourselves in, for instance the game *Portal*, we have to draw on our fundamental axes of orientation in the sense that we immediately perform sequential cuts and mappings, bits by bits, in order to interpret the surroundings as spatially meaningful and orientable to us.

I have argued that there is a *real* basis for our capacity for spatial orientation in that we have a capacity for exercising powers establishing oppositional structures that exhibit a system of directions (from our vantage point as "origo") which make orientation in both physical and virtual space possible.

***Literature***


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***Computer Games***


- Antichamber (http://store.steampowered.com/app/219890)
- Fez (http://store.steampowered.com/app/224760/)
- Portal (http://www.youtube.com/watch?v=TluRVBhmf8w)