Periscope and live fixations (2017)

Periscope is a live video streaming social media app for iOS and Android, with an in-browser desktop iteration, enabling near real time connection with your contacts and other users broadcasting publicly. The ways in which the software works technically, brings different media together through a GUI and layering of comments, emojis and vector graphics layered on top of the video streams are worthy of investigation in terms of the way they come together to form a concretised platform. The potential effects of this kind of hybridity have been outlined by Manovich in the example of Google Maps and Street View.

> Since May 2007, Google Maps has offered Street Views that add panoramic photo-based views of city streets to other media types already used in Google Maps. A hybrid between photography and interfaces for space navigation, Street Views allows users to navigate through a space on a street level by clicking on the arrows superimposed on the panoramic photographs.
> (Manovich, L p182 2013)

Where Google Maps uses stitched together photographs as you zoom in 'beyond' the 2d Cartesian map, Periscope offers a number of live streams depending on how many are active or recent streams are present. This is arguably the quickest format presently available to access a video stream of most populated areas of the world, at least where Periscope is active. This prompts the idea of 'ambient findability' (Morville, P p3 2005) the 'ability to select our sources and choose our news'. While not immune to the filter bubble effect, the map viewport and 2 second time delay are features that, in combination, add weight to co-founder Beykpour's assertion that Periscope is a 'platform for truth' (Curtis, S 2015). The idea of offering the immediacy of Twitter combined with live video from the broadcaster's device came to Beykpour in Istanbul during a protest that broke out in Taksim square.

> …it's silly that there are all these smartphones with high-speed internet connections and thousands of people who walk by the street that my hotel's on every day. Why isn't there a way for me to see through their eyes what's happening right now? We decided, let's try and build the closest thing to a teleportation device that we can.
> (Curtis, S 2015)

However, without the map viewport where the user can potentially check another source a matter of meters they would not be able to verify that the footage isn't fake. On the trajectory towards ambient findability and virtual presence, the Google Map / Street View hybrid has a feel of being a precursor to yet unrealised platform where the 360 views will be realised as live streamed video. Periscope offers an improvised solution in this case due to a

pre-existing ubiquity of smartphones with cameras. Indeed, since early 2016 is has been possible to connect with a GoPro device capable of recording and broadcasting 360 video. A further adaptation of pre existing hardware, is the use of the accelerometer (or gyroscope) present in contemporary smartphones to navigate viewing angle by rotation of the device.

Launched in 2015, the Periscope iOS app was competing with Meerkat and was favoured by Twitter who acquired it for a reported $100m before its official launch (Periscope (app), Wikipedia, 2017). Marginal performance differences persuaded Twitter of Periscope's superiority which is arguably where it still out performs rivals in 2017. Introducing an innovative functionality to the world of social media is not easy in an environment that demands low latency, which Periscope was able to provide to better effect than Meerkat which operated at a 30 second delay (Tatton-Brown, M 2015). The ability to broadcast to followers only rather than fully publically provided users with access to more relevant videos, but once Twitter had blocked Meerkat's access to its social map they could no longer compete in any case (Periscope (app), Wikipedia, 2017).

In 2017, Periscope is currently going through an interesting phase, facing new competition and arguably falling behind considering the introduction of Facebook Live and other social media platforms now offering live streaming functionality. The idea of Periscope becoming a platform that stands on its own the same way that Instagram does from Facebook now seems less likely to be sustained long term. However, with the capacity already outlined of web and mobile applications can be updated swiftly, a 'Go Live' button added to the Twitter smartphone apps in response as of December 2016 (Heathman, A 2016).

Comparison with competitor apps is valid and needed, but rather than do that here, it may be interesting to consider some of the technical aspects of the Periscope platform and how they may have affected initial success. Even with the increased integration with the Twitter platform it still provides the most concise hybrid of the map, video stream and lists, even if it is the least direct in its purpose.

> Software solves relational problems by acting as a catalyst for transductions to occur and sustaining individuations within a modulation. Code thus transduces everyday life, alternatively modulating sociospatial relations. From this perspective, space is transduced — bought into being — as a part of a provisional solution to an ongoing set of relational problems. Coded space and code/space occurs where the transduction of space is mediated by or is dependent on software.
> (Kitchen, R and Dodge, M p72 2011)

Some of the problems that Periscope is responding to have already been mentioned: live coverage of emerging world news, verification of news as real or fake, the scalability and detail level of maps and variations on these

themes. At its core, it is responding to problems of space/time, as Beykpour has suggested in the quote used earlier, it aims to allow for teleportation. Taking this understanding of relational space as being 'brought into being', and the significant effects code and software can have on it, it is easy to think that Periscope can have an active role in the space in which it is present, and that the video streams themselves become new spaces. In Code/Space, Kitchen and Dodge observe that analysis of software often occurs 'as if people and things exist in time only, with space a mere neutral backdrop' (p13). It is possible that software is often preconceived with a greater bias towards time, particularly with regards to social media platforms such as Twitter, owners of Periscope, being dependant on immediacy. On one level, in a visual sense, Periscope can be said to be concerned with space, both through a 2d Cartesian map and the lens based visual representations of space that it facilitates. It is through the combination of these features that it can be said play a role in bringing space into being. In the spaces where Periscope is being used this would create a 'coded space' where the environment is partly reliant code to transform it. However, it could also be argued that Periscope creates new code-dependant spaces beyond the physical environment they are in. In this instance, transduction of space is less to do with the moving image of the space being broadcast and more to do with the layers of code that have been brought together to create the platform.

> Our original vision was to have the viewers affect the experience by asking things, so we had to have two-second latency. That meant we had to throw away everything else that was out there and write our own encoding and decoding format.
> (Curtis, S 2015)

From the same article referenced earlier, Beykpour alludes to importance of low latency in allowing for real time communication. It is not entirely clear what is meant by writing their own encoding / decoding format. This may have been something present in early version to get initial high speeds. Alternatively, he may be referring to the specific combination of protocols and flexible streaming software. At present, Periscope relies on the Real-Time Messaging Protocol (RTMP) via Wowza Streaming Engine software which transcodes the input in real time using various codecs, usually H.264, and can output using different protocols depending on the device (https://www.wowza.com/docs/wowza-transcoder). In any case, it was by using a faster, not a more efficient or higher fidelity system for broadcasting video, that Periscope initially attained success. Meerkat had put quality first by using the HTTP Live Streaming Protocol (HLS), as the co-founder Ben Rubin has indicated in comments on the Product Hunt website.

> "I'm in love with HLS. For Meerkat use case HLS is better despite the 10-15 sec delay as it giving advantages in stable, crystal clear quality. We can use it to shift stream to audio only when connection is low, or do all sort of tricks."

(Rubin, B 2015) https://www.producthunt.com/posts/meerkat

HLS also scales better to a wider range of devices and connection speeds, but even a 10 second delay would be too long for a sense of bi-directional live interaction. RTMP is an old format initially developed by Macromedia, now owned by Adobe, for the Flash Video format 'flv' (Real-Time Messaging Protocol, Wikipedia 2017). The version the Wowza uses has supported the H.264 codec since 2008 and supports many file formats including .mp4, .f4v, .mov, .m4a, .m4v, .mp4a, .mp4v, .3gp, and .3g2 (Wowza Streaming Engine, Wikipedia 2017). RTMP still relies on specific players usually based on Adobe Flash Player for which support in modern browsers and devices is reducing. Therefore, other solutions such as RTSP and modified versions of HLS are being looked into, by Periscope and other platforms (Siglin, T 2017).

> Delivery is speeded up by streaming, in which the whole file is never delivered or cached by the end user and only the currently viewed parts of the video arrive at the end-user screen. Remaining bandwidth can then be used for interaction and for the additional services that streaming server software offers for traffic management, security, customer surveillance, and targeted advertising. "Value-added" services such as these and additional channels always win out over higher-quality images.
> (Cubitt, S p251 2014)

On the topic of mediation present in current streaming services replacing the TV model Cubitt alludes to further reasons as to why the compromising of the image quality is considered acceptable. Going back to the idea of Periscope as a platform for truth, the mediation present in compressed digital video can be explored. The blocky aesthetic of compressed video has been utilised paradoxically for added realism in found footage films from the Paranormal Activity series, Cloverfield and many others. With Periscope it is still an effect of low bandwidth and the limitations of ubiquitous devices and coding / decoding standards that they are optimised for. It is also worth considering, that due to the complex editing tools and commonly applied compositing techniques available through Adobe and Autodesk (Manovich, L p157) our ability to visually differentiate between real and digitally altered lens based images, even if they are moving images, is diminished. Conversely, the way in which a codec such as H.264 responds to fast jerky movement common in mobile footage is not easily reproducible as a visual effect with current video editing applications. If the Periscope broadcast is being thought of as a code dependant relational space, the highly compressed images reveal more about the way platform is functioning than a higher fidelity stream might.

> … computer functionality reveals itself through technological limitations. Bottlenecks, such as processor speed, screen resolution, color depth, or network bandwidth— 4- bit, 8- bit music, 16- color pixelized

visuals, slow rendering, compressed image and video with artifacts—create an authentic computer aesthetics, that is, the aesthetics of low-tech today.
(Goriunova, G and Shulgin, A p113 2008)

It is possible to argue that as the video quality is deliberately compromised in favour of low latency and added services, the macroblock aesthetic of Periscope broadcasts is caused by intrinsic artefacts, not glitches. The mediation occurring in the broadcasts is no different to any other H.264 encoded digital video, it is just more frequently visible to the human eye due to the restricted bitrate. The visible artefacts provide an insight into the logics present in the way that computers deal with images. It is interesting that limitations are interrogated in in real time by the broadcaster as part of a space coming in to being, also to some extent by the viewers interacting through comments and likes. A live stream can easily be faked by pointing your camera another screen showing pre recorded footage or through a more sophisticated system, but in relation to the quick access to supporting information within and outside of Periscope it should be easy to detect.

The idea of Periscope being a provisional solution fits with the ways in which mobile and web based software does not work towards a final version but a flexible platform that can be seamlessly updated at any moment. The unusually limited resolution experience that is in use at present is just one iteration that will eventually change over time as mobile internet speeds increase and more efficient codecs and protocols are developed. It is not always the case, however that we have access to the most efficient formats as soon as they are released. The dominant H.264 codec, is not the most efficient available today nor does it provide the best possible image, while the RTMP protocol is even more outdated. In the case of H.264, one reason it has been hard to displace is that modern hardware supports H.264 accelerated decoding. This makes a significant difference to performance and power consumption, so while other codecs may have the potential to perform better, if they do not have the support of major hardware developers then they will not be able to run as efficiently. Live streaming may have a role to play in the transformation of the codec landscape, but as Sean Cubitt has warned, 'in the realm of the codec we can no longer separate aesthetics from political economy' (Cubitt, S p252 2014)

> In the ultra high-definition future children will … have confidence that the imagery they perceive is no longer representational at all, but rather constitutive of reality itself.
> (Self, W 2016)

What Will Self is alluding to is that the kind of reality that we experience through our daily interaction with screens presenting moving images is increasingly less about the representational quality of the images and more about how they are transduced in real time. The reason that we are disturbed by images breaking up is not because of the aesthetic effects but because it reveals the precarious nature of this reality. The thought that it is

almost universally standardized by the H.264 codec, a limited format that assumes stillness and slow transitions enforcing this aesthetic in some ways, is a troubling thought in itself.

Live steaming services are not only dominated by codecs, but also influenced by lesser known third party companies that do a 'good enough' job with technologies in existence but do not seem to have the ability / need, to invent and truly advance the mediums available. It has proved enough that Wowza can more efficiently make use of out of date technologies designed for different purposes and fight off patents from bigger corporations on grounds making better use of their software.

The searchability of Twitter due its text based nature and hashtag system makes it a natural platform for immediate access to information, Periscope need not operate in this way as a consistently active platform, but is certainly has the potential to transform and enhance the Twitter experience, inadvertently addressing some of the problematic issues with social media despite, or perhaps because of its lack of clear goals. It should not be a matter of considering whether Periscope will be more popular than Facebook Live or other platforms. It is hard to consider live video streaming as more suited to the closed community of Facebook than the Twitter model. It may be that it is not relevant for frequent posts but certainly holds weight in some situations where Twitter cannot offer a location specific service. As a medium that in some ways operates in a more spatial sense, sheer numbers are less relevant, the value of Periscope existing without a direct purpose other with some degree of freedom to experiment in this position should hopefully continue. Beyond the map, the live data available in purely seeing the numbers of users active in a certain location provide spatial information in a way that previous forms of social media have not employed.

While a tweet functions more as status updates a live video stream may signify something of greater magnitude, whether that is a tour of an art exhibition, protest demonstration or other world event. The connection with Twitter affects this by giving the chance for the user to stream live as a kind enhanced status update. The fact that your Twitter followers can get a push notification as soon as you go live whether they are a Periscope user or not adds an important layer of hybridity that exponentially increases the likelihood of viewing live content that you would be interested in. It is important to note that this remains part of the problematic issue of social media bubble effects of algorithms that filter information that reaches the user based on previous behaviour.

To take this line of inquiry further it would be important to investigate the technical elements of Periscope that are brought together by its GUI. While the coding and decoding process of the video stream has been looked at in some detail, this could be taken further in terms of first hand research. There is a degree of information readily available on some aspects of the way Periscope operates, but there may be more scope in examination of the technical workings of software with the assistance of other practitioners with different skillsets. The other

viewports and the way they are linked as different modes of presentation of the same database, could be explored in further through research and first hand investigation. By creating a highly interactive real-time environment with the potential to experience events from a distance creates social problems as have been evident through violent acts being streamed live on different platforms. It is not my intention to ignore these issues, but rather to understand the environments that are being created on a technical level and consider how this may affect events and spaces of all kinds. Through a greater comprehension of how spaces are mediated by code and software it should be possible to arrive at more relevant solutions for problematic issues that arise in relation to live streaming platforms.

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