Report 3

DECO3200 - Human Computer Experience Design Studio
Semester 2 2012

Hanley Weng
Course Blog

Secret Lives

Goal

The installation in it's current conceptual form is a modular collection of robotic systems that communicate with one another. The aesthetic form that this communication takes, their layout, contextual influences, and the content of their discussions remain disjointed within the concept, as progress has been made to refine these aspects of the work.

Following the deep conceptual-technical research undertaken in the second report, a technical approach has been executed throughout the duration of report three. As such, this report is a technical implementation of the conceptual foundations established in the prior report.

Background

The internet provides a wealth of existing resources that are representations of communication. However, these are typically very specifically focussed resources, such as snippets of text religious scripture. It is interesting to note though that not as many sites have commenting systems as previously thought, especially not within Sydney or Australia (e.g. this includes the Sydney Morning Herald). However, these sites at times do have links to other networks such as twitter. Services such as nearby-tweets can offer tweets near the rocks, however, a conversational format is difficult to discern. Forums such as whirlpool, stack overflow and apple support communities on the other hand offer very communicative text, though are often too bulky to be passed off as casual conversation and much too focused on particular topics. The issue of narrow focus also occurs on sites such as deviantArt, though comments on photographs of civilisation and landscapes can offer quite communicative text, this can often be too centred on the artwork.

There are various pieces of generative art, poetry and text. These include A Case on Generative Art: Digital Poetry (Calvi, Buchanan, 2010), Generative Poetry with L-Systems, a Generative Poetry App , Mystery Engine, and others; Generative Poetics, Generative Poetry by geniwate that includes visuals in

the definition of poetry, documents that attempt to determine The Aesthetics of Generative Code (Cox, 2000), and ones that attempt to Permute Meaning with Generative Poetry (Evans, 2009). However, with the exception of haikus, these often provide too little meaning to be communicative.

Generative songs take a different approach and often substitute words into human-made sentences (e.g.songlyricsgenerator ,song-lyrics-generator ,feralcreature - lyrics-generator ,petelevin - countrylyrics), when they do not, they can become excessively random (anticulture - RandomLyrics). Generative haikus function on this concept also, but their short length and lists of predetermined variables aid in the human inference that they have meaning (metagenhaiku , Generative Literature (Lai, 2012)). This concept of inference has also been utilised in generating plot scenarios.

As noted in previous reports, people can become immersed in studying representations of themselves – this lends itself well to the arising visual aesthetics afforded by the kinect (e.g. as found on sites such as kinecthacks).

Also noted in previous reports are concepts that have been more utilised in the following technical implementation, namely the conceptual-technical significance of artificially intelligent debate, discussion and knowledge traversal .

In addition to text, and speech as an audio form of text, proxemics is a nonverbal communication defined as "the interrelated observations and theories of man's use of space as a specialized elaboration of culture" which largely affects one’s interpersonal communication in regards to one's relationship with humans and their surrounding space - buildings also. The definition and term was coined by Edward T. Hall (1966) .

Approach

During this report, additional technical research and implementation has been conducted in regards to coding the communicative network and speech within the piece. Work has also been done in regards to bridging the potential kinect and projection components of the piece. Additional problems were dealt with along with problems that arose with situated design.

.

Research into potential resources of communication content was initated with a brainstorm of different media-types. These included religous text, artificially intelligent linguistics, google scribe, deviantArt comment feeds, news article comment threads, tweets, generative texts, songs, and poetry, and wikipedia jumping. Through the process of prototyping simulated conversations from pseudocode related to our system, it was determined which resources were feasible. Generative songs, poetry, stories, tweets, news article comments, and forums were ommitted as potential resources due to either a common lack of human tone or resources. Generative haiku's were technically feasible, and their generic vagueness allowed humans to infer enough meaning from them that they could pass off as humane. However, the use of haiku's promote a calmer and quieter exhibition space than previously intended.

Therefore, the final and most suitable communicative resource was chosen; wikipedia jumping, which has great potential as a knowledge base of information snippets and hyperlinks. The network of linked information wikipedia provides can certainly be navigated through by our community of bots in a myriad of different ways. The concept of using wikipedia jumping as a resource also works well with previous research into the conceptual-technical value of artificially intelligent discussion, evolution and debate.

Of note, the wikipedia knowledge jumping pseudocode initially involved only one recursive rule: "Start with a random article. Grab first sentence. Follow first hyperlink and ignore anything in brackets." - this almost always lead to Philosophy. Implementation of this began with the parsing of xml representations wikipedia pages from the url: http://en.wikipedia.org/wiki/Special:Export/[pageTitle] . Various reusable java functions were created to parse these pages, and to omit nested brackets. The issue of deciding on a format to store spoken text and links were solved through the realisation that text in [[square brackets]] would not be read out loud, and hence links could be stored there whilst the relevant spoken text was extracted out of the brackets. The wikipedia jumping program was tested multiple times with two different 1000+ sets of random words, which recursively worked their way up five to ten levels of links. Errors encountered usually involved an entry not being found, a redirect, and the presence of certain symbols, artifacts or brackets. These outlieing errors were solved for and the program continued until access to all recursive sets of the sample of random words were satisfied.

.

With initial plinth dimensions determined through group discussion, and the presence of Adam's augmented projection texturing code, in conjunction with Dale's kinect-based presence detection code, a

bridge needed to be established between the projection and kinect code that would allow the setup of both in the same space, and allow both Dale and Adam room to work on aspects of the piece that would more likely be presented.

Technical inspiration was taken through some of the 3D, mathematics, and algorithms present in some ToxiLib Processing Examples – these included ThreadSphere.pde, BoxConstraintDemo.pde, KurveyCloth.pde and TerrainSteering.pde. Following a broad search of different kinect libraries, a decision was made to use SimpleOpenNi, as it was the library used in Dale's code and it was cross-platform which was useful for collaborative purposes.

Various issues were encountered throughout the implementation of the kinect-projection-bridge program. One example was the inability to get P3D or OpenGL working on my laptop – this was later solved by completely erasing my previously full "/System/Library/Java/Extensions" directory. The mathematics behind planar mapping across multiple matrixes was difficult, and eventually plugged with quick hacks, for example; the rotation of planes 360 degrees and setting the plane to the optimum desired rotation based on a 3d distance function. Less of an issue, was the need to repeat a function many times, hence personal functions were written that built upon existing ones (e.g. rotate(Vec3D v) was written to replace; rotateX(v.x), rotateY(v.y), rotateZ(v.z)). A final issue that was discovered in attempting to align the projection and kinect image in 3-dimensional space. Initial research into this misalignment of fustrums (or field of views) has shown that a Pade Transformation(kimchiandchips blog 544 , projection mapping with kinect) can be used to create a WorldXYZ map in ProjectorXY, adam has also mentioned the use of a perspective function which may work seamlessly in conjunction with peasycam (which is currently being used in the program).

Various experimental programs were derived from the goal of creating a kinect-projection-bridge program. Most notable are ones that explore the visual aesthetics that the kinect can provide, this includes a program that can take pictures of people in 3d space and stitch them together in various ways. Such kinect visual aesthetics have arisen in recent artworks, and have proven to be good visual inspiration. Regardless of sub-branching programs, the current kinect-projection-bridge program works as follows:

- presents a user (exhibitioner) with the kinect depth image of it's view.
- the user selects 3 points on the ground, this will determine the ground plane on which all augmented objects will sit upon
- the user may use the mouse to pan, zoom, and navigate around a view of the kinect's 3d space (a view that joins the kinect's webcam and depth images)
- the user may use various keyboard shortcuts to create virtual plinths of set sizes, which can then be scaled, rotated and translated – these plinths are augmented on top of the 3d space already viewable to the user

.

Mark was also aided in discovering errors with the rotating bots. This was achieved by pulling his code back to the functional basics and gradually adding layer by layer of additional code. It was discovered that his continuous buffer stream (sent out of processing), would eventually result in lagging and missing characters on the arduino end. Hence, delay was added to processing and fixed. In the long-term,

additional methods were proposed such as only acknowledging one message in the serial buffer (either the first or most recent) sent from processing, and flushing the rest, and potentially limit the messages sent from processing (e.g. when the servo does not move).

.

Matt and Tom's work on the rotating lazy susans eventually resulted in the realisation that exact angle could not be controlled though the servo alone. This is because the servo could only control velocity, whilst momentum, friction, weight etc. were contributing factors to the resulting angle. Proposed solutions included: 1. the use of an led on the base of the spinning susan, and a photosensor to determine when the two aligned as the lazy susan spun - and hence when a certain angle was reached. 2. the same concept as 1 but using buttons and grooves in the lazy susan to press buttons at certain angles. 3. the use of metallic strips under the lazy susan, and two wires - with running current, that hung loosely and could occasionally touch the strips as the susan spun – hence completing a circuit (like a switch) at certain angles. Matt later found that it would be best and easier to include two stops that prevented excessive rotation of the lazy susan.

.

Mark Mitchell, Kendrick Khoo, and I also drove and delivered the plinths. On delivery into the sentient, situated design played an interesting role allowing Mark and I to position everything. One example setup we had not contemplated on previously was one central plinth of webcams surrounded by the larger-computer-based-plinths – presenting a peek-a-boo type interaction as people browsed around the installation. Debate between Mark and I on the distance of plinths also brought into context the concept of human proxemics and zones of comfort as independent to different human characteristics, noting how we are attempting to anthropomorphize our bots.

In attempting to set up the plinths and network, we ran into many problems that we had not accounted for. This included the need for a local network connection which is being temporarily solved with a router and wifi dongles. Running server-client code on the weaker computers also proved that the communication code needs to be readjusted to accomodate for older macs - with delayed UDPs, time delays, and the destruction of voice commands (comments of frontiernerds –'text-to-speech-in-processing'). The technical implementation to destroy voice synthesis proccess was initially discarded as it did not allow the system to track when a voice had completed talking (that issue may need to be addressed through mp3 generation on the server-side), however it is interesting that it can be reused here for assuring only one voice runs at any given time.

Conclusions

Wikipedia was found to be the most suitable resource for communication content and flexible traversal for our system. Notable future work in regards to wikipedia jumping include the ability to jump between ‘pages’ – to follow a cousin hyperlink of a page, rather than traverse to a page that contains a link to the current page, or a link of the current page. Also, maintaining ‘sinks’ in the network of pages, to attract the traversal of pages to certain topics, and away from recently discussed topics. A simple example of a predetermined sentence that can be inserted into the conversation is: “Oh, I understand <previous topic> now. Could you please describe to me the meaning of <next topic> though?”, such simple predetermined sentences can be expanded upon and made more varied and generative – much like the implementation of generative texts that were initially discarded as potential resources.

If the kinect and projector are to be used, the three codes regarding these two objects needs to be consolidated. Also the alignment of field of views in the kinect and projector needs to be solved in regards to the real world setup.

Many useful technical and conceptual concepts resurfaced, even ones that were initially discarded as they were seen as having no apparent worth at the time.

Lastly, situated design is a highly benefitial process to such physical exhibitions and can provide much insight.

References

- anticulture - RandomLyrics, http://www.anticulture.net/RandomLyrics.php
- Calvi, Buchanan, 2010, A Case on Generative Art: Digital Poetry, NHTV University.
- Cox, 2000. The Aesthetics of Generative Code, CaiiA-Star, University of Plymouth
- deviantart photographs of civilisation, http://browse.deviantart.com/photography/civilization/
- Evans, 2009. Permute Meaning with Generative Poetry, University of Alabama
- feralcreature - lyrics-generator, http://feralcreature.com/lyrics-generator/
- frontiernerds comments –'text-to-speech-in-processing', http://frontiernerds.com/text-to-speech-in-processing
- generating plot scenarios, http://www.archetypewriting.com/muse/generators/plot.htm
- Generative Poetics, http://www.dataisnature.com/?p=82
- Generative Poetry App, http://www.wired.com/beyond_the_beyond/2008/03/yet-another-gen/
- Generative Poetry by geniwate, http://leonardoflores.net/post/15238579726/generative-poetry-by-geniwate
- Generative Poetry with L-Systems, http://itp.nyu.edu/~ap1607/lsys/
- Hall, Edward T. (1966). The Hidden Dimension. Anchor Books. ISBN 0-385-08476-5.
- kimchiandchips blog 544, http://www.kimchiandchips.com/blog/?p=544
- kinecthacks, http://www.kinecthacks.com/
- Lai, 2012. Generative Literature. School of Creative Media, City University of Hong Kong
- metagenhaiku, http://www.tpolm.org/~ps/recyclebinladen/metagenhaiku/
- Mystery Engine, http://mystery-engine.com/
- nearbytweets, http://nearbytweets.com/
- petelevin - countrylyrics, http://www.petelevin.com/countrylyrics.htm
- projection mapping with-kinect, http://forum.libcinder.org/topic/projection-mapping-with-kinect
- song-lyrics-generator, http://www.song-lyrics-generator.org.uk/
- songlyricsgenerator, http://www.songlyricsgenerator.com/
- Sydney Morning Herald, http://www.smh.com.au/