

Applied Hypertext Theory in a Demonstration of a Non-Sequential Audio Narrative

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Philip J. Fitzpatrick

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DATE

Dr. Steve Schneider.

Dr. Ryan Lizardi

ABSTRACT

A Non-sequential, narrative can present objects, actual or imaginary, which depict connected events, presented in a medium that affords opportunities to determine the sequence of the presentation. Non-sequential, narratives can have multiple beginnings but no end although they do offer levels of saturation. Hypertext techniques can be used as a platform for the creation of a non-sequential narrative through links to text and multimedia as hypermedia. This paper reviews Non-sequential narrative and hypertext techniques and their affordances to a reader/listener for novel exploration and new narrative creation from an existing audio narrative. A demonstration project for applying hypertext techniques to audio based on the Serial, Undisclosed and Serial Dynasty related podcasts to allow reader/listener narrative exploration and creation are also examined. The function of a future application to allow for a listener to segue directly between audio segments.

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Introduction

According to Lev Manovich, many new media objects do not tell stories; they do not have a beginning or end; in fact, they do not have any development, thematically, formally, or otherwise that would organize their elements into a sequence. Instead, they are collections of individual items, with every item possessing the same significance as any other, (Manovich, 2001, p.218). An opportunity presented by relating a non-fictional narrative like Serial in a cohesive non-sequential model using relevant tagging of segments of the audio narrative creating a hypertext of the narrative is in allowing the listener to explore the existing narrative in a manner different than that conceived by the original authors. This offers the listener the affordance of drawing out novel conclusions from personal experience provided by exploring the existing narrative in a non-sequential manner.

Tagging Audio Streams with Semantic Metadata

In general, creating a work in new media can be understood as the construction of an interface to a database, (Manovich, 1999). Semantic tagging of audio segments allows the creation of a database of metadata that allows for organization of the data to support processes requiring information. Metadata summarizes basic information about the data. Metadata allows for algorithmic processing operations like filtering and using templates on relevant or specific data. The metadata used to describe all of the events, people, places, things that are part of the narratives of the podcasts we have chosen to examine for this project all have the potential to add information value to the original media and it

is possible that the metadata may even provide more value to the listener than just listening and hopefully prove to be at least as interesting.

Ontologies about the data help manage all of this metadata by describing relationships between the data and metadata. These can be integrated into a database when combined semantically. Ontologies can provide a common terminology to enable sharing across multiple systems (Vesin, et al., 2012). "Ontologies can be combined, shared, easily extended, and used to semantically annotate different kinds of resources" (Jovanović, et al., 2009). The relationships that can be demonstrated by careful selection of semantic metadata can aid a listener to quickly find a specific character, event or other specific asset in a chosen genre.

Navigating Tagged Audio Streams

In the demonstration of this digital information product the listener is presented with a system of semantically tagged audio content. This affords the listener with the opportunity to choose different semantically tagged hyperlinks of interest relevant in some way to the content of the stream previously chosen or to step backwards and forwards through the current audio stream in five minute segments. The segment length chosen was relevant to the way the narrative is told within the Serial and Serial inspired content. The discovery and navigation of the topics covered by the audio content is demonstrated through a database of semantic tags built within TiddlyWiki. The ontology of the tags is derived from the stories told in the Serial and Serial inspired podcasts. These semantic tags, People, Groups, Places, and Events are derived from the narrative

selection and not only afford the listener the option of moving through the narrative out of sequence in an organized manner but also in a novel manner of discovery.

The Focus of This Project

So in contemporary society webpages or to be more correct, hypertexts, have become affluent forms of narratives. Hypertexts have great potential to create non-linear forms of narratives as they allow for individuals to actually interact with a story through links, images, including audio and video. The focus of this project is a digital information product that provides an example of how an implementation of hypertext techniques can be applied to provide an experience for a listener to witness a non-sequential narrative constructed through the use of a database of semantic tags derived from Serial and Serial-inspired podcast audio content. The DNA Venn diagram below (Figure. 1) illustrates where the research hopes the project will be. A database of tags describing a narrative laid open for the listener to explore built from the great and wide archive of Serial and Serial inspired podcast content.

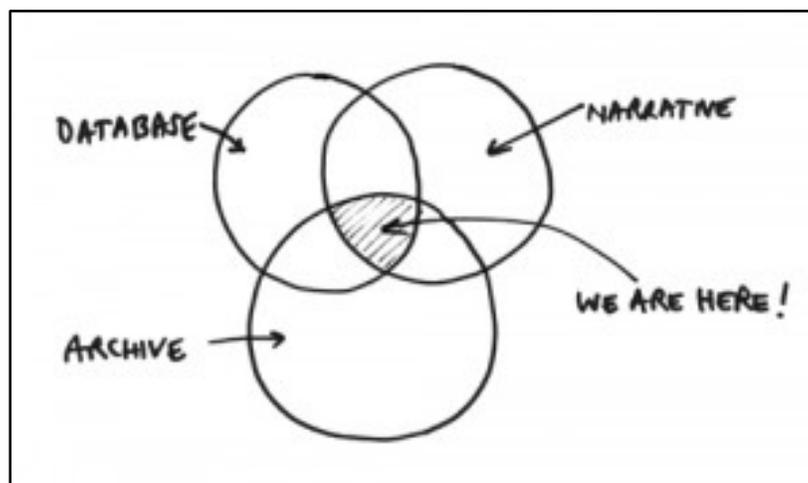


Figure.1: DNA Venn diagram retrieved from <http://www.dnasymposium.com> – A non-sequential narrative where the listener can interact with the story.

This demonstration will be built within the TiddlyWiki blogging software which will provide a framework for the project. Semantic tags will be used to create a database composed of a metadata. These semantic tags to bring together segments provided by relevant episodes from Serial and Serial-inspired podcasts as contextual and audio content. This will allow a listener to witness an audio non-sequential narrative. Various hypertext techniques including filtering, linking, sorting, tagging and transclusion used in the construction of the project are discussed. These hypertext techniques allow for the construction of the non-sequential narrative.

Literature Review

Defining Hypertext

The word "hypertext" was coined by Theodor Holm Nelson in his paper, "A File Structure for the Complex, the Changing and the Indeterminate", presented at the ACM 20th national conference in 1965. The conceptual groundwork for hypertext began much earlier with Vannevar Bush and Memex. Memex was a machine Bush an engineer hypothesized but never realized in 1945. Bush imagined Memex to be a machine that is "mechanized so that it may be consulted with exceeding speed and flexibility." The name Memex is a portmanteau of "memory" and "index", and as imagined by Bush would

provide an "enlarged intimate supplement to one's memory." In other words a way to not only access and store information mechanically out of sequence but also to provide a means to build an index of information between and within documents. In *Computer Lib / Dream Machines* in consideration for what hypertext is Nelson states that by hypertext he means non-sequential writing. (Nelson, 1974, p.44). Nelson further refines his definition of hypertext as forms of writing which branch or perform on request. Such jumpable interconnections become part of the writing, entering into the prose medium itself as a new way to provide explanations and details to the seeker. These links may be artfully arranged according to meanings or relations in the subject, and as possible tangents in the reader's mind, (Nelson, 1974, p.19).

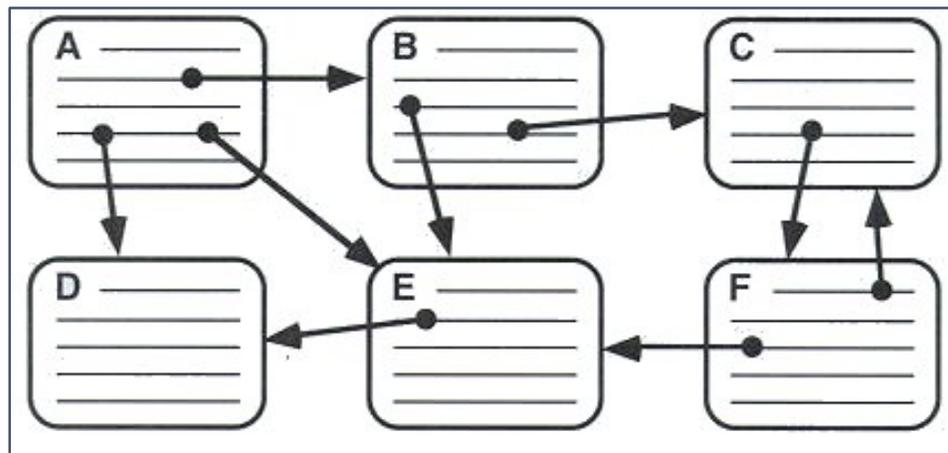


Figure.2: A Simplified Hypertext System. Retrieved from webdoc.gwdg.de - An illustration of a block mode hypertext.

As illustrated by (Figure. 2) Hypertext is a presentation of information as a linked network of nodes that a reader is free to navigate in a non-linear fashion. Ted Nelson had stated that Hypertext, As popularly conceived, is a series of text chunks connected by links which offer the reader different pathways“, (Literary Machines, 1987, p.0/2).

The American Heritage dictionary 3rd definition for “hyper” defines it to be, “existing in more than three dimensions”, as in hyperspace. The multidimensional definition of “hyper” as a concept arose in the time when Ted Nelson and others were building hyper-textuality and this definition of hyper seems to fit best when considering hypertext.

Another description of what hypertext could be is provided by George P. Landow in his book *Hypertext*. Landow tasks the reader to imagine a handful of cubes connected by straws, a cluster that almost resembles those models of molecules that illustrate articles in *National Geographic*. These cubes become “lexias” or blocks of text (Landow, 1992, p.52) and the straws are imagined to be electronic links. At this point hypertext is nothing more than electronically connected units of text or more simply text with hyperlinks. Now imagine that those little cubes are not word containers, but receptacles holding whole sentences, paragraphs, scenes, speeches--or photographs, diagrams, songs, symphonies, videotapes of vaudeville acts with barking dogs.... Consider also that those straws, now enlarged to tunnel size, can arch from one corner of the room to another without going through all the neighboring cubes along the way. The designer lays out the linkages. Instead of a neat model of a molecule, all primary colors and straight lines, we have something more like a tangled web with an appearance to something more akin to models of the human brain.

Hypermedia is the extension of hypertext to other media types and was preferred by Nelson and seems to have won out over the synonymous term “interactive multimedia”. As Nelson states, “now the word “hypertext” has become generally accepted for branching and responding text, but the corresponding word “hypermedia”,

meaning complexes of branching and responding graphics, movies and sound – as well as text – is much less used. Instead they use the strange term "interactive multimedia": this is four syllables longer, and does not express the idea of extending hypertext", (Nelson, 1997). Somewhat quixotically hypertext has come to represent more than text and the terms hypertext and hypermedia have become interchangeable in common usage. So despite the reference to text a hypertext is not concerned with what kind of media is on the other end of the link.

Hypertext Techniques

Hyperlinks Interconnect Digital Objects

A hyperlink can reference any media object that can be rendered digitally and can point to the entire body of digital media or to a specific segment within the digital media. Hyperlinks allow the interconnection of and can allow for a description of the implied relationship between disparate digital media types. A hypertext can be said to be a text with hyperlinks. The prominent Web language, HTML, does not support the separation between content and linking structures. This picture has changed after the emergence of the eXtensive Markup Language (XML). According to the specifications of the XML-based standards XPointer and XLink, links can be stored independently of the actual content. Different information objects can be linked together even if they reside in different applications as long as the applications support the above standards.

Irrespective of whether a hypertext structure really does imitate the structure of human memory and/or knowledge processing, readers of hypertext have learned to expect

that hyperlinks are used associatively and designers of hypertext systems and writers of hypertext documents construct their projects with that protocol in mind., (Jonassen, Johnson-Sheehan & Baehr). Linking to show causality is integral to the plot element framework; the links give the users a way to trace the events and reactions that form the story, (Allen and Acheson, 2000, p.16). While Nelson aptly describes how the sequential march of text was a matter of necessity. Hypertext could be said to be text with hyperlinks. George Dillion discusses the critical bridge that hyperlinks are between sequential text and liberated hypertext. The Central to the reader/viewer's processing of hypertext is the cross-modal link. By comparison with the source-to-target inferential bridge entailed in reading written text, when the link is from word to image or vice versa, the search domain is considerably larger and the process of 'bridging' tends to make text-parts and image-parts exchangeable. Web artworks seem to foster two receptive shifts, with the physical/visual elements lending to be apprehended as more emblematic or metaphorical, and the textual/verbal elements as more a pan of design and performance, than they would do elsewhere. One of the affordances of hypertext links, then, is to weave fragments together into complex signifying structures and to make us alert to how we are constantly shifting interpretive rules and frames to make sense of our world, (Dillon, 2005, p.2).

Hypertext Tagging for Semantic Keyword Descriptors

Hypertext tagging is often used in blogs allowing authors to use semantic keyword descriptions to identify objects on their websites topically or by category. This allows blogs with similar topics to be lined together by these tags to provide media consumer/authors access to related content beyond the immediate article. This differs

from HTML tagging where the tag describes an action to a web browser. As indicated by Allen and Acheson, Tagging provides a formalism for describing stories, even if it were not entirely validated ethnologically or psychologically, could be helpful for tagging the structure of stories. Narrative tags would produce a network of hypermedia links, (Allen and Acheson, 2000, p.12). A program that wants to compare or combine information across the two databases has to know that these two terms are being used to mean the same thing. Ideally, the program must have a way to discover such common meanings for whatever databases it encounters. A solution to this problem is provided by the third basic component of the Semantic Web, collections of information called ontologies. For Web researchers an ontology is a document or file that formally defines the relations among terms. The most typical kind of ontology for the Web has a taxonomy and a set of inference rules, (Berners-Lee, T., Hendler, J., & Lassila, O., 2001, p.3). Semantic Web technologies generally offer methods to formalize and share knowledge, (Jovanović, et al., 2009, Vesin, et al.).

Transclusion in Context

A key concept in Nelson's vision of hypertext (1965) is transclusion or virtual inclusion, which permits composite documents be constructed by reference to the original components rather than by making additional copies of the original reference and so aiding in modular design and reuse. For this demonstration project transclusion is useful for creating structure also. Context-neutrality where the meaning of the transcluded text should be independent of the various self-contained units that makeup the project and so should avoid confusion caused by an out of context reference.

Sorting for Relevance

Hypermedia programs have offered several content and link adaptation methods. Content adaptation methods include additional, pre-requisite, and comparative explanations; explanation variants; sorting and link adaptation methods include global and local guidance; and global and local orientation support. Meta adaptive systems include various adaptation technologies, and they automatically-select the most appropriate adaptation technology for the user and the given context. To make the best technology selection, these systems must be designed to be aware of the limits of each technology (Brusilovsky, 2003). Sorting and filtering will be used to present only relevant results to a reader/listener

Hypertext Filtering Provides Benefits of Linearity

Landow states, “As long as a thematic or other culturally coherent means of ordering is available to the reader, the fragmentation of the hypertext document does not imply the kind of entropy that such fragmentation would have in the world of print. Capacities such as full text searching, automatic linking, agents, and conceptual filtering potentially have the power to retain the benefits of hyper-textuality while insulating the reader from the ill effects of abandoning linearity, (Landow, 2006, p.110). TiddlyWiki provides a number of ways to filter the results of a query:

TiddlyWiki Filters can be used...

- with the list macro, to create a filtered tiddler list
- with the timeline macro, to create a filtered timeline
- in a shadow tiddler called “DefaultTiddlers” to define which tiddlers will open when TiddlyWiki starts
- with the startup parameter called filter, a URL parameter that defines which tiddlers open when the TiddlyWiki starts, (Tiddlywiki, 2015)

Describing a Non-Sequential Narrative

A narrative is often not the story itself but rather is a recounting of the story. As this project offers another means of recounting the story told within the Serial and Serial inspired podcasts as they are about the accounting of the events leading up to the murder of Hae Min Lee and the subsequent trial and incarceration of Adnan Syed. The term non-sequential narrative was coined by Ted Nelson in his work “Dream Machines”. Nelson explains that, “by 'hypertext' I mean non-sequential writing”, (Nelson, 1974, p.58). Hypertexts with the affordance of linking to content in any order, even out of order have great potential to create non-linear forms of narratives. Hypertext also allows individuals the ability to interact with a story using hyperlinks to not only to or within text but to other media including audio, images and video. According to Ted Nelson the sequence of linear text is evolutionary but this is not the way we think, “Ordinary writing is sequential for two reasons. First, it grew out of speech and speech-making, which have to be sequential; and second, because books are not convenient to read except in a sequence.” “But the structures of ideas are not sequential, they tie together every which

way. And when we write, we are always trying to tie things together in non-sequential ways”, (Nelson, 1974, p.58).



Figure.3: “Gasoline Alley” 1934 Sunday page, by Frank King – An illustration of a non-sequential narrative. Each cell can stand as an individual story and can be read in an order determined by the reader.

Non-sequential narratives do not necessarily have a beginning and indeed may have multiple beginnings and while they may not have an end they do present levels of saturation. As the principals of hypertext can apply to any other media type non-sequential narratives can take on many forms. Above in (Figure.3) is a visual example of

a non-sequential narrative experiment presented by Frank King in his dominical serial Gasoline Alley. It should be considered a non-sequential narrative because of Frank King's atomization of a single space into different moments. The reader is free to view the cells as an individual story and to witness the narrative of the arrangement of the whole.

An affordance of hypertext is that as part of as Manovich's describes his New Media Revolution any kind of computer mediated production, distribution and communication can be encompassed within it.

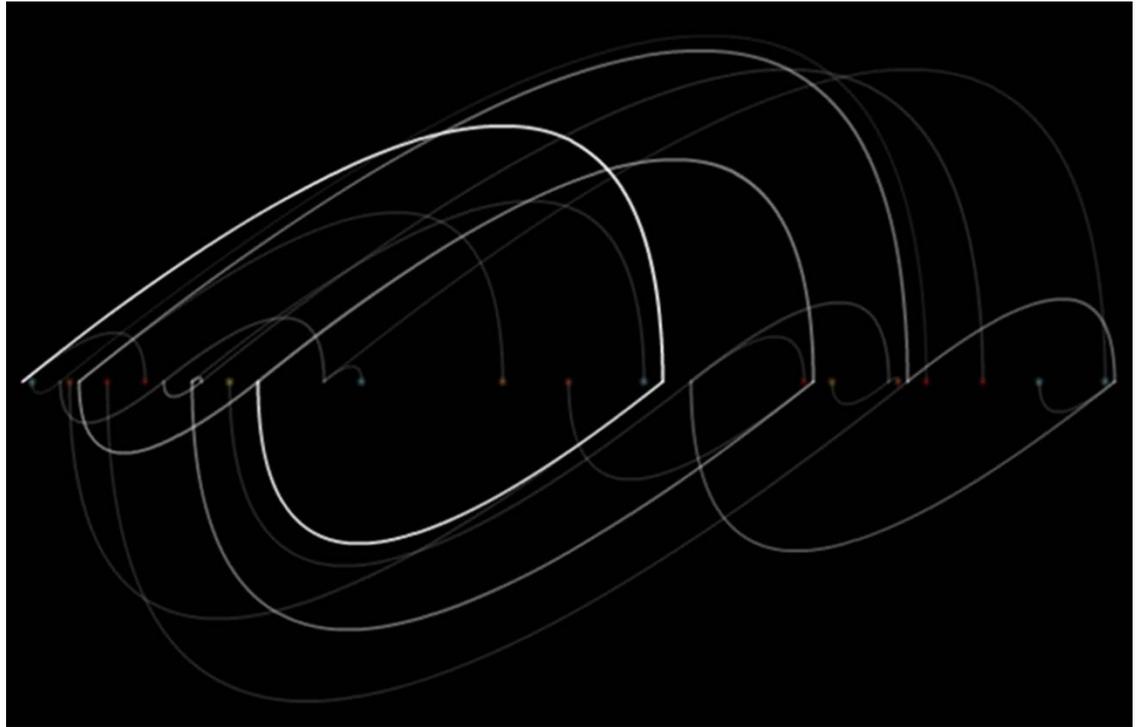


Figure.4: A diagram of the CYOA novel “A New Hope” by Christopher Gibbon from designer Christian Swinehart on his website <http://samizdat.cc/cyoa> - On his website Swinehart created animated graphs visualizing the possible reader paths within the narrative. The visualizations are color-coded and the plot of each book is divided into different structural elements and groups based on the number of choices and how positive or negative the alternate version chosen by the reader is. The twelve books are then laid out chronologically, each arranged into rows of ten pages to better reveal their structural patterns. You can even explore each of the narratives as an animated visualization. Colored dotted line indicates available jumping off and landing points for a given reader. Colored arcs indicated how positive or negative the outcome of the choice was for a given reader.

This is an example at crossing medium with non-sequential narrative is demonstrated by Designer Christian Swinehart. CYOA or “choose your own adventure” novels were a feature of the 1980’s and offered low budget interactive entertainment. In a CYOA novel a reader would in the course of the text occasionally be offered a decision that would direct the reader to a page number to continue to an alternate version of the story. An attraction of the CYOA novel was that there was an air of uncertainty to the story. Rather than locked into pre-determined twists and turns laid out before the passive reader by the author the CYOA the reader was both actor and author of the story within the confines of selections offered and with direct feedback based on those decisions.

The Podcast as a Source for a Non-Sequential Narrative

A podcast is a form of digital media that consists of an episodic series of audio or digital radio, subscribed to and downloaded through web syndication or streamed online to a computer or mobile device, (Wikipedia, Podcast). The episodic nature of most podcasts presents the opportunity connect multiple episodes from multiple podcasts using metadata in a way to allow a listener to participate in the creation of a new narrative and to highlight information ontologically about the same topics covered in the different episodes in the different podcasts.

About The Serial Podcast

According to serialpodcast.org, “Serial is a podcast from the creators of This American Life, and is hosted by Sarah Koenig. Serial tells one story - a true story - over the course of an entire season. Each season, we'll follow a plot and characters wherever

they take us”, (“serialpodcast.org: About”, 2015). For its first season Serial focused on the 1999 murder of Hae Min Lee who was an 18-year-old student at Woodlawn High School in Baltimore, Maryland and the subsequent arrest and conviction for first degree murder of Lee’s ex-boyfriend Adnan Syed. The well-constructed narrative and the intriguing story created by Koenig have spawned other successful podcasts including Bob Ruff’s Serial Dynasty and Rabia Chaudry’s Undisclosed. These later podcasts focus more on the handling of the investigation and the potential acquittal of Syed especially Chaudry’s Undisclosed.

Due to the nature of this investigation much of the commentary, evidence, interviews, opinion and even feedback are presented in a somewhat convoluted manner. Offering a reader/listener the opportunity to examine related material while listening to Serial will allow a greater insight into Lee’s murder and Syed’s possible wrongful conviction. This tool may provide what Doug Engelbart has termed bootstrapping for Serial listeners and those interested in this case. According to Engelbart bootstrapping describes when whoever is working on developing and/or deploying new/improved tools and practices for boosting Collective IQ could use what they build to boost their own effectiveness, it is providers using what they provide to become faster, smarter, more effective providers, (“Doug Englebart Institute”, 2006).

TiddlyWiki Encourages Users to Follow Content

A wiki is an information product that affords the opportunity to collaborate on structure and content. Wiki inventor Ward Cunningham wrote in a Twitter tweet in 2014 titled The Plural of Wiki is Wiki, that the word "wiki" should not be used to refer to a

single website, but rather to a mass of user-editable pages and or sites, so that a single website is not "a wiki" but "an instance of wiki". Cunningham wrote that the concept of a wiki federation, in which the same content can be hosted and edited in more than one location in a manner similar to distributed version control, meant that the concept of a single discrete "wiki" no longer made sense.

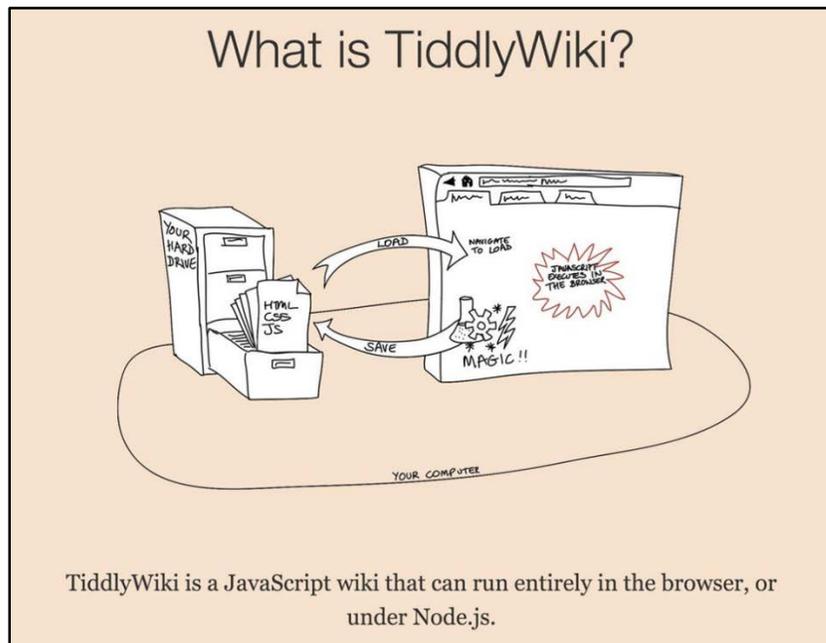


Figure. 5: Retrieved from <http://tiddlywiki.com/talkytalky>

A TiddlyWiki is an open-source single page application wiki. A single HTML file contains CSS, JavaScript, and the content. The content is divided into a series of components, or Tiddlers. A user is encouraged to read a TiddlyWiki by following links rather than sequentially scrolling down the page. Jeremy Ruston created TiddlyWiki in September of 2004 to automatically “wikify” paragraphs of content in an HTML page. As Ruston puts it “overtime it folded in on itself to become a completely self-contained wiki engine“. One of the ways TiddlyWiki differs from HTML is that listeners, readers

or even viewers are encouraged to follow links between content rather than browse content by scrolling down a page.

METHODOLOGY

Selecting Relevant Serial, Serial Dynasty and Undisclosed Podcasts

Serial, Serial Dynasty and Undisclosed podcast episodes covering a relevant topic were selected. The podcast episodes were selected to provide an initial narrative for the demonstration and to offer a selection to allow the reader/listener to change and experience the narrative in a novel fashion. Audio segments were broken out of selected episodes from Serial, Undisclosed and Serial Dynasty podcasts relevant to people, places, groups or events. The Undisclosed and Serial Dynasty podcasts were chosen because they occur in chronological story order with Undisclosed referencing Serial and Serial Dynasty referencing both Serial and Undisclosed. The way that the latter two podcasts reference back to each other and to the Serial podcast provide a structure to work through when examining the same events in the case. Undisclosed and Serial Dynasty also provide updated information regarding the case. All provide a different perspective for comparison and examination by a reader/listener. The focus of the demonstration was a part of the narrative threading through all the Serial, Undisclosed and Serial Dynasty podcasts and was narrowed topically surrounding the person of Jay Wilds and his involvement with the murder of Hae Min Lee, Jay's plea agreement and the way the investigation was carried out by the involved police agencies.

Selecting Audio and Text Content from Podcasts

The full audio podcasts were broken down topically into segments averaging three to five minutes by listening to the podcast in full and then a listener went through the podcast again and highlighted relevant segments by using timestamps to focus the segment on some part of the narrative. Audio search applications failed to function satisfactorily because of the quality of the audio and the nature of its presentation. Three to five minute segments were chosen as they allow a listener a chance to better focus on the topic of discussion in a given segment. The various transcripts consisting of the entire speech of the associated audio segment were selected for relevance to the audio segments. The transcripts either originated from the podcast producer or in cases where there were no transcripts publically available text to speech software was employed and the transcripts were checked for accuracy and corrected by listening to the associated podcast episode.

Narrative Construction Using Hypertext Concepts within TiddlyWiki

A hypermedia blogging application, TiddlyWiki, was employed to hold the meta-data and link to the content used for the demonstration. A TiddlyWiki tiddler or blog entry can hold and act on content and can be tagged with relevant terms. Tiddlers were tagged to with meaningful and appropriate tags. Tag names were created as relevant metadata terms concisely describing a person, group, place or event. A people tag applied to an actor in the narrative, for example Adnan Syed. A groups tag applied to the various organizations involved in the narrative, for example The Baltimore County Police. The places tag involved locations where action took place in the narrative, for

example Leakin Park. Events tags involved key activity of the narrative, for example Jay's arrest. Other tags used described a function of the tiddler that they were attached to, for example object which describes a tiddler that holds narrative elements. For transcripts all references of key words were tagged. Filtering was used as a way presenting metadata by a key term within a tiddler. Sorting was deployed to allow a tiddler to reformat the presentation of metadata. Audio segments and transcripts were linked to a tiddler which allowed immediate access to the material once the tag was selected. Transclusion of a tag within a tiddler allowed for a description of the narrative by describing a relationship between tags.

A Digital Information Product Provided as a Conceptual Demonstration

In the demonstration a reader/listener can select a tag within a tiddler configured as a control or a tag or transcluded tiddler within text also set in a tiddler. The listener is afforded the option to continue to listen to or read related content or can choose to follow a different tag in the same or different topic to a new tiddler containing new relevant text or audio. This allows the listener to experience the narrative in a novel fashion of their own choosing outside of the normally linear presentation of text or audio. TiddlyWiki audio transclusion presents a media player that affords the listener control over the audio segment allowing the listener to listen, stop, rewind or replay the audio segment. Transcluded tagging allows the listener or reader to listen to the current audio sample or preempt the audio to return to a previous audio segment or text or move to a new one using an available tag.

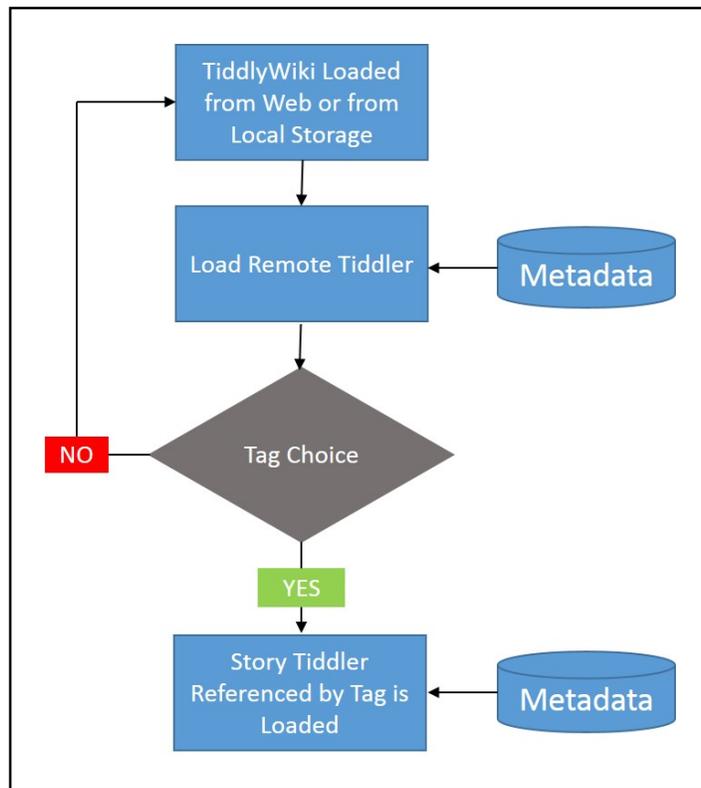


Figure. 6: An outline for a Digital Information Product Provided as a Conceptual Demonstration.

1. TiddlyWiki loaded locally or from web
2. Wiki displays Remote tiddler
3. Metadata loaded from wiki database
4. Reader/listener selects topic tag from remote
5. Wiki loads tag with hyperlink to media or story object
6. Reader/listener chooses transcluded audio
7. Reader/listener chooses hyperlink to object
8. Wiki loads tag with hyperlink to media or story object

Within the tiddler are provided relevant semantic tags. Relevant tiddlers related to the current semantic tags are transcluded within the current tiddler by means of a template functionality provided by TiddlyWiki in the main body of the tiddler.

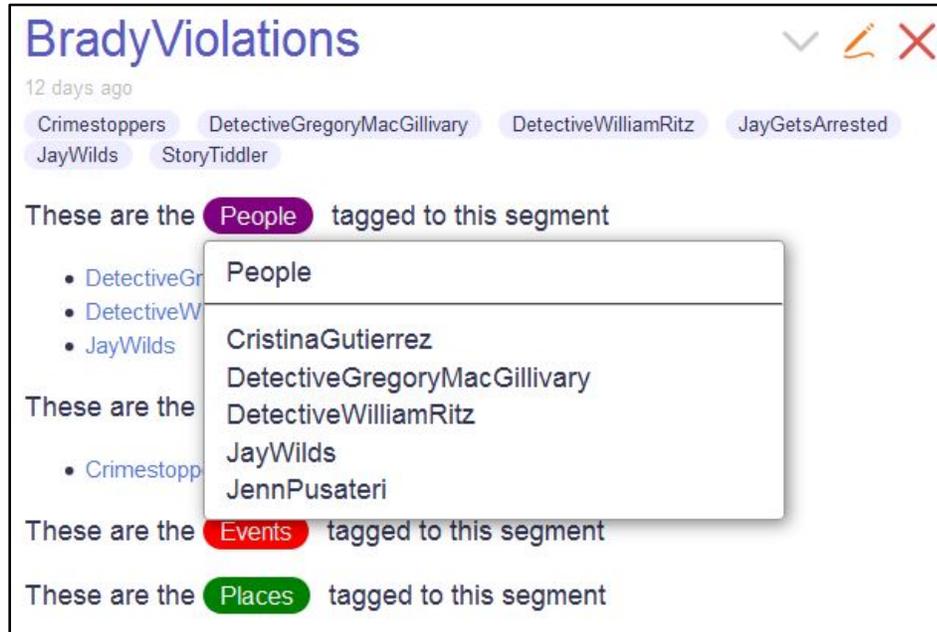


Figure. 7: A left click on any of the semantically keyed tags results in a drop down box displaying other elements that share the same tag. Clicking on any of the other elements results in the display of a separate tiddler (Figure. 8 immediately below) showing links to relevant story tiddlers associated with that element.



Figure 8. : Choosing People semantic tag and choosing Jenn Pusateri displays hyperlinks to relevant story tiddlers about her.

The bottom part of the story tiddler offers the listener the option to move back and forth between five minute segments of the currently displayed audio segment offered in the story tiddler in (Figure. 9).

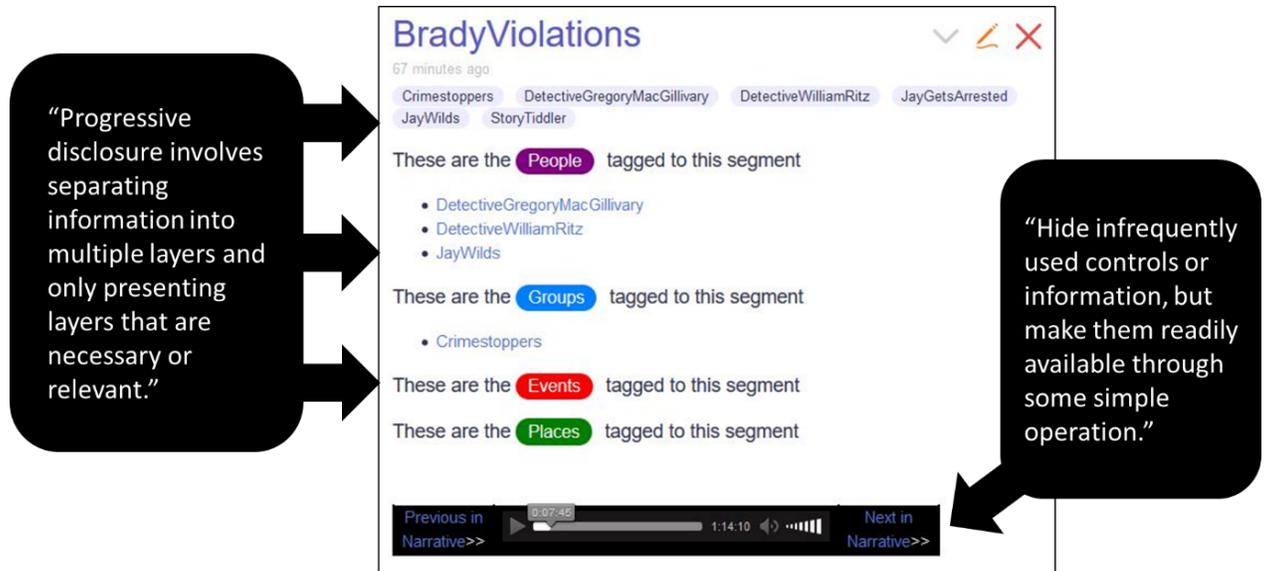


Figure.9: An illustration of a tiddler used for navigating between audio segments. - The top portion of the control contains primary tags specific to People, Group, Places and Events. The bottom half dedicated to elements that allow the listener to move back and forth between narratives.

HTML5 table provided for additional functionality and flexibility allowing for the construction of a framework in the bottom control. The control is composed of frame of filtered tiddlers tagged "segment" indicating they are segments of audio and they allow the listener to jump back and forth between the current audio segment and additional five minute segments of the current audio.

Design considerations for the control included considerations for color, consistency and progressive disclosure. As per Lidwell, Holden & Butler, (2010), "Color can, reinforce the organization and meaning of elements in a design" (p. 48). The topical tags along the top were set off in bright colors to make them stand out universally against the dark table and the white expanse of the TiddlyWiki. The color of the button to topic also affords a reader/listener the ability to recognize the buttons function without necessarily reading the text and develops an association between the button color and the

topic it is related to. As stated by Lidwell, et al. (2010), “According to the principle of consistency, systems are more usable and learnable when similar parts are expressed in similar ways” (p. 56). Tagging in TiddlyWiki maintains a constancy of shape and size of the buttons in the control which will allow a reader/listener to more readily assume the button functionality. In regards to the theory of progressive disclosure incorporating tags into a table that guides the user topically reducing complexity. As Lidwell, et al., (2010) indicate, “Progressive Disclosure is primarily used to prevent information overload, and is employed in computer user interfaces, instructional materials, and the design of physical spaces”. , (Lidwell, et al., 2010, p.186). TiddlyWiki affords tags as buttons which simplifies the operation of movement through the demonstration for the user. The different primary tags separate the content of the TiddlyWiki and expose only those elements anticipated by the listener. The primary tags expose a dropdown list with tiddlers matching the tag of interest selected allowing the reader/listener to read text related to the topic or to listen to the audio segment related to the tag. Text based tags and transclusion will be used for information not specifically related to the narrative but possibly of interest like source citation.

Collaborating With TiddlyWiki

Early in the project it was determined that there was a need to be able to share the developing TiddlyWiki. Initially this was done through DropBox file sharing software. The DropBox service and application afforded collaboration by allowing shared contents either by allowing other DropBox users access to a DropBox folder or via a link generated by the DropBox service. Contents could be accessed using the DropBox application or via a web host interface. Dropbox was replaced by GitHub as it was

thought that GitHub would afford reuse of TiddlyWiki code while continuing to offer a collaborative capability. Github is a web based expansion to the Git repository hosting service. Github is a very powerful tool for collaborative application development. Like DropBox, GitHub offers a web based client and an application and provides a limited file hosting service. Github adds distributed revision control, bug tracking, feature requests, task management and a wiki for team collaboration. Perhaps because the target audience of GitHub seems to be primarily application developers and possibly because of all of the additional functionality there is considerable overhead in the setup and configuration of GitHub over a dedicated file sharing application like DropBox. Unfortunately many of the tools provided by GitHub for collaborative application development afforded no obvious advantage for this project built within TiddlyWiki. There were a few other issues unresolved with the normally simple and straight forward GitHub file sharing. Often times GitHub would break web access to the TiddlyWiki complaining that the Tiddlywiki5 document was truncated. The decision was made to return to sharing the TiddlyWiki through DropBox for the following reasons. The affordance of the additional functionality over DropBox provided by GitHub could not be realized. The GitHub application required a multistep process to synchronize offline and online copies while DropBox was passive with updates propagated as soon as the new files were placed in shared folders while preserving shared web links. Finally that the DropBox application is much more accessible in terms of setup and use. The version of TiddlyWiki5 is relatively new so there are bound to be teething issues especially working within a comprehensive application like GitHub. The researcher imagines that as development progresses and bugs are squashed GitHub will become a suitable home for a TiddlyWiki5 wiki.

Conclusion

The subsequent research and the development of this demonstration provided the researcher with a better understanding of hypertext techniques including embedding, filtering, linking, sorting, tagging and transclusion. The use of semantic tags in the construction of a non-sequential narrative within the structure of the TiddlyWiki 5 blogging client. Even though the topic is non-fiction because the order in which the segments is not set by any author the reader/listener in a sense becomes a collective co-creator.

The TiddlyWiki 5 web blogging software with some help from HTML5 were used to create an implementation of hypertext techniques by adding navigation pointers to a relevant podcast episodes of the Serial, Serial Dynasty and Undisclosed podcasts which are all based on discussion, examination and criticism of the death of Hae Min Lee and the questionable investigation leading to the succeeding conviction for first degree murder of Adnan Syed, a former boyfriend of Lee's. Dr. Schneider's advisement was invaluable in providing the researcher with insight through discussion about the project and the research. Dr. Schneider helped to enable the researcher to conceptualize non-sequential narratives, topics in hypertext theory and the use of TiddlyWiki. TiddlyWiki 5 proved helpful in providing structure to not only hold the segments of audio but also facilitated hypertext techniques and an application or digital product a reader/listener could use for the demonstration. In some cases perceived limitations of TiddlyWiki 5

called for the use of HTML5 to add some additional functionality. This is possible because TiddlyWiki 5 is built out of HTML5 and so functionality is reciprocal to a point. As HTML5 is so intimate to TiddlyWiki adding changes directly is sometimes not possible and has to be enclosed in some other structure. At the advice of Dr. Kahn the researcher called upon design techniques like progressive disclosure to develop a simple interface to the various audio and transcript segments in HTML to encapsulate TiddlyWiki techniques to create a method for a reader/listeners to move between different audio and transcript segments and back and forth within the story.

The focus of this demonstration project was on linking audio segments into a listener controlled narrative using semantically tagged segments of audio and text. The TiddlyWiki framework due to the affordances of hypertext would be just as capable of linking to video or imagery or any other object that could be codified. As text is derived from speech and cinema is derived from both and photography they all share an inherited linear communication modality. Text offers an escape as print affords the ability to bypass preceding sections by allowing a reader to open the book to a certain page in a non-linear fashion, perhaps this is why hypertext has not yet replaced the book. The book already contained non-sequential affordances. Reference works have taken advantage of this feature by offering cutouts with keywords that allow a reader to jump to a section where desired information is likely to be and this is an affordance of a newspaper. Hypertext is decidedly non-linear but can contain links to non-linear objects. Hypertext offers a freedom of choice, to decide what media we will experience next and what order we will experience it in.

Some Thoughts on the Demonstration

Though the goals of this simple demonstration were achieved in that it allows a listener to experience an audio narrative out of sequence in a novel fashion chosen by the listener with the help of text and by using semantic tags. The project also succeeded as a demonstration of applied hypertext theory concepts applied to hypermedia and an exploration of non-sequential narrative. Some of the shortcomings realized in the construction of the demonstration are that a listener also needs to read as transcripts and other textual connections are necessary to plumb together the audio segments. Transcripts were marked up with keyword tags and transcluded tiddlers allowing a reader to experience other text or audio from within the transcript and to return to where they left off. They are out of necessity sequential so a way of connecting audio segments directly together allowing complete end to end non-segmented narrative experience would be preferable. Another shortcoming is that the method of the demonstration requires at least two actions by would be listener. It would be desirable that the playback of audio segments be immediate without a requirement for further interaction from the listener.

Considerations for a Future Hypermedia Player

A future project could be the construction of a player that integrates the functionality presented in this demonstration more fully allowing for direct media segment to segment movement controlled by the listener. Current media players possess the functionality to allow play to start at a preset location and time within a program

sequence. A listener can choose to stop existing media, change to different a different time or to start on a different location on the media.

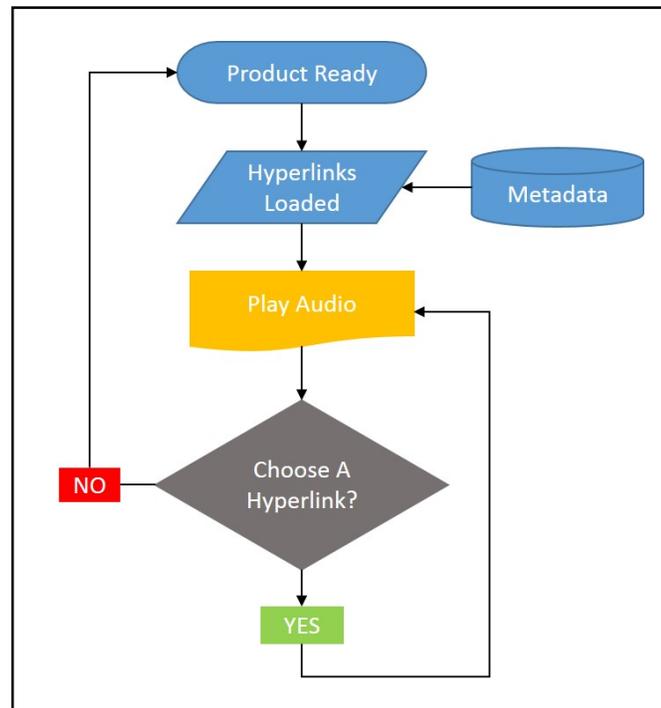


Figure. 10: Proposed Future Digital Information Product Outline

1. Product Loads from Web
2. Product Ready
3. Listener selects audio to play from an available list
4. Metadata containing relevant hyperlinks is loaded
5. Metadata is filtered to offer only relevant hyperlinks
6. During play listener receives signal that hyperlink is available in audio
7. Listener either chooses to continue to listen to current audio or to follow offered hyperlink
8. If listener chooses offered hyperlink location in current playing audio is saved
9. Metadata containing hyperlinks is loaded from database
10. Metadata is filtered to offer only relevant hyperlinks
11. Listener either chooses to continue to listen to current playing audio or to follow offered hyperlink
12. When audio is finished playing or listener stops audio and chooses to return to previous audio or to follow a new hyperlink player returns to start or continue to play audio from where previous hyperlink left off.

The hypermedia player that should succeed this demonstration inherits all previous media player affordances and as a hyper-media player that provides a method for indicating available access to different segments of a podcast or other audio narrative without interrupting the audio narrative or distracting the listener. The hypermedia player would provide be able to execute a hyperlink jump to a different, cross-referenced program segment not preset in the program sequence. A listener would control the hyper-media player by using a selection of simple controls. Where the listener can control the experience by the press a button or by making a gesture or by providing a verbal cue. This would indicate to the player to play a sample of the offered audio transclusion, another to send the player along the new audio stream and yet another to return to the original where the listener left off allowing for a true audio non-sequential narrative experience.

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Philip J. Fitzpatrick

Born: 30 August 1968 | Bronx NY

p_fitzpatrick@hotmail.com

EDUCATION

AS Psychology/Computer Science,	Rockland Community College,	1987 – 1991
BA Psychology/Computer Science,	Iona College,	1991 – 1994
MS Information Design Technology,	SUNY Polytechnic,	2013 – present

PROFESSIONAL EXPERIENCE

- Systems Network Analyst Programmer** Columbia University, Palisades NY 08/05 – Current
- Provide direct hardware and application user support for Apple and Windows clients at Lamont Doherty and Morningside facilities at the desk side and using remote access tools
 - Manage archiving system using SamFS and Solaris with Quantum ADIC tape library
 - Support Blackberry, iPhone and other smartphone clients using BIS and Exchange
 - Perform network administration, monitoring and trouble resolution for Ethernet and WiFi networking
 - Administer campus wide client backup solutions using Retrospect and cloud solutions
 - Support AV functions from production to recording and streaming using TeraDek solutions
 - Specify, recommend and purchase hardware and software
- Senior Project Leader** Kraft Foods, Walton NY 07/00 – 10/04
- Supported a team providing IT support and training for users at six production facilities based throughout NY
 - Plan, install and plant networking including switching and Ethernet and fiber termination
 - Perform software and hardware support and administration for local MPIX servers, Windows XP server over HPUX on Novell NDS and Windows directory and Windows 2000 servers on MS Active Directory network
 - Successfully executed an HPUX UNIX and Novell NetWare 3.12 to Microsoft Windows 2000 migration and as an integral part of the team moving five Kraft facilities to the company wide domain Active Directory Direct support for AS400 clients and mobile RF terminals
 - Administration and first tier support for telephony systems including Lucent Merlin and Definity PBX
 - Assist with configuration and support of PLC systems from Allan/Bradley and Modicon
 - Specified, budgeted and purchased all IT related equipment for six facilities
 - Developed and supported a systems web presence for Kraft Northeast systems and local plant use
- Systems Administrator** Amscan Holdings Inc., Elmsford NY 05/98 – 06/00
- Administration of Windows NT and NetWare servers in an industrial setting at five production facilities in NY
 - Provided assistance with DGUX to HPUX migration and HPUX user administration and client support
 - Developed and executed improvement projects
 - Specified and purchased all equipment for IT department including a complete PC and LAN retrofit
 - Support AS400 clients on mobile handheld RF terminals
- MIS Purchasing Agent** Lockheed Martin IMS, Tarrytown NY 03/95 – 05/98
- Reporting to controller performed all aspects of purchasing for MIS in house and multiple municipal projects
 - Assisted Lockheed support to research new trends in technology and evaluate vendors for projects
- Systems Specialist**
- Provided Lockheed in house systems support for Microsoft Windows NT clients on a Novell NetWare 5 LAN
 - Assist customers with SMS/800 systems configuration and database record construction