

The Never Ending Story: A Collaborative Narrative Storylog

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Abstract

This paper describes a course of research integrating the social sciences and computing technology to realize the individual inner world upon the physical world by storytelling, immersive audio, location-specific content, blog and location-aware technology. Our work aims at developing a storytelling platform which forms a new way of storytelling as postmodern literature and an unprecedented aplenty imaginative world in addition to the cognitive real world. With our *Storylog* system, the individuals would be able to engage in a form of first-person storytelling in the place they locate. Via RFID tagging and Wifi connection, all participants could conceptually contribute to an infinite narration of an invisible layer, the Fantasia upon a physical space with portable devices. Story conversation enables people to interact with the story roles as well as to interact with the real people further. With multiple users in different space and time simultaneously, our system forms the collaborative storytelling and augmented social relationships and generates a new field in social relationship and cultural discussion. The results of the experiment show that all participants are all confident to create their cognitive world accurately.

Keyword: location-aware technology, location-specific content, locative media, blog, narrative, mixed reality, storytelling, proximity-triggered interaction

1: Introductions

As in Michael Ende's *Fantasia* [1], the Childlike Empress governs the infinite kingdom and the Nah's appearance causes the biggest danger so that the Childlike Empress is deathly ill. Atreyu with Bastian was awarded the infinite power of the Childlike Empress and his goal of trek was to find the savior, a human. All of the people ever entering the *Fantasia* are saviors of the different period of the *Fantasia* and their wishes influence it immediately and make the *Fantasia* plenty. However, the *Fantasia* only exists in the book and the challenge is how to make it realize. As Shoter [2] said, "world as activities and events rather than substances and things," and therefore, the individual world forms from one's cognition instead of the real world. We think that a cognitive world consists of a

virtual imaginative world over the real space enabled by location-aware technology, storytelling media and the personal portable device. Meanwhile, the proximity-triggered interactive technology opens the road to the *Fantasia*; the infinite power of Bastian is awarded by the system designer and wishes by storytelling of people can make the immediate influences in *Fantasia* where the story effects can make the stories plenty and bring the discussion in social relation and cultural field (Figure 1).



Figure 1-1. System diagram, 1-2. A participator of Storylog

2: Prior Art

From Salamensky's theory [3], "a new kind of conversational space opens up...The particular mix of spatial metaphors and the dynamics of instantaneous communication...build a sense of belonging," there are relationships within the people, the story and the storytelling location. In technical researches, the location-based relation has developed for a long time in mixed reality and urban planning. Milgram [4] defined a Reality-Virtuality (RV) continuum as a way to define how new technologies could form new types of realities. Fisher [5] expanded the idea and developed a model for authoring media content linked to physical space, which showed the concept of a virtual layer overlapped upon the physical space. Similar concept was found in Soundscape Composition [6] which provides pre-recorded audio content at specific locations. While in the earlier works, these kinds of contents lack the relation of location and media, and thus they are against Salamensky's theory. Therefore, the later works try to make relation between multimedia and location using location-specific content. For example, SoundWalk [7] provides a guideline with vocal and background sounds but the listening mode is linear. In Location33 [8] the received multimedia contents are independent to a specific individual breaks the traditional linear listening mode of music using the walking path of the listener to

create a new song, but it is still against Salamensky's theory. The way that people are both the receivers and the creators solves the problem as Urban Tapestries [9] enables people to leave their path in the city and form a complex network. However, these works do not fulfill the implied interaction property of Salamensky's theory that people interact with each other. Patholog [10] uses weblog to create the interaction of users since Hourigan [11] argued that a blog could create more direct dialogue between readers and writers. On the other hand, that the weblog allows users to read anywhere causes the lack of linkage between location and media. Another way to promote interaction is gameplay such as Uncle Roy All Around You [12] [13], which is a special city game to enable gameplay in the real space by following online-player's directions. The street players interact with the environment instead of the people and in this mixed reality, players have no right to change the game narration. Pirates! [14] is a proximity-triggered game to make the adjacent people to interact, while this interaction occurs in the real world rather than the multimedia content space. Thus, these works might not meet Salamensky's theory.

In *Storylog*, the relation between people and location from their cognition echoes Shotter's theory; the relation between people and multimedia from their individual cultural background echoes Bakhtin's theory. Moreover, the inherent property of interaction from blogging and the game property are embedded in *Storylog*. Therefore, *Storylog* realizes the theory of Salamensky to form a meaningful and interactive story world.

3: Project Description

3.1: The Human World Consisting of Stories

A part of the human world begins from storytelling. Ong's extensive work [15] on orality and communication points to many of the characteristics of listening prior to print literacy and the recording and stockpiling of speech/sound. In the ancient times, people recorded their stories by oral history, but in the modern times people recorded their stories by writing, photo, or video. These recordings can be thought as are the different forms of the stories. Stevenson [16] has also introduced the concept of culture citizenship which is participatory and open to critique. "The power to name, construct meaning and exert control over the flow of information in contemporary societies" is his viewpoint which asserts that people produced the culture in their times. However, instead of everyone's productions being remained, only the history book or the monumental literary work last. Bakhtin's approach [17] on dialogics of space claimed that each person organizes his world through the specificities of his unique experiences. He pointed that no two bodies can occupy the same physical space because each body is unique and therefore, he emphasized the value of the individual cultural production. Due to the limitations of

recording technology, the paper documentation times is flaw that not everyone's stories were conserved. However, the flaw is filled in this digital times that all the information can be digitized and broadcast. The digitalization and broadcast are driven by two high peaks in which one is Tim Berners-Lee constructing the first WWW and the other is the weblog arising. The former causes hypertext-styled information recording and transmission but the right to publish is still hold by few people, and the latter causes a big revolution which make everyone be able to "talk" and reach the highest peak of the information detonation that forms a complete world, an aplenty and dramatic story world.

Literalizing the word "story", it means all the happened or not happened events told by people, such as history, poetry, architecture, art, science, and etc. It contains all of the human civilization in every domain.

The story has its own time axis that can describe the future and the past. Moreover, the story describes not only the real world but also the fantastic world in which everything is distorted with the Surrealism, such as animals can speak. The real world is only a part of the story. In short, the story surmounts the time and space which forms a giant kingdom from the imaginative power in individual's minds.

The individual also provides the different views as StoryCubes [18] showed, in which, "A set of StoryCubes created with a group of people builds up changeable blocks of narrative; a set of eight results in a possible ninety-six different faces, sixteen different cubes and a multitude of different relationships and new ways to tell or explore a story." In a world, more individual participation will generate more aspects and diversities and that's the reason why collaborative storytelling is interesting. The variability of storytelling by an individual is linear, while the variability by multiple storytellers is a geometric ratio. Hence, the individual participation will form an aplenty story world.

Collaborative storytelling causes the interesting "story effects." The latter story is influenced by the former stories in traditional storytelling, but the former story is also influenced by the latter stories in digital storytelling because of the complex never-ending effects of stories (Figure 2 shows the story effects: 4 big circles representing 4 individual story worlds, the dots representing the elements of a story and the arrows represent the temporal sequence of story creation). That's the difference between traditional and digital storytelling where the chronological limitations is broken and the story effects will cause the "new story" more freakish than the original story.

The story world can be thought as the virtual world of an individual's mind and the story effects also mean the "cultural effects" which merge different cultural elements (In Figure 2, an individual mind mixes with other individuals'). That's the implicit cultural blending and interaction in our work.

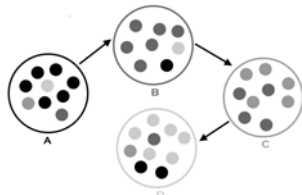


Figure 2. Story effects

3.2: Combination of Virtual Story World and Real World

The story with real and surreal properties forms a virtual layer on the real space and expands the imagination and creation of individuals. Milgram [19] defined the situation as that “The most straightforward way to view a Mixed Reality (MR) environment, therefore, is one in which real world and virtual world objects are presented together within a single display, that is, anywhere between the extrema of the virtuality continuum.” Following his definition, the *Storylog* is a mixed reality environment which mixes the virtual elements (the electronic sound and the created stories) and the real elements (the participating human, the human voice and the environment).

The traditional story world is a virtual world in which the reader uses imagination to meet the roles of the story but the mixed reality makes it as real as the Snow White and the Cinderella no longer live in a fairy tale. Instead, a listener talks to them and interacts with them such as dancing with Cinderella and even more, we can imagine that an argue between a boss and an employee becomes a holy war between the light and evil power. The digital story world has a stronger attraction than the traditional world. For example, the online game is the simplest way to make the game roles have the real personality to “talk” while no right to change the game narrations. In *Storylog*, the individual makes a vow come true by creating his narrations and has infinite right to lead the storyline.

All of the story roles become real causes the interesting opposite Augmented Reality and Augmented Virtuality relationship as Milgram defined. For example, a physical doll of Simba of the Disney cartoon “The Lion King” augments the virtuality of the virtual Simba in the cartoon world, while the virtual Simba augments the reality of a physical and tangible doll.

These kinds of relationships become extensive in *Storylog* because a role’s name in a story is virtual but the storyteller is real existence. The storyteller A forms himself as the virtual role “a” of his story. From A’s viewpoint, the virtual role “a” is augmented by the real existence of himself, and on the other hand, he is augmented by the virtual property of the role “a” (arrow 1 in Figure 3). When the listener B listens to the story and thinks that his friend F may be the role “a.” From B’s viewpoint, the virtual role “a” is augmented by the real existence of F (see arrow 2 in Figure 3) instead of A (arrow 3 in Figure 3). However, from A’s viewpoint, F is not the augmented reality of the role “a” (arrow 4 in Figure 3). The difference coming from the individual

cognition makes everyone’s cognitive story unique and echoes Bakhtin’s viewpoint.

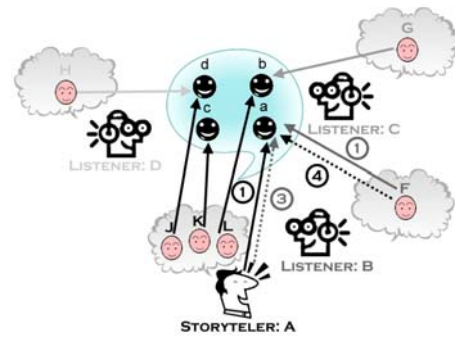


Figure 3. The augmented virtuality and augmented reality relationship in a story world with Mirror Image Effects

3.3: Story Conversation

In the real world, time and space occur simultaneously when people meet. The story role is essentially kept virtual such as “the imaginative Mr. Right,” for example, and until one day the virtuality is augmented by a real person. However, in the virtual story world, the challenge is how to make the time and space cross. When a person hears a story and finds a man similar to the story role, he meets the imaginative man, and furthermore, interacts with the man.

Through story conversation, people interact with the story roles by creating story dialogues just as the face-to-face talking in the real world and thus form the collaborative storytelling. For example, the storyteller A forms himself the virtual role “a” (dialogue circle 1 in Figure 4), and the listener B hears the story and it means that B meets “a” and forms himself the virtual role “b” and then creates the story plot to response “a” (dialogue circle 2 in Figure 4). Afterward, A finds the response of “b” and it means that A meets “b” and he also creates the story plot to response “b” (dialogue circle 3 in Figure 4). Therefore, all the story plots form their cognitive story world which only exists in their imaginative world. Precisely, the cognitive world consists of the stories by the listeners’ choice and arrangement.

The encounter of the story roles means encounter of their imaginative men who talk to each other from the different time and locations, and therefore the temporal and spatial limitation is broken to result in the two-way augmented virtuality and augmented reality relationships. This brings guess of each other but one hardly knows the real identification of each role in the real world.

The former story effect by a story teller is implicit because the influence of the individual’s storyline is unconscious, but the effect of story conversation is obvious. This meets Salamensky’s theory. If the interaction is as strong as face-to-face dialogues, it will cause the story plots blending into each other’s stories and make the fusion of the story worlds as the cultural fusion.

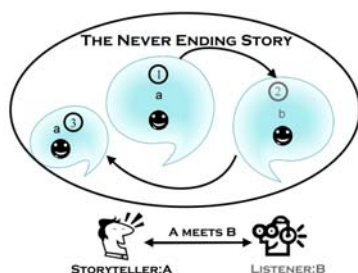


Figure 4. Story Conversation forms the collaborative storytelling

The cognitive mode also causes the interesting “mirror image effect.” When a listener makes story conversation to these story roles, he talks to the mirror images of the real people.

3.4: Immersive Audio Story

In addition to the first-person storytelling, auditory media can effectively create the immersive feeling. The sound is unique because the voice of everyone is different. The sound also keeps the emotion of people and the surrounding aura in the past so that a listener can meet the storyteller at that time and location by hearing the audio story. As Dyson [20] thought that the microphone, similar to radio, provides surrogate intimacy and “a spiritual and atmospheric nearness of broadcaster and listener,” the distances between the storyteller and the listener in the real world disappear. Hence, in *Storylog* the spatiotemporal limitation is broken. Furthermore, the auditory media are superior in mobile blog than the visual media, such as text, photo or video, since audio doesn’t disturb people during motion.

The sound passes as the time does and no one can reproduce exactly the same sound in the ancient ages. However, in the digital audio times, the situation is broken and causes a new problem, schizophrenic sound, as Metz [21] said that this “schizophrenic sound” [22] is disembodied from its source, context and time of occurrence, and becomes an abstract “aural objects” of representation. The most significant difference between the traditional audio times and digital audio times is that the sound in the concert hall duplicates anywhere through internet and causes the musical globalization. On the other hand, the Sony Walkman invention as Gay [23] terms the experience of listening to portable audio a ‘soundtrack to life’ makes people have power to decide what contents to listen, but makes the problem more serious. Furthermore, the portable recording devices, such as PDA, mobile phone and mp3 player cause a new revolution that people have the infinite power even to create the audio contents by themselves everywhere. Everyone starts to “talk,” such as audio diary and online singing and it forms a complete audio world while it still can’t stop the out-location situation and makes the problem complicated.

In *Storylog*, the meaning of sound is related to itself, the unique cultural background of individual and causes the interesting “cultural shock.” The stories by external people bring the out-cultural shock to influence the local

culture, and finally, two kinds of culture fuse to one culture, which reveals diversity as a tourist city does mostly.

Following Schafer’s work, Truax [24] developed the acoustic communication models including sound, listener, and environment in a holistic interconnected system, where sound mediates a two-way relationship between listener and environment. He pointed out the relationship between people and environment of traditional listening but its unsuitable in the digital times, and for example, in *Storylog*, the breaking of the sound and environment is fixed by the location-specific content. People can be easily insulated from the environment by wearing the headphones as Dyson said that, “the abstract nature of virtual audio and the limitations and the opportunities brought by the technology of headphones and program code create a *new space of perception and embodiment*.” That’s why the audio story attracts people’s curiosities which is invisible and untouchable but existent really and makes people immersive in the story world as Truax said that electroacoustics also puts sound under unprecedented scrutiny as well as aesthetic appreciation, fostering analytical listening.” He also argued that “an immersive environment includes the three major elements: speech, music and soundscape in which the soundscape is an imaginative audio space where people immerse. Moreover, Dyson talked about the point that “this realism is not born of the ‘real’ [but is] constructed through other media.” That’s why people can’t get strong immersive feelings from virtual objects but in *Storylog*, the immersive feelings are created by the real objects since the voice represents a real existent person, unique mind and unique cultural background of a real existent person.

The passive interaction of listening to background music, as Westerkamp [25] argued, also results in the inevitable silencing of spontaneous human soundmaking. On the other hand, people are both the storytellers and listeners that interact with the real people by interacting with the story roles, and this important interaction property echoes the Salamensky’s theory.

3.5: The STORYLOG Elements

Elements of *Storylog* are listed in the following.

1. Time

The blog is another storytelling way that echoes the Ong’s viewpoints and the time sequence in *Storylog* is embedded. The most important property from the sequential data is fast update which makes the *Storylog* keeps magical attraction forever, always with unknown things to be found.

2. Locations

The development of portable devices enables the mobile blogging that makes people blog everywhere while the sense of location is lost. The location element is amplified in *Storylog* with the audio story of unique

culture at the location of the content creator and therefore, the locative sense is kept.

3. Sound

The popularity of the consumer electronics and the digital recorders forms the background of using the vocal media. In *Storylog*, audio creates the immersive feelings and voice augments the virtual story to promote the story conversation and social interaction.

4. Narration

Narration in *Storylog* is the unique style in storytelling which makes the story plots more dramatic than the traditional blog and forms a new “storytelling language” which is collaborative and contributed from all of the participants.

5. Interaction

The interaction property is implied in *Storylog* by active listening. People listen to or create stories to response to the story roles. Therefore, the interaction reveals the social relationships of the story roles and the participants. Furthermore, the *Storylog* is a form of the postmodern literature by actually listening to audio contents in arbitrary order.

3.6: Story Semantics

Product Semantics is proposed by Reinhardt Butter and Klaus Krippendorff [26] to introduce the idea of a product as a text with levels of meaning. “Product semantics is the study of the symbolic qualities of man-made forms in the context of their use and the application of this knowledge to industrial design.” That points out the importance of the underlying meanings a form conveys and we extend the concept to yield the term “environment semantics.” That is, the environment appearance represents its underlying, meaning and for example, a Gothic building expresses and speaks for itself. In *Storylog*, the environment transfers the explicit appearance into the implicit media by tagging technology that makes the environment speak up. With proximity-triggered technology, the space with RFID tags forms spatial Wikipedia (see Figure 6 for space, and the colored cylinders represent the individual thoughts) where the individual puts his thought, his story world and his cognitive story place, and keeps the sense of place. In additions, tagging brings awareness of people to notice the ignorant but important things which might be the underlying semantics of the environment in the great cultural kingdom of *Storylog*. This brings about the concept of “story semantics” where a story reveals the unique culture of an individual at specific location. The story semantics could be thought as piled story units created by different individuals over a same spatial location, and could be further interpreted by superimposing story images over physical world. Culture fusion of individuals could result from collaborative storytelling, and transform a neutral “space” with absolutely mathematic property into a meaningful “place”, which is constructed with individual cognition and culture over space.

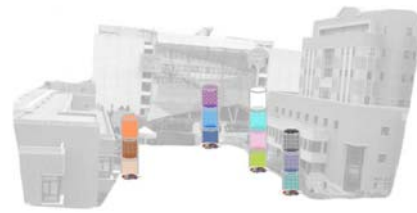


Figure 5. Spatial Wikipedia

3.7: Story and Macro Game World

Pearce [27] found major distinctions between games and other media. The narration leads the game as well as the narration leads a story. Pearce also started that, “the action of successful computer and video games is of necessity spontaneous, and not directed,” which points out the interaction as the collaborative storytelling. Furthermore, he defines a game as a structured framework consisting of a goal, obstacles, resources, rewards, and penalties. In a more general viewpoint, his architecture is also a part of the story world. White [28] thought that western journalists are trained to recognize the news value of conflict; this is one reason why video and computer games often feature conflict-based scenarios. He echoes why obstacle is the essential element in a game to attract people as an exciting story.

In the game world of our *Storylog*, every storyteller uses the first-person perspective to create the game narrations as a real game role, similar to Bolter’s [29] description of violent action games which produce a feeling of immersion in the player, through their use of linear perspective and first-person point of view. He describes that the virtual game becomes real by making immersive feeling as the first-person story creation and individual cognitive story sequencing.

Therefore, from the macro view, the *Storylog* is a giant multi-player game with real world adventure and reveals the human life.

4: User Scenario

4.1: Step1: Entering the Fantasia- The Proximity-Triggered Technology Tagging the Story World

A *Storylog* user carries a portable device, a PDA with an RFID Reader on weekdays in the city. To avoid the forced interaction, *Storylog* attracts users’ attention by glary *Storylog* stickers embedded with the RFID tags. With the proximity-triggered technology, an RFID Reader touches a *Storylog* sticker (Figure 6-1), and the road to the Fantasia is opened. Users enter the magical story world (Figure 6-2, 6-3) downloading the interesting stories and get the immersive feeling by listening to the in-place story, the location-specific content.



Figure 6-1. Proximity-triggered Storylog with RFID tags, 6-2. The Storylog initial interface, 6-3. The listing of stoy audio files.

4.2: Steps 2: Vowing to Construct the Fantastica-The Individual Cognitive Virtual World Realized by Storytelling

Users then log in the *Storylog* System, where they can create story impromptu (Figure 7-1) and upload immediately (Figure 7-2). Metaphorically, users tag the virtual world to the real world as spatial wikipedia and make relation between the human world and the locations, as Shoter described, by realizing the individual mind, the individual story world and the individual culture. Also, this is what Bakhtin said, and forms an aplenty, complete story world, the Fantastica.

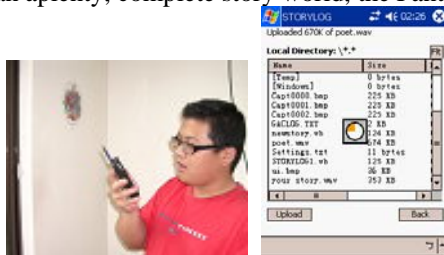


Figure 7-1. The storytelling scene, 7-2. Upload interface.

4.3: Steps 3: Interaction with the Roles in Fantastica- Story Conversation

Through story conversation, users interact with each other, as Salamensky's theory, and make collaborative storytelling to form a more plentiful story world, the infinite Fantastica.

4.4: STORYLOG System

The *Storylog* system as the Bastian of Fantastica with infinite power is fundamentally a web-based system augmented with personal media created by the PDA with an RFID sensor, and it is developed with EVB for the mobile system environment. The server is an Apache HTTP server transferring a HTML page with list of the story audio files, and the server is also an FTP server storing the users' story audio files in database with 6 directories. Each directory corresponds to a suit of user accounts and secrete codes and its unique RFID number, representing the 6 experiment locations to guarantee the accurate connection between the story and the location. When a user approaches the tagged location, the RFID detector gets the located RFID

number, and the system transfers the corresponding data list from HTTP server and sets necessary information for upload (Figure 8).

5: Story Social Relation Analysis

Users of the experiment are graduate students, 11 males and 1 female, with high familiarity, high special activity density and the long stay at a location. The locations of the experiment are located at different places in MCU campus.

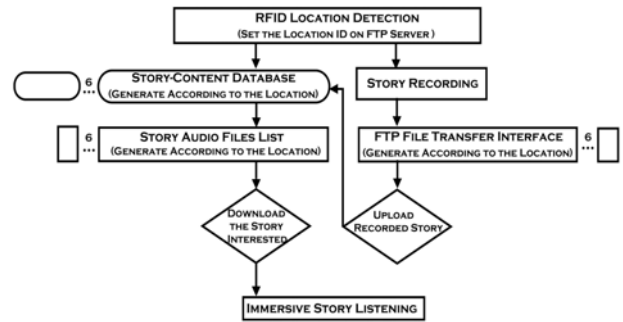


Figure 8. Storylog system architecture

We use questionnaire to survey personality subjective judgment, story roles subjective personality judgment, the properties of created story, the motion of storytelling, the real world familiar degree of all the participants in the experiment, the augmented social relationship (In Figure 9, the arrow represents the augmented relation. An arrow from A to B means that in B's viewpoint, A augments the A's avatar, and B correctly guess the relation between them.), the cognitive social circle and the satisfactory degree of the *Storylog* system.

We find the relation between the personality and the created story. The created role's personality is highly correlated to the personality of the storyteller if the similarity degree of personality is high. On the other hand, the created role with low degree means that this is an imaginative role, and it could be the man he wants to be. Therefore, the degree means the gap of the storyteller's imagination and real personality. Moreover, the high degree enhances the augmented social relationship, and that is, users realize the true and implied personality in the story world upon the real world by storytelling. During experiment, all users feel easy to create his stories and most of them think that the story world reveals their imaginative world.

Furthermore, the familiar relation in the real world and the story roles personality helps the augmented social relationships. Auditory media element makes the correct rate almost one hundred percent which proves the unique property of voice.

Besides, the higher degree of social relationships such as meeting frequency and face-to face talking divides the users into groups of acquaintances. Most of users agree that *Storylog* is more attractive than the traditional story and attracts them to listen to a story at the location expressly. Through story guess, they know

more about someone's inner personality and the degree of participation will raise when users know that their friends may be in *Storylog*. In our observation, a collaborative story is more interesting than a single created story. Interactive responses of created stories enhance the will to tell story, and improve the important social relationship in *Storylog*.

Most of the users satisfy with the *Storylog* system about the interface design, the clear function, the smooth download and upload speed and the low noise of the story audio files.

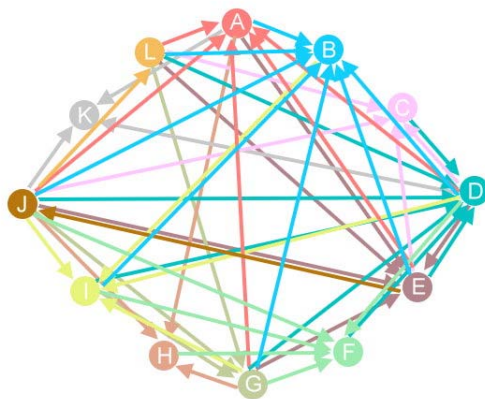


Figure 9. Network of augmented social relationships

6: Conclusion and Future Work

We have designed and built *Storylog* prototype to create an open, infinite and agnostic platform that can be configured to allow for the free-flow stories of individuals' creativity and imagination to realize the invisible cognition, the *Fantasia*. We have also implemented functions of spatial storytelling and social interaction. In addition, proximity-triggered technology opens the door of the story world that generates the augmented social relationships in the story world, and furthermore, effects the social relationships of physical world and forms participators into communities with cultural fusion.

The storyline is decided by the user's choice and the tagging keywords from the participators help people to find story roles and categories in the infinite story world.

Nevertheless, the RFID technology also has some demerits nowadays, such as the restricted range for the passive tag in the developing transition and the problem may be solved in the future.

Finally, the success of *Storylog* is not measured by how many storylines are created, but, it is by how much successful and accurate it is to concrete an individual mind, to make interaction within the "real" world, and to listen to or create stories with deeply mental connections and social relationships. In fact, all participants feel confident to create their cognitive world accurately in our observation.

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