

UDN: User-Directed News

1. Research Team

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2. Statement of Project Goals

As journalism moves into the Twenty-First Century, new forms of information technology and integrated media systems (IT&IMS) stand to revolutionize methods for acquiring, packaging, organizing and delivering information content. With these advancements in IT&IMS will come both opportunities and challenges for creating experiences (and systems to author them) that humans will find to be usable, useful and preferred options for interacting with “newsworthy” information content. While some of the basic issues that have existed for evolving journalistic contexts over the centuries (from word of mouth to print, radio and television) remain relevant, new issues will emerge for how humans will effectively interact with the deluge of digital content that will continue to expand in both quantity and scope as we move further into the information age.

User-Directed News applies different IMSC technologies, especially immersive media such as panoramic video and Remote Media Immersion, to journalism. UDN will also explore how new content systems, such as Immersive, Interactive, and Individualized Information (I4), can be adapted to the industry. These technologies allow people to become more immersed in journalism stories. Introducing IMSC technologies into the journalism industry changes both the consumer news experience and the underlying newsgathering and authoring process. The User-Directed News project or UDN envisions customized, interactive, immersive news ‘experiences’ in which people are more than passive readers or viewers. Rather than just reading or watching news, people will *experience* news events and stories.

One area where journalism could benefit from the emerging IT&IMS revolution is in the use of systems that are capable of capturing and delivering newsworthy events within more “immersive” viewing formats. As opposed to traditional “fixed-camera (and talking head)” capture and delivery of “on the scene” reporting of newsworthy events, the potential now exists with immersive media systems such as 360-degree panoramic video (360-PV) to create immersive environments that allow users to self-select what aspects of the event that they would

like to observe. This approach may serve to transform the user from simply being a passive observer of “fixed” content to an active participant in the news process. Panoramic Video, when delivered via a head-mounted display, can allow users to get the sense of actually being immersed within an ongoing event.

When immersed in this context, the user has the option to actively choose what aspects of the event that they are most interested in or are compelled to view. At the same time, *this would not eliminate the need for the news reporter*, but rather, would dynamically transform her role into that of a “news-mentor”, who could stroll freely around the camera and point out aspects of the scene that the user could either chose to view or not. Viewer choice is key here in that current single-camera approaches can indeed follow a roving reporter around an event, but do not allow for users to self-select what aspects of an event are most relevant to their interests. The combination of the “immersive” aspect of “being there” combined with free choice of viewing may provide a new paradigm for how news is created and consumed.

3. Project Role in Support of IMSC Strategic Plan

In reaching the research goals of User-Directed News, UDN will also provide new requirements for enabling technology in key research sub-areas crucial to IMSC such as multimedia content representation and structuring, integration/fusion of databased information, immersive audio, haptics, and video, and speech recognition and natural language query processing. UDN will both test the strengths and weaknesses of IMSC technologies through their application in journalism, and raise new issues and challenges.

In keeping with the interdisciplinary nature of this project, engineering research in IMSC is integrated with journalism and industry research in the Annenberg School for Communication, and in particular the Journalism School and Online Program. In addition to developing new technologies in IMSC’s labs, various aspects of User-Directed News will be tested in Annenberg’s new 3700-foot Multimedia Newsroom/Laboratory, a new experimental laboratory (currently under construction) that will have dedicated space for UDN. This relationship underlines the importance being put on bridging the gap between research and industry. User-Directed News will not only create new technologies and components for the next generation of news, but will test those modules with real content and industry professionals.

4. Discussion of Methodology Used

UDN requires both technological research and impact and usability studies. Human factor research, user testing, and social impact studies are all integral parts of the UDN project.

UDN acts as both a testbed for new IMSC technologies and a source of new research directions and challenges. Existing and future IMSC technologies will be adapted and applied to journalism, including:

- Integrating multiple immersive media, such as panoramic video and positional audio
- Using speech recognition modules to control the playback and navigation of immersive media stories
- Applying video tracking technology to 360-PV

- Linking objects in immersive media to concepts in content databases and news ontologies
- Integrating user tracking and gesture recognition to create a more immersive user interface

In adapting and applying immersive media to journalism content, a number of pragmatic and user-centered questions need to be addressed scientifically before a determination of the value of systems such as 360-PV can be made. Many of these results and conclusions can be leveraged within the different application areas and vision of IMSC such as Education, Communication and Entertainment. Some of these include:

- Will users prefer to have (news) content delivered in this format? For instance, does immersion and self-selection compel the user to prefer this method of being “involved”?
- Will content authors (reporters) be able to adapt to this more “free form” method and what challenges will this produce for delivering “stories” to users who may not chose to follow the information flow in a traditional, fixed, “linear” manner?
- Will choice of viewing interfere with the acquisition of the logical story line a reporter is trying to convey in a news report?
- Will users be able to recall key points of an event in a meaningful manner?
- What aspects or content features will be improved and what will be impaired in terms of info processing?
- What types of events would be best suited for these technologies in terms of user preference and information processing issues? What are the key elements of events that might predict successful outcomes for use of the system?
- Will users naturally explore a 360 environment and choose to use this option?
- Can we use standard HMD tracking data to quantify user exploration of the environment?

5. Short Description of Achievements in Previous Years

Initial research focused on making the news consumer feel more immersed in a media-based news story. One challenge was to combine multiple news elements – including different mediums such as video and text – into a single ‘news experience’, and to let the user interact with that story.

In a project titled Immersinews, a video-based broadcast story was created in which users learned about a civil rights museum in Watts, CA. But users did not passively watch the story. Through mouse interactions directly in the video, they could alter the narrative path through the story. Image, text and other video elements responded to the user depending on which objects they clicked in the main video.

This research helped to investigate alternative ways of exploring media, short of the fully immersive experiences that Remote Media Immersion environments will empower in the future.

5a. Detail of Accomplishments During the Past Year

A news event was created using both traditional and panoramic video about Skid Row in Los Angeles. Through the panoramic story, viewers were put in the midst of some of the harshest living conditions imaginable within a modern society. Within such newsworthy locations, the camera was strategically positioned in the midst of the event. The reporter stood in a fixed position within the field of view of one of the five camera arrays and reported the story in a traditional fashion.

The user study compared people's reaction to the news story from two groups. Group 1 viewed the (traditional) feed that came from one of the cameras' field of view containing the reporter's delivery of the story. Group 2 viewed the event within a head-mounted display, and could control their own perspective within the 360 arc, while at the same time hearing the *exact same verbal delivery* from the reporter as delivered in Group 1.

Following exposure to the two-minute story, users were tested on multiple measures of memory for the information conveyed in the story or events and on user preference for use of the system. Memory for the content of the news story was also tested one week later. As well, tracking of head turning in Group 2 produced an initial metric of exploratory behavior within a 360-degree panoramic environment. Memory for the content was tested immediately and one week later. This created initial results regarding immediate acquisition and retention of content and recall/recognition retrieval of this type of information.

6. Other Relevant Work Being Conducted and How this Project is Different

Many news organizations have experimented with creating new forms of journalism narratives, from "info games" [1] and 360-images and three-dimensional representations of information to multimedia presentations and slideshows [2] of news. But the current endeavors in this direction are time-consuming to produce, and only leverage the most basic and limited of news information. Story narratives are static, customization and interactivity is minimal [3,4], and next-generation interfaces are limited in their ambitions.

Some academic organizations such as the MIT Media Lab and the Center for New Media at the Graduate School of Journalism at Columbia University are focusing on some of the theoretical issues of UDN. These include understanding content, knowing the individual, presentation and interface and applications [5]; creating new interactive multimedia prototypes [6]; and researching acquisition technology, mobile news systems, content-based image and video retrieval and natural language retrieval and summary generation [7]. But the tangible goals in their research are isolated. They lack driving online news model such as UDN that would leverage and fully realize research breakthroughs in these areas into an integrated system.

7. Plan for the Next Year

As research into using panoramic video for journalism pieces matures, advantages and characteristics of more immersive medium will affect the planning and authoring of stories.

Journalists will work with engineers to plan out ways to capitalize on the qualities and unique features of 360-video.

Endeavors will also be undertaken to incorporate other technologies into these next-generation journalism stories. UDN will apply existing technologies in object tracking to panoramic video. And research into voice-driven commands and gesture interpretation will be added to the user experience.

8. Expected Milestones and Deliverables

Research targets beyond year focus on integrating interactive user interfaces and tracking user gestures into immersive media stories. UDN will also attempt to adapt more complex forms of immersive media to journalism, such as RMI, and to leverage new content systems such as I4.

Video region analysis, identification and tracking (Years 2-4):

The ability for the system to recognize previously identified regions/objects in video is a crucial aspect of the Automated Content Analysis requirement for User-Directed News. For this milestone, when video content is fed into the system regions (people, objects, etc.) that have been identified into previous media (and entered into a library) will be automatically recognized in the new video. Once identified, they will be tracked (and labeled) throughout the clip. There will also be authoring tools to define (unrecognized) regions and identify and enter them into the video library. This research will integrate efforts in video analysis and storage with information integration and ontology relationships.

Interactive video stories (Years 2-3):

As video is rendered, identified regions are tracked throughout video (including panoramic video). Users can click on objects and people, and more information will appear in different visual levels based on ontology relationships (to identified regions) and related content. The video story results will be evaluated by journalists for appropriateness and effectiveness of content. The content will also undergo traditional UCS studies for Performance Assessment and Perceptual User Interface.

Analysis of user in video environment (Years 3-4):

An important aspect of UDN is the analysis and tracking of users within virtual environments. Drawing from research into Robust Vision Analysis, while a user is viewing video through immersive hardware their body positioning and gestures are tracked and analyzed. A user's body position is not only analyzed, but is matched to objects in the video they are interacting with, and this data is matched with (spoken) user requests such as 'Who is that'. Leveraging research into Facial Gesture and Analysis, user expressions are also analyzed and fed into the user profile related to request satisfaction and communication style, content representation and environment preferences, etc. The research in this integration project overlaps with gesture and emotion inference work in the Communication project, and gesture interface research in the Entertainment project; common research and achievements will be shared among the projects.

9. Member Company Benefits

The development of immersive technology coincides with a time of unprecedented change in the news industry. The two trends are closely connected. As the Internet continues to grow as a vehicle for the distribution of news and information, as well as an education and entertainment medium, the audience benefits from the expansion of the broadband environment, cheaper and more efficient hardware, and the increasing power of software. Users of new media now have great expectations about what they can access online and are demanding more powerful technology, such as can be provided by immersive environments. This is particularly true in the field of journalism, where news organizations are turning more to multimedia applications and offering users more control of information networks.

The journalism industry is highly concerned about leveraging these new technologies and not losing consumers to other (competing) content industries and attractions. Many media companies want to be involved not only in bringing to market finished authoring tools, but in the research and development of these new technologies.

10. References

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