Rockefeller State Park Website
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ABSTRACT
The Rockefeller State Park website is designed to be comprehensive and easily accessible for the prospective and returning visitors to the park. This online resource uses technologies including ArcView GIS, IBM HotMedia and Java Applets to make the information experience engaging and interactive. ArcView provides GIS data about various geographical and geological features of the park like trails and slopes. IBM HotMedia provides a Rich Media experience with 360-degree panoramic tours and Zoom sequence animations. This paper presents a blue print for the website’s creation process. It discusses the information structure of the website, as well as the above-mentioned technologies and how they were utilized for this website. It concludes by identifying further enhancements and future scope.

INTRODUCTION
The Rockefeller State Park Preserve, a generous gift of the Rockefeller family, is operated by the New York State Office of Parks, Recreation and Historic Preservation. Though the Preserve is characterized by variety of habitats and activities, many people other than the local ones do not know it. There is no source of information available for the Preserve other than some flyers, which are available in the Preserve office itself, and the Friends group website [1]. The Friends group website [1] concentrates only on the activities carried out in the Preserve by the group and does not give information about the wide range of additional activities that happen in the Preserve. To attract more visitors, volunteers, and donors to the preserve, there is a need for making all this information, available at one place and easily accessible. In today’s age Internet is the most effective medium to reach people. Almost everybody has access to the computer and the Internet connection. Thus having a web presence lets you reach a wide range of audience directly into their homes. Most of the Parks in US have their website. These websites have a major share in making these parks popular. Acadia National Park is the sister park of the Rockefeller State Park Preserve and it has a very nice website [2]. It turned out that Rockefeller State Park Preserve needs an online presence for broader visibility.

The “Rockefeller State Park Website” is an attractive and interactive information gateway to the Rockefeller State Park Preserve, which will help in attracting more and more visitors to the park. This source provides historical, geographical, geological and botanical information about the preserve. It also provides information about the facilities, activities and programs in the preserve. The site act as a resource center for all kinds of information enabling visitors to know their park better and making it easier for them to participate in the various activities.

The site presents interactive trail maps providing accurate information about the trails, their slopes and the lakes in the preserve. These are generated with IBM HotMedia [3, 4] using the GIS data and the aerial photographs provided by ArcView GIS [5]. The site
also presents 360-degree panoramic tours of the park that give an immersive 3-Dimensional feel of the park to user from their home computer. These tours are also generated using HotMedia [3, 4].

There are existing sites on the Internet that develop interactive maps using HTML imageMap and JavaScript tree menu. When you click a certain trail or route on the map or its name in the tree menus, the particular trail or route blinks on the map. ZoomIn – ZoomOut functionalities are available on the web pages which can give enlarged map of any trail or any route. An example is MapQuest [6]. MapQuest includes A* Search algorithms and interactions with the user. It provides superb functionalities to a road finder but it uses traditional maps and its zoom functions only upon clicks. The most typical example of this category can be found at “Transport for London” Interactive Map [7]. With HotMedia, interaction is easier to implement and it can be made more attractive by using transition effects, mouse-over tool tips, hotlinks and zooming sequences [3, 4].

There are various sites on the web that make use of GIS data. The official website for Henderson county in North Carolina has an interactive GIS online mapping system which can be used to create maps of property and other geographical features in Henderson county [8]. The other site, GIS Online [9] is the fastest, easiest and affordable way to get current, reliable property profiles and neighborhood sales report on the Net. The information on the site is highly accurate since it is based on GIS data. “Yavapai County Interactive Mapping Application” [10] implements an integrated and cooperative GIS program among the local governments and agencies within Yavapai county. Yavapai county Government uses GIS technology throughout several departments including the Assessors office, Elections, Planning and Building, Roads and Flood Control among others, comprising nearly 200 users.

In this paper we will discuss the information structure of the website as well as key strengths of the two technologies, ArcView GIS and IBM HotMedia, and how they were utilized to create “Rockefeller State Park Preserve Information System”.

METHODOLOGY
Using technologies provided by ArcView GIS and HotMedia, the site is made into an interactive rich media experience. In addition to standard hyperlinks using HTML and JavaScript, the site contains hyper linked rich media content. The site is structured into various sections based on the kind of information provided. Access to these sections is through a hierarchical dynamic menu system. The Fig 1 shows this structure.
TECHNOLOGIES USED FOR THE SYSTEM

ARCVIEW GIS
ArcView GIS is a powerful and easy-to-use tool, made by Environmental Systems Research Institute (ESRI) that brings geographic information to your desktop [5]. ArcView gives the power to visualize, explore, query and analyze data spatially. One doesn’t need to know how to create geographic data in order to use ArcView. ArcView uses MrSID image format. This is a multiresolution wavelet-based image format that allows for a high compression ratio and fast access to large amounts of data at any
scale. Various geographical data such as roads, water sources are stored in ArcView using x, y, z coordinates for longitude, latitude and elevation. This data can overlay the aerial photograph already stored in the system. One can then create a single view with a certain data superimposed on the aerial photograph giving you a contextual image like a map of a preserve with all it’s water sources marked or a map of a county with all it’s school districts lined out. One can query data satisfying certain attributes and as a result that data gets highlighted on the view. So on the water sources view, one can get all the water sources that are more than five hundred meter in perimeter highlighted.

We were provided with the aerial photographs of Rockefeller State Park Preserve and the surrounding area in SID format and the data for trails, slopes, and streams in the area. We created a view by superimposing trail maps on the aerial photographs. Using query mechanism we highlighted each trail separately and exported the resulting view in a web usable image format, JPEG. These JPEGs were then used to create interactive trail maps with HotMedia.

**IBM HOTMEDIA**

While there have been numerous examples of rich media technology in use on the Web, most provided only a single narrow type of experience such as 3D object depiction, animation, or multi-resolution images. Most required the user to install a plug-in, which could require up to an hour to download over a modem connection. Furthermore, many depended on special media servers, an expense and maintenance overhead for Web sites. Finally, the rich media content itself was typically “heavy,” requiring the user to wait for the entire file to download before the experience could begin. With the HotMedia you can add special effects such as streaming audio, 360-degree views, animations, panning and scrolling, synchronized audio, and zoomable multi-resolution images [3, 4]. You can also add interactions and hot links, and assemble the entire experience into one file that is easily added to a Web page and delivered over today’s networks. HotMedia dynamically determines the minimal code and data content, which is needed and downloads it progressively. This code being based on Java applet technology requires no plug-in or special media servers. HotMedia works over standard HTTP protocol requiring no more than a standard Web server for all its current functionality except tracking. The HotMedia system architecture is illustrated in Fig 2 [9].

![Fig 2. HotMedia System Architecture](image-url)
HotMedia presentation files, created using a HotMedia authoring tool, are archived on the server file system and are accessible to the server-side of the architecture. The server-side comprises of a generic HTTP server and a user interaction-tracking server. Communication with the client for data requests, data delivery, and tracking information receipt use the HTTP protocol [9].

The client side display is controlled by the presentation and user interaction logic. The client architecture is comprised of a master-control module responsible for the need-based creation of media rendering components, an action-enablement kernel module, and a user-interface kernel module to handle all explicit user interaction through buttons. Together these controls the presentation state of individual media streams through their respective media rendering components. Since the HotMedia file arriving at the client from the server is a multiplexed stream of multiple media tracks, it is de-multiplexed by a de-multiplexing logic within the master class file [9].

We used three different media types provided by HotMedia- Zoom sequence, Animation and Panorama.

The complete trail map image is used to create a base map with hyperlinks. These hyperlinks use the “tool tip” property to display the trail name. A click on the trail hyperlink triggers a new page loading a “zoom sequence” to that particular trail. In the zoom sequence, the base trail map gets zoomed in to focus on the select trail in the end.

Various pictures of the Preserve were assembled into HotMedia animations. Transition effects are provided to make the animations interesting. There are hyperlinks within the animations, which take you to relevant information pages or other HotMedia presentations.

We took multiple pictures and stitched them together to form a flat panoramic image. A panorama was then created in HotMedia that displays this flat image with a cylindrical projection giving a 3-dimensional immersive feel to the viewer. This panorama again has hyperlinks that will take the user to other relevant pages or HotMedia presentations.

**HTML / JAVASCRIPT**
Web pages are created using HTML, the Hyper Text Markup Language. HTML lets you mix regular text with special tags that describe the content, layout or appearance of the text. These tags are then used by browsers like Netscape Navigator or Microsoft Internet Explorer to format the page. JavaScript is a scripting language that can be embedded in Web pages and interpreted as the pages are loaded. JavaScript can discover a lot of information about the HTML document it is in, and manipulate variety of HTML elements. We created the menu system for our using JavaScript and dynamic HTML layers. With mouse over the menu, the font of the menu changes to highlight it and submenus under that menu get displayed in a pop-up layer. The menu system is highly customizable. It is parameterized so that tasks like adding a new menu or changing the font involve changing a value of a parameter.
**USER INTERFACE**

Fig 3, 4, 5 and 6 are the screen shots of the UI:

**Fig 3. Homepage showing Interactive Tours menu**

**Fig 4. Facilities Page**
Fig 5. Interactive Trails page

Fig 6. Volunteers Page
RESULTS AND CONCLUSION
With the “Rockefeller State Park Website”, visitors of the preserve can be in touch with the preserve from the comfort of their home. They can keep themselves updated with the latest Park News, Special Events Schedule and other programs information. With the interactive trail maps and panoramic views, first time visitors can get the realistic feel of the Preserve. More serious hikers can plan their day ahead using the trail maps and accurate trail information provided on the site using the ArcView GIS data. The HotMedia makes it possible for a non-technical organization like Rockefeller state Park Preserve to easily host interactive rich media content with no need to investing special servers and software. It makes it easy to view the rich media content even for the slowest dial up connection user with no need to download large plug-ins.

RECOMMENDATION FOR FUTURE WORK
Currently any modification to the site will need modification of the content connecting to the host server and uploading a modified content. Someone with knowledge of web programming and web servers like FTP will be needed to carryout these tasks. Since such a technical person may or may not be available in the Preserve office, there should be a way for any non-technical person to update the site new content. A Web Content Manager can be developed to facilitate this. Follow-on projects can also be concerned with the creation of databases to store and algorithms to analyze and present various environmental data.

REFERENCES