


Applications of NetInteractive Documents

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Abstract

When studying a document (a Web-page, a file, a digitized brochure or document) on the internet users usually can only read, but not interact with the document or the information provider (IP for short) or other users. However, allowing users to send feedback to the IP might help the IP to improve the document, to find out user preferences, or if the users ask questions answer them professionally. However, if the users are even allowed more (like adding comments such as information, media objects or useful links) - clearly all under the control of the IP but visible to other users- they are not just helping themselves, but the IP and also other users. Indeed, why not also allow discussions (moderated by the IP) between users, to establish a link between users. By defining subgroups of users as the only ones to be able to see certain comments, things can still be made easier and better controllable. An experimental system for this has been developed and is being further enhanced, the author of this paper is one of the members of the team, the effort called Net-Interactive Documents (NID for short). Some of its many applications are described in the body of this paper. Main question might be: Why has this not been done earlier? The answer is that large IPs were worried that they would be overwhelmed by additional work. However, here the main trick is that for large amounts of information the responsibility is not with one IP, but with various groups of experts in the areas concerned.

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Categories: H.3.7, H.3.5, H.5.3, I.7.1

1 Introduction

Net Interactive Documents (NID for short) allow users looking at a document on the internet not just to read it, but to send feedback, add to it and start or participate in discussions – all controlled by experts appointed by the IP who put up the information in the first place- all associated with certain parts of the material. A detailed description of NID can be found here[1].

It has surprised the instigators of the idea Bilal Zaka and Hermann Maurer and the author, who joined later, how many interesting and different applications this approach is opening. We will describe a (certainly not complete list!) of possibilities in what follows.

2 NID for digital libraries

The first idea to use NID was for digital libraries. This means converting analog documents into digital ones in order to make them available via internet. However, the original idea of interactivity was already there. In addition to archiving documents, it is also possible to write annotations and have discussions. Another benefit for libraries is that they would also get feedback from readers. Readers have much more possibilities to use the documents, like they can enhance the text with images, videos or even links. By creating new links they can also point to other documents that might be of interest.

Maybe even more important: In a library that uses NID it can use it to encourage document-reviews that are added to documents; it can announce events and get feedback which events are more desirable than others, or suggestions for events the library administration had not thought of, or for the wish that certain documents are added to the library.

Another reason why NID stands out from other digital documents is that one can create groups of users. This group of users will then be able to have their own documents to which only they have access. This means that these documents are only visible for this group. This reading group can then have discussions among themselves and add annotations without other users noticing. This way, it is also possible to hold a reading session digitally, without major losses in terms of the lively exchange of content.

3 Conference Proceedings

NID can be a great asset as it can also be used for conference proceedings. The conference proceedings consist of a brochure with general information about the conference, and has title, authors and an abstract for each full paper. For the proceedings, the organizers/editors of the conference are responsible, and any

feedback concerning the proceedings goes to them. However, from the title and abstract of each contribution there is a link to a separate document with the full paper and/or the presentation. All matters concerning such a document go the authors, i.e. to the experts, and do not concern the editors of the proceedings. Good examples of this are EuroSpi² [2] and "Die Mongolei"[3]

4 NID for organisations as knowledge and information depot

Another important point is receiving and sharing information within an organization. If a product has special features, this must be mentioned and recorded for others, potentially over long periods.. Let's take a car as an example. A mechanic has added a small but special feature, but this is not mentioned in the manual, either because it was forgotten or simply taken for granted. Such a feature could be speed control. The speed control on my car does not brake when going downhill, meaning it exceeds the speed I set. Another frustration is that the speed control can only be increased but not decreased. This would not happen if even seemingly unimportant information is added as it is discovered directly by the mechanic in the NID document, so that other later mechanics are reminded of this. This is certainly more realistic than changing and reprinting the entire manual. Thus, new information and innovative features are not lost for future constructors and future buyers, and more and more annotations are added to the NID document thus compiling more and more knowledge in the company, even when persons are changing.

Another important application aspect of NID for organizations and companies is that they can easily distribute the documents for employees through one system. For each department a separate group is created on NID. This group then has exclusive access to the documents intended for it. This means that there are many groups on the NID server, all of which are assigned to some department. The administrator of the group is the head of the department, who is responsible for questions, suggestions and proposals for improvement. The employees in the department can also have discussions among themselves and add annotations.

This makes internal communication and distribution of information much easier. Changes to documents can be implemented more easily and the documents build interactivity between employees.

NID is particularly attractive to companies because of the feedback it provides to employees. Employees can leave their opinion (also anonymously) in an NID document at any time. This helps the employer to better respond to the wishes and suggestions of the employees. Criticism can thus be implemented

more easily, making working life easier for many employees.

Nowadays it is hard to write an email directly to the head of a company. Mostly the messages are intercepted by employees or secretaries. Thus, the message usually never reaches the recipient directly. But this can be changed with NID. The management which has a very high position and is relatively far away for employees can now be reached also by customers who can be authors in a NID document. This way, wishes and criticisms are directly forwarded to the responsible management. Thus, internal as well as external suggestions can be received and processed directly by the highest personnel.

Criticism or requests can also be answered indirectly through annotations. If a customer or employee expresses criticism in the form of an annotation, the top management can also respond directly and carry out changes if applicable. This leads to the fact that wishes can be converted faster since they are read directly by e.g. the department head.

5 Information for Customers

For a company it is very important to be able to offer the customer a certain service. Whether it is the guarantee of a warranty, a good customer service that can answer questions competently, criticism or even leave reviews. All these aspects belong to a good company that wants to offer the customer a good service.

When users buys a product of such a company, they also get a link to the NID document containing a detailed description of the product (if desired also in several languages). In this NID document, the user can find all the information about the product and can also directly contact the customer service. The user can make an annotation with e.g. a question at any place in the NID document. The producer of the product or the customer service will be notified immediately that a new annotation has been added. The dedicated expert can answer the question directly, because it is immediately visible where the question was asked and the context is therefore clear.

This allows an easy and interactive interaction between buyer and seller. If a buyer has a question about a product, it is not uncommon for other buyers to ask exactly the same question. So if a buyer has a question about a product and adds it as an annotation, this question is also visible to all other buyers.

Another commercial application is the simple distribution of advertisements. As a publisher of an NID document, one can insert advertisements based on annotations. The annotations can contain links, short promotional videos or even promotional photos. If customers are interested in the product, they can simply click on the link in the annotation and will be redirected to the NID document about the advertised product. Of course, a link to the product can

also be inserted directly. The advantage of this is that the advertising is not too intrusive, as it is on various websites. Users will see the advertisement only when they move the mouse over an annotation area. Users are on the one hand curious about what is behind the blue marked area and can also look at it at any time, but if they feel annoyed by it, they are only a short movement of the mouse away and the advertising disappears again.

6 Webshops

For webshops, NID can be a great asset. The advantages for webshops are obvious. One can use NID as a question and answer portal next to the application as a description of a product. Different employees are responsible for each product category and therefore different contacts for customers. This makes it possible for employees to work efficiently, as they know exactly which product is meant when a consumer makes an annotation. This eliminates the often sluggish e-mail contact, as everything is revealed by the annotation.

Asking for information in a web store is often tedious, because one first has to find the store's e-mail address, then fill out a contact form. After that, it often takes a few days until someone from the customer service answers, and then the person must know every detail about the product, so that proper help can be provided. Often, this leads to more e-mails and errors, all of which would be avoided with NID.

Not only web stores could benefit from NID, even food delivery services. Often, the dishes do not include necessary and interesting information for the customers. Details such as whether the meal is vegetarian or vegan are often not obvious. Or for people with allergies, an option to ask questions would be beneficial. Also, the annotations made by customers can remain in the NID document or in the menu, so that future customers can immediately benefit from this information.

If one runs a flower and plant online shop, for example, one can use a NID document to insert descriptions of all available plants. For each species of plant a separate expert can be selected, who can then answer the customer's questions competently. This ensures that the customer is well advised and questions can be answered immediately. Of course, users can also discuss issues among themselves and answer questions. However, the discussions among buyers may be supervised by the experts and only released after a thorough inspection, so that no wrong information can be spread. Customers can also add pictures of the plants purchased in an annotation and have a lively exchange with other users who are interested in plants there.

Furthermore, the experts in the NID documents can add tips that could be very interesting for customers. The documents can be expanded by the editors,

the experts and the customers, with advice, pictures, or even videos. Further information based on NID documents can also be added as annotation. If a plant holds an interesting story that exists in the form of an NID document, a link to that article can also be added.

7 Teaching applications

Another possible use of NID is for school or even university purposes. The NID document is a main component of the course. The professor delivers a lecture with the help of the document, and can add further annotations at any time. Grading of the students can partially be based on meaningful annotations in the NID document. Students can also ask questions in the document and have discussions at any time. The questions can also be asked anonymously to make it even easier for students to clear up ambiguities. All annotations made by the students are reviewed by the author of the NID document, in this case the professor. If the annotation is an enriching contribution, it can be published by the professor.

An important factor with school or university materials is access. Access is not possible for people who are not logged in. Even more, if desired by the presenter, access can be enabled only for the students, but not for other NID users.

A nice example of teaching materials are the documents by Hasso Hohmann[4] from the architecture lecture at the TU Graz and the school materials of the FIDEL project [5].

Another way to bring NID documents into the classroom is to create quizzes. One can also create quizzes for NID documents that are visible to all or only certain groups. This allows the teacher to test the students' perceptions of the document content and knowledge. Grading is based on the correct answers to the quiz questions. The quiz can be created on any page and can of course only be answered once per student.

Another advantage for teachers is that they can also add videos. Whether it is just a short clip from Youtube or even an entire lecture unit. So it is possible that students can read through the document on their own and watch the lecture at any time and as often as they want. It is also possible that only voice messages can be added. This provides the teacher with an even easier way to convey the lesson material not only visually, but also audiotively.

8 Digital newspaper

Large online newspapers are on the rise with Interactivity. If you take a look at newspapers like Spiegel[6], Kleine Zeitung [7], der Standard [8], The Independent [9], dailymail [10] or scientific journals like ACM[11], you can see the beginnings of a certain interactivity through comments everywhere.

Digital newspapers can also benefit from NID and its features. Many newspapers get very few feedback from their readers and therefore don't know if the articles are well received. Often, however, there is no possibility to leave feedback, or it is cumbersome to do. There must be an easy and fast accessible possibility for the user to leave feedback in an uncomplicated way. Often, with online newspapers, one can only leave a comment at the end of the article. It is therefore rather difficult to leave a critique or feedback on a particular paragraph or sentence.

With NID, newspaper publishers can get user feedback easily. Readers can add their comment anywhere and also send feedback directly to the publisher of the article. Discussions are easy via NID and the article still remains clear. This makes it easy for users to add comments and annotations, and the publishers of the newspaper can use the feedback to see whether an article is well received or not. The newspaper publisher can also use annotations to link to similar articles that might be interesting for the user.

Feedback on an article depends, of course, on the article itself. If it is just an informative neutral article, feedback will probably be fewer than if it is a "hot issue" topic like COVID vaccination was for a long time. And of course all interactive features of NID are again available, under the control of the IP.

9 Research organizations

Research institutions can use NID to publish the latest information about their projects and research. This will enable them to provide interested people with the information as quickly and easily as possible. Due to the main factor of interactivity of NID, research organizations can take advantage of direct feedback from users. The cumbersome sending of emails and the sparse replies and feedback mails are thus history.

Research organizations can illustrate their novel scientific concepts via videos, images, and voice messages in addition to text. This makes it especially understandable for the readers and provides the certain degree of variety. They actively involve the user and thus also encourage the user to think about the concept. To actively get feedback, the editors of the NID document can ask questions (simply create a quiz) on the appropriate pages. Such questions or discussion entries will appear as soon as the user reaches this page.

10 Addition to teaching applications

Teaching applications are wide-ranging. A good example is the FIDEL project, which was already mentioned in section 7. In the FIDEL project, which started in September, NID cooperates with a school. This project is designed to familiarize students with technology and NID in particular. The challenge is for students to work interactively with each other and with the NID documents. The concept is that there is a separate category "Fidel: The Library of the Future". In this category all subcategories are listed. The subcategories deal with various topics, such as climate change, human rights, health, and many more.

The task of the students is to comments, analyze or possibly to also write documents. One of the sub-tasks of the students could be to write a report, either about a current topic, such as climate change, Corona, etc., or about a private topic, such as events or trips they have experienced during the vacations, or on a school excursion. Other students have the task to comment those reports, add links, videos or pictures. The grading will be based on the quality of contributions of the students.

Basically, teachers can convert their teaching materials to NID. This offers several advantages. They can add annotations, images, links directly and students can access them right away. Teachers are more flexible, have a better overview and can do the grading based on comments of students. Teachers can add voice messages to the NID document in case of absence from class for any reason. This way, regardless of the teacher, students can still complete the chapter that was scheduled for that class session. If questions arise, they can send them to the teacher using annotations or the feedback button.

11 Other applications

The previously discussed uses of NID were only a fraction of how many there really are. NID still has a wide bandwidth of applications that will emerge in the future. Just think of museums, where NID would be an optimal application to ensure the best possible information presentation to visitors. Every visitor can scan the QR code after paying the ticket and read additional information in the NID documents and ask questions. The museum staff can use the additional feedback from the visitors.

The same principle can be applied to cultural events and exhibitions.

An interesting aspect is the political aspect of NID. Parties can publish their election program in NID documents, so citizens can leave their feedback at any time and even ask questions directly to politicians. This document then contains the annotations, presuming that these have been approved by the persons responsible for them. These contributions can be quite interesting for a large

part of the population, and thus many questions are answered once and are always readable in the NID document for all.

Scientific institutions can upload the latest research to a NID server and thus easily spread information without e-mail traffic. Thus, all interested parties have easy access to the latest scientific publications and can ask questions directly to the publishers.

As you can see, NID has a wide range of applications. NID is used in many different areas and thus leads to many simplifications and provides interactivity between the IP, the users and the document in an unprecedented easy form.

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