DON'T KEEP YOUR INTERNET CUSTOMERS WAITING TOO LONG AT THE (VIRTUAL) FRONT DOOR

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ABSTRACT

One of the primary e-commerce challenges on the World Wide Web is when users experience intolerably long waits for a website's homepage to load. Zona Research, Inc. estimates that over $4 billion in lost revenue is due to slow downloads over the Internet. When the loading time of a homepage exceeds the maximum amount of time that a Web user is willing to wait, a Web user will either redirect the web-browser to an alternative (e.g., competitor's) website or quit using the Web; an opportunity, at the moment and perhaps forever, is lost to not only serve, influence, or interact with, a potential customer, but also to advance the growth of e-commerce. Given the important role of a homepage as a portal to a website or to a host of websites, it is critical that a homepage design consider not only appearance and functionality, but also loading time. The Internet industry has been devoting significant attention to solving the *waiting time* problem

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with approaches that are technical or operational in nature, with those most promising being extremely expensive and time consuming to employ (e.g., fiber optic cable). These approaches have not, up to this point in time, yielded the desired results. This research describes a complementary marketing approach to reducing the negative impact of the waiting time problem; one that is based on the psychological theorizing of "anchoring and adjustment," with implications that would be relatively inexpensive to implement. In experiments where all Web users experienced the same actual wait for a homepage to load, those exposed to a shorter waiting time anchor, both perceived as shorter the waiting time for, and evaluated as higher the quality of, a homepage; and when the waiting time anchor was less than the actual waiting time, the perceived waiting time was *less* than the actual waiting time. In addition, those exposed to the smaller waiting time anchor were *more* likely to continue searching the associated website as opposed to searching a different website.

INTRODUCTION

Internet firms are not only losing money hand over fist, but also losing significant revenues due to slow loading homepages. Zona Research, Inc. estimates that slow downloads could result in lost sales of approximately $4.35 billion in U.S. e-commerce (Rebello, 1999). Unfortunately, a significant proportion of e-commerce potential on the World Wide Web is being held hostage by a world wide wait. The persistence of the *waiting time problem* is limiting the advancement of true interactivity (Banks, 1997).

The practical issue of this problem is straightforward. A Web user who directs the web-browser to the homepage of a website, is likely to redirect the web-browser to the homepage of another website (e.g., a competitor's) if the homepage has not fully loaded (i.e., appear on the screen and be functional) within a "tolerable" length of time. That is, the Web user will switch attention to another website's homepage when the length of time required for loading a homepage exceeds the *maximum* amount of time that a Web user is willing to wait.

From a marketing perspective, the immediate impact of having a homepage that does not load quickly enough (and consequently results in a Web user redirecting his web-browser to a different website) is the lost opportunity to satisfy a user's current Web searching needs or objectives (e.g., learn more about products, evaluate products, purchase products) and to more positively influence any consumer decision process for which the Web user had intended to use the webpage information. Further, the Web user's attitude toward not only the website, but also the brand and manufacturer, may be negatively impacted.

If this condition persists (assuming that a Web user even attempts again to visit a website), the long-term effect may be that a Web user surely will never revisit (nor attempt to revisit) the website and may negatively influence other Web users, belonging to either similar or different communities, with regard to their propensity to visit the website (e.g., suggest, through either one's own website—perhaps tacitly by not providing a link to the "intolerable wait" website—or by direct communication, that they never visit the "intolerable wait" website). Given the different nature of word-of-mouth on the Web (i.e., one can potentially interact with many people in a very short period of time), a negative message could be disseminated swiftly and its impact on a website and firm could be disastrous.

Given the practical importance of a "fast" loading homepage on building and retaining website traffic, and the persistence of the waiting time problem on the Web, this research is focused on developing and testing an approach that will reduce a Web user's perception of waiting time for a homepage (or any webpage for that matter) *without* requiring any modification to the homepage's content or form. All else being equal, this, in turn, will provide website

sponsors/developers a better chance at building and increasing website traffic and revenue.

First, the waiting time problems are introduced; then, relevant theory to this problem is briefly discussed. Next, an approach, based on these theory, to solving this problem is proposed and tested. Finally, the paper concludes with a discussion of managerial implications and future research.

WAITING TIME AND THE INTERNET

The Internet industry is making progress in reducing the effects of the waiting time problem. Up until now, approaches to reducing waiting time on the Internet have been primarily technical or operational in nature. Technological hardware and software solutions, such as network improvements to broaden bandwidth and increase data transmission speed, and data compression algorithms (e.g., for streaming of real-time audio or video), do indeed reduce waiting time (or enable greater capacity, i.e., an increase in usage, without an increase in waiting time). Implementing some of these solutions, however, is expensive (e.g., to rewire only the United States with fiber optic cables would cost nearly $100 billion, to rewire the world would cost approximately $1 trillion; Mack, 1997) and time consuming (e.g., it will be several years before all of AT&T's high-speed network is running; Murr, 1999). Further, the employment of some of these solutions may result in inefficient standards and may not produce the desired results in the most timely manner (e.g., commercial success on the Web is still extremely rare; Hodges, 1997).

These hardware and software solutions focus on reducing physical (Newtonian) waiting time. A complementary approach, which has been used in a very limited way on the Web, is to focus on *perceptions* of waiting time (Katz, Larson, & Larson, 1991; Larson, 1987). Perceptions are more important to consumers' subjective evaluations of, for example, quality and customer satisfaction (Iacobucci, 1998).

Information about the expected waiting duration associated with the loading of a webpage is communicated minimally on the Web. Typically, near the bottom of the web-browser, there is a dynamic display that indicates how much information, in bytes, is being delivered during the information transfer process. Occasionally, an icon which indicates the proportion of information that has been loaded appears near the bottom of a web-browser. These indicators may provide some information about waiting time and may influence a Web user's expectations and decision making. This information, however, is not very informative with respect to waiting time.

In fairness, specifying a precise duration of time for the loading of a webpage is difficult, given that both the path of the information (i.e., the cables to be crossed) and the type of connection (i.e., speed capability of a cable) utilized by a Web user will vary. Still, given the significance of the waiting time problem and its pervasiveness, it is surprising that greater efforts have not been undertaken to reduce perceived waiting time.

The waiting time problem is going to persist, at the least in the short term, even with improvements in technology (e.g., though *relatively* fast 56K modems exist, many Web users have slower modems, and they do not tend to upgrade quickly); in fact, hardware improvements may be falling behind and not keeping up with Web users' bandwidth appetites (Weiss, 1997). The cost associated with, and the time required to implement, some of the technical solutions to the waiting time problem are great. In addition, data-rich forms of information are going to be increasingly desired (e.g., *full-screen* full-motion video with sound, videoconferencing) over the Internet. Some are predicting a full-day blackout of the Internet due to a surge in audio and video transmissions (Resnick, 1997). (America On Line [AOL] experienced blackouts in 1997. This is not the Internet, but this experience is indicative of what could occur.) Delivery speed of information may need to be on the order of gigabits (i.e., billions of bits) rather than on the order of the currently possible megabits. In addition, a dramatic increase in the number of computers connected to the Internet and the number of Web users is expected—in the United States, 52 million by the year 2000 ac-

cording to Forrester Research Inc. (Himelstein, Neuborne, & Eng, 1997)—thereby creating greater bandwidth demands. The potential usefulness of psychological solutions will endure as long as the technology that is available and being used by the masses has not virtually eliminated waiting time.

WAITING TIME PERCEPTIONS, SERVICE EVALUATION, AND ANCHORING AND ADJUSTMENT

Waiting time can have a significant impact on service evaluations (see Iacobucci, 1998, for a good review; Maister, 1985). Researchers have studied the significance of waiting time in service evaluations (Roslow, Nicholls, & Tsalikis, 1992; Wee & Cheong, 1991) and the relationship between perceived waiting time and service evaluations. A general finding relevant to this research is that, not surprisingly, an inverse relationship exists between time-delay length and service evaluation (e.g., Taylor, 1994); specifically within a computer-based context, Schleifer and Amick (1989) report that system response time is inversely related to computer user satisfaction. Recently, Dellaert and Kahn (1999) published the first article on perceptions of waiting time and *website* evaluation, of which the author is aware, in the *Journal of Interactive Marketing* (one of their conclusions is that information that reduces uncertainty about the wait helps Web users evaluate the website material independently from their frustration with the waiting time).

With respect to consumer waiting and service evaluation, Maister (1985) stated that it is hard to play "catch-up ball" and that "there is a halo effect created by the early stages of any service encounter." He suggests further that "if money, time, and attention are to be spent . . . the largest payoff may well occur in the early stages of the service encounter." This suggests, in terms of waiting time on the Internet, that it is best if the homepage (the webpage of a website that is typically accessed *first* by a Web user) loads relatively fast, and that efforts toward achieving this result will be rewarded.

In post hoc discussions of two waiting time studies, Katz, Larson, and Larson (1991) and Hui and Tse (1996) suggest that consumers may be utilizing *anchors* when formulating judgments about time (n.b., they do not analyze the impact of anchors; they simply mention them). These articles do not discuss this aspect any further, nor do they suggest any future research related to this. In addition, Zackay (1990) indicates that anchoring may be a potential cognitive and perceptual bias with respect to perceived waiting time; again, however, a study that investigates this is not reported. Interestingly, anchoring and adjustment has been used to explain the importance or effect of a first impression. Given that a Web user forms a first impression about a website (or about a particular search occasion on a website) from its homepage, the consideration of anchoring and adjustment effects on perceptions of waiting (i.e., loading) time and quality of a homepage is intriguing and potentially important.

Anchoring and adjustment (Tversky & Kahneman, 1974) studies have primarily focused on identifying the contexts in which anchoring and adjustment affects judgment (see Yadav, 1994, for a review). Though Tversky and Kahneman (1974) break out anchoring and adjustment biases into various categories, *all* categories and *all* applications have, at their core, the phenomenon of a "prior" value serving as an anchor and a too-limited adjustment; it is a "natural" to apply the concept to waiting time perceptions. Yet, this author did not identify any papers where some form of waiting time anchor was used in relation to judgments about waiting time duration. Some papers that studied anchoring and adjustment effects and considered time were identified. These papers, however, investigated the effects of time delays on persuasion of arguments (Insko, 1964; Luchins & Luchins, 1970; Miller & Campbell, 1961)—*not* on the perceptions of a waiting time duration (i.e., the focus was only on the effects of the passage of time on a nontemporal-type judgment); further the time delays were not intended to serve as anchors.

AN ANCHORING AND ADJUSTMENT APPROACH TO REDUCE PERCEPTIONS OF WAITING

The literature on anchoring and adjustment suggests that a Web user's perception about the loading time for a homepage can indeed be influenced when an anchoring and adjustment process is used. Further, the literature on waiting time suggests that a Web user's evaluation of a website's homepage quality is inversely related to the perceived loading time of the homepage (i.e., the longer the wait, the less positive the evaluation of a website's homepage quality). Taken together, it is hypothesized that Web users are subject to the anchoring and adjustment bias of insufficient adjustment; specifically, a) the perceived waiting time for a homepage to load will be shorter for Web users exposed to a smaller waiting time anchor than for those exposed to a larger waiting time anchor, and b) the evaluated quality of a homepage will be higher for Web users exposed to a smaller waiting time anchor than for those exposed to a larger waiting time anchor. If these hypotheses are supported, then a Web developer could influence the all important first impression that a website homepage makes on a Web user.

Experiment 1

Experiment 1 was used to assess the relationship between waiting time anchors and perceptions of homepage loading time. Of interest is whether the anchoring and adjustment bias applies in the case of perceived waiting time for a homepage. Specifically, will Web users who are presented with different waiting time anchors—yet, all experiencing the *same* physical wait for a homepage to load—have a) different perceptions of the homepage loading time and b) different perceptions that are consistent with insufficient adjustment (i.e., the perceived homepage loading time is between the waiting time anchor value and the actual waiting time duration)?

Seventy-two Web users from a northeastern U.S. university community participated. Given the importance of maintaining precise control over waiting time, a commercially available web-browser was not used in this study (the author was unable to obtain the precision desired with commercially available web-browsers). Instead, the author developed a personal web-browser—titled *WebLab*—using Macromind Director (a multimedia software package widely used for developing web applications); and Web users interacted with it. The look and feel of the WebLab web-browser, for the purposes of this study, was the same as that of any commercially available web-browser (e.g., text and graphics could appear on webpages, links existed).

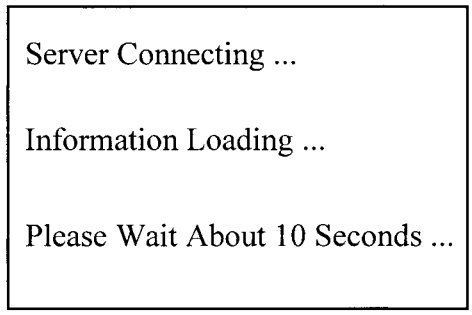

FIGURE 1
Waiting Time Message (10-second condition shown)

Participants sat before a computer monitor and were invited to direct the WebLab web-browser to the homepage of "The Automobile Website" (created by the author). After doing this, WebLab users were presented with a waiting time message in which a waiting time anchor (of either 5 or 10 seconds) was imbedded (see Figure 1), and they experienced a time delay (i.e., the homepage did not load immediately). The waiting time anchor was operationalized by the statements "Please Wait About 5 Seconds" and "Please Wait About 10 Seconds." *All* WebLab users, however, experienced a 7.5-second wait for the homepage to load (i.e., the actual physical time it took for the homepage to appear on the monitor was 7.5 seconds). (An illustration of "The Automobile Website" appears in Figure 2.)

The actual waiting time value and the waiting time anchor values used in this experiment were based on practice and experimental theory. Internet leaders (e.g., Yahoo!) use a 5- to

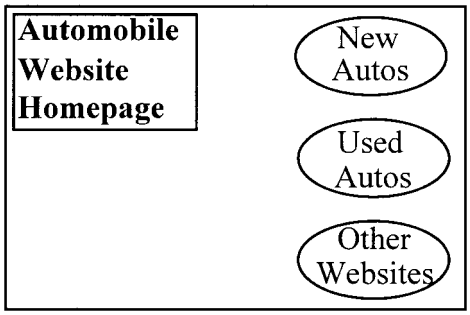

FIGURE 2
Illustration of "The Automobile Website" Homepage

10-second target for homepage loading (M. Sawhney, personal communication, August, 1998); and webpage design experts indicate that, on the Web, waits in excess of 10 seconds are intolerable—this limit is decreasing as the Web ages and consumers gain more experience (Lynch & Horton, 1997).

Participants were randomly assigned to one of the two waiting time anchor conditions. After experiencing the wait for the Automobile Website homepage to load and appear, WebLab users immediately indicated their perceived waiting time (i.e., the length of time it took for the homepage to load and appear on the monitor).

Results. The waiting time judgment was the dependent variable, and the waiting time anchor (with two levels) was the independent variable in a between-subjects analysis of variance (ANOVA). Waiting time judgments were significantly related to the waiting time anchor [$F(1, 70) = 5.738$, $p = .019$]. On average, the perceived waiting time for the Automobile Website homepage to load was less for those exposed to the 5-second waiting time anchor than for those exposed to the 10-second waiting time anchor. The mean perceived waiting times, in seconds, for those in the 5- and 10-second waiting time anchor conditions were 5.62 and 8.66, respectively. This is consistent with the classic anchoring and adjustment bias of insufficient adjustment (see Figure 3).

Discussion. All WebLab users experienced a 7.5-second wait for the Automobile Website homepage to load and appear on the monitor. One group of users was presented with a 5-second waiting time anchor (i.e., "Please Wait About 5 Seconds") and another group was presented with a 10-second waiting time anchor (i.e., "Please Wait About 10 Seconds"). The mean of the perceived waiting time by those in the smaller (i.e., 5-second) waiting time anchor group is significantly less than that judged by

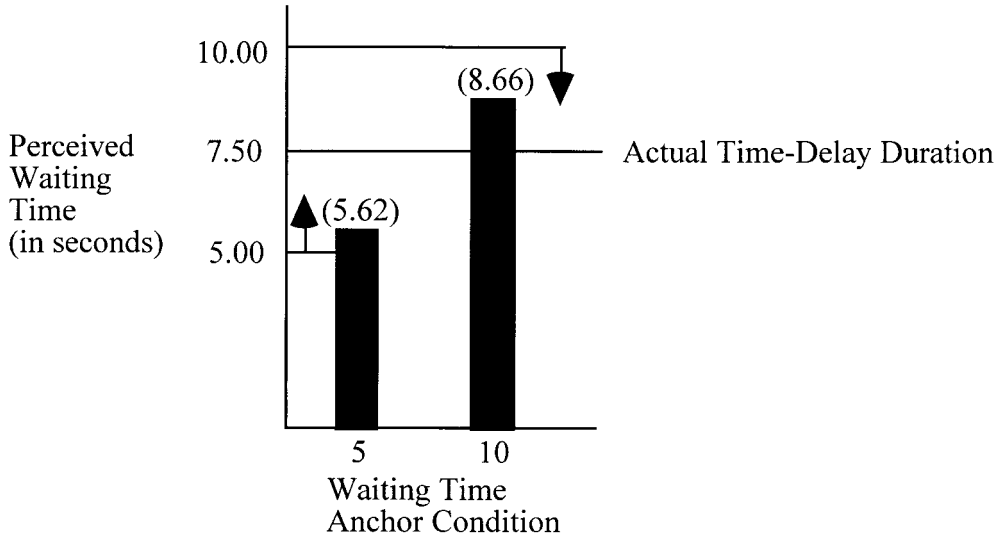

FIGURE 3
Mean Perceived Waiting Time (in seconds) by Anchor Condition

those in the larger (i.e., 10-second) waiting time anchor group (5.62 seconds < 8.66 seconds). In addition, the mean judgments are consistent with assimilation effects in that both mean waiting time judgments are between the waiting time anchors and the actual waiting time (i.e., $5.00 \leq 5.62 \leq 7.50$ and $7.50 \leq 8.66 \leq 10.00$).

The results of Experiment 1 support the claim that a significant relationship exists between waiting time anchors and perceived waiting time, and that the anchoring and adjustment bias of insufficient adjustment applies in the context of waiting for a homepage to load and appear. From a practical perspective, it is noteworthy that the mean judged waiting time for those exposed to the smaller waiting time anchor is significantly less than the mean judged waiting time for those exposed to the larger waiting time anchor—even though all WebLab users experienced the *same* waiting duration.

These results are theoretically interesting. From a practical perspective, however, it is also important to assess whether the waiting time judgment in the context of the World Wide Web has a material effect on the evaluation of a homepage's quality. This is the focus of Experiment 2.

Experiment 2

Experiment 1 established that the anchoring and adjustment bias of insufficient adjustment applies in the context of waiting for a homepage to load and appear on the Web. In addition, the mean perceived waiting time by those exposed to the smaller waiting time anchor was *less* than the mean perceived waiting time by those exposed to the larger waiting time anchor. The purpose of Experiment 2 was to assess whether a relationship exists between the mean evaluation of the quality of a homepage and the waiting time anchor values.

One hundred and five Web users from a northeastern U.S. university community (who did not participate in Experiment 1) participated in Experiment 2. The procedures were identical to those in Experiment 1 except that WebLab users were asked to evaluate the quality of the homepage (on a 7-point scale where 1 = high quality and 7 = low quality).

In addition, for exploratory purposes WebLab users were also asked to indicate how likely they would be to continue searching the Automobile Website as opposed to another automobile-related website (1 = extremely unlikely, 7 = extremely likely)

Results. The evaluation of homepage quality was the dependent variable, and the waiting time anchor (with two levels) was the independent variable in a between-subjects analysis of variance (ANOVA). The homepage quality evaluations were significantly related to the waiting time anchor [$F(1, 99) = 4.961$, $p = .028$]. WebLab users who were exposed to the 5-second waiting time anchor rated the quality of the homepage to equal, on average, 5.67; and those exposed to the 10-second waiting time anchor rated the quality of the homepage to equal, on average, 6.19 (recall that 1 = high quality and 7 = low quality). The difference is in the direction hypothesized: Those exposed to the smaller waiting time anchor evaluated the quality of the homepage to be higher.

WebLab users—when directed to assume that they were searching for information about automobiles—also provided some information about their next immediate search activity after viewing the Automobile Website homepage (i.e., WebLab users were asked to indicate how likely they would be to continue searching the Automobile Website as opposed to another automobile-related website). Those exposed to the smaller waiting time anchor (i.e., 5 seconds) were, on average, *more* likely than those exposed to the larger waiting time anchor (i.e., 10 seconds) to continue their search within the Automobile Website; the mean likelihood ratings are 5.05 and 4.41, respectively (recall that 1 = extremely unlikely, 7 = extremely likely). The difference is marginally significant [$F(1, 99) = 3.586$, $p = .061$].

DISCUSSION

The results of Experiment 1 support the hypothesis that Web users are subject to the an-

choring and adjustment bias of insufficient adjustment with respect to perceived waiting time. WebLab users did not sufficiently adjust from the waiting time anchor value to the actual waiting time anchor value. The mean perceived waiting time for those exposed to the smaller waiting time anchor value was *less* than that for those exposed to the larger waiting time anchor value.

The results of Experiment 2 support the hypothesis that the quality of a homepage will be judged more highly by Web users exposed to a smaller waiting time anchor than by those exposed to a larger waiting time anchor. The mean judged quality of the homepage for those exposed to the smaller waiting time anchor value was *more* than that for those exposed to the larger waiting time anchor value. In addition, it appears that the perceived waiting time was a mediating variable between the waiting time anchor and the evaluation of the quality of the homepage in that those exposed to the smaller waiting time anchor perceived the waiting time to be less *and* the quality of the homepage to be higher.

The quality evaluation of the homepage, in turn, could have influenced future search in the Automobile Website. Though no formal hypothesis was made about continued search within a website, those who were exposed to the smaller waiting time anchor, and subsequently perceived the waiting time to be shorter and the quality of the homepage to be greater, were more likely to continue their search within The Automobile Website.

This study is the first to investigate and support that anchoring and adjustment processes are used for judgments about waiting time on the Web. This research highlights also the potential usefulness of a psychological approach to solving the waiting time problem on the Internet. This approach is not meant to be an alternative to current solutions; rather, it is complementary. Further, the implications of this research go beyond the application of waiting time anchors; it emphasizes the importance of waiting/loading time itself.

Those responsible for website design should not overlook the importance of designing an effective homepage. The homepage is used by Web users in forming a first impression about a website. It is arguably the most important webpage of a website. It is the portal to the remainder of a website. Further, a website's value as a "portal" (i.e., as a link to a variety of other useful websites) may be highly dependent upon the perceived value of the homepage itself. The perceived waiting time associated with the loading of a homepage may ultimately determine, at least in part, the magnitude of the traffic to be obtained.

In designing a homepage, one should consider not only the traditional design elements (i.e., amount and type of information, layout, appearance, logical placement of information and links, etc.), but also the amount of time required for the loading of a homepage. If a Web user perceives the waiting time associated with the loading of a homepage to be *intolerable*, then the Web user will direct the web-browser elsewhere and may never view any of the information contained in the website; and potentially, not purchase any of the products (or utilize any of the information) promoted or made available by the website. All else being equal, the longer it takes for a website's (or portal's) front door to open (i.e., the loading of its homepage), the less likely it is that the customer who "rang the doorbell" will still be standing at the front door awaiting your greeting.

Website designers may need to employ design considerations that limit the number of "bells and whistles," such as extensive use of graphics and animation (which require relatively large amounts of time to load), resulting in a "simplified" website. This does not mean that graphics, color, and texture are to be excluded from a website homepage. It means that the tradeoff in increased loading time should be taken into account when determining the extent of using these design techniques.

From a practical perspective, the approach tested in this research is relatively inexpensive, and it should be easy to implement. In addition, successful implementation of this approach does not require Web users to modify any hard-

ware or software elements of their computing systems.

Future Research and Further Website Design Implications

This study focused solely on the most important webpage of a website, the homepage. It is sensible, however, to assume that the use of waiting time anchors and the consideration of loading time can be applied similarly to the design of other webpages belonging to a website. This should be tested.

This problem is a bit more complex. In testing this, consideration must be made for time devoted to searching a webpage and its possible interaction with the perceived waiting time (for that webpage). Do Web users utilize these constructs independently? In addition, research into the nature of waiting time anchors would be valuable. Does a waiting time anchor need to be explicitly presented (e.g., within a statement) for each webpage, or can a perceived waiting duration itself serve as a waiting time anchor?

The objective of this research was to highlight the importance of, and test an approach for, responding more quickly to the (virtual) front door knock of a Web user in order to get them into your website. Future research will focus on how to improve a Web user's satisfaction once he/she is in your website.

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