

Web 2.0; the technology and how interface design is changing since its inception.

1. Introduction

This report is an analysis of the primary technologies of Web 2.0; namely AJAX and CSS, with regard to the effect they're having on web design, in particular interface design; the usability, visualisation, functionality and interactivity in this new era of user orientated web 'applications'. Contrary to what its title suggests Web 2.0 is nothing really 'new' and as such brings nothing new to the Internet, for this it has suffered a lot of misinterpretation. It does in fact describe an idea, as far as defining a new 'era' of the web, the era of user-based content driven websites, for instance social community networks like Facebook and wiki websites like Wikipedia, both being user generated content with massive and constantly growing user bases.

This new 'era' has seen a lot of changes to the way we view and manage information on the Internet, specifically the interactivity involved within websites which has recently taken leaps forward and it's the interactivity which this report will look at, dissecting the implications of technology collaborations like AJAX, where JavaScript and XML allow so much more to be done within a website, the pinnacle of this is quite possibly the XMLHttpRequest function which allows near instantaneous responses and specific data feedback from websites without the browser refreshing the entire page. It is this ability that is ultimately allowing websites to act more like a software package through interactivity and productivity than a standard set of web pages did previously.

2. Web 2.0 and the Technology behind Web 2.0

Web 2.0 is a buzzword built upon the achievements of a collaboration of technologies now becoming quite common on the Internet, in definition Web 2.0 quite simply is about peopleⁱ, it's all about the user; social community websites namely being a key group;

Facebook especially is an example of this grouping that will be looked at later. Web 2.0 is comprised of the bringing together of technologies to formulate a new standard of web page design, where interactivity and user control is centric to its purpose, the Web 2.0 age is all about the experience and the user, completely, even down to the content. What allows this to be done and done so well is something called AJAX (Asynchronous JavaScript and XML); this is not a new technology or a technology in itself, even though the term was only coined in 2005 by Jesse James Garrettⁱⁱ it is in fact just a collective name for multiple technology.

3. What is AJAX?

AJAX is a combination of HTML (XHTML), the DOM (Document Object Module), JavaScript and XML, but most importantly the XMLHttpRequest which is utilised by JavaScript to transfer information between client and server, commonly 'behind the scenes' which results in the asynchronous, practically instant and seamless loading of information into a web page, independent of the need for a full browser reload.

3.1 JavaScript, CSS and DOM

JavaScript, CSS and the DOM together are the main controlling methods behind the interface appearance, its look and feel, how it displays and how it changes, through the use of these technologies the web page as a document can be manipulated, used together this is allowing the interactivity of websites to increase. How this works is down to the individual functions of each technology, the DOM represents and allows access to the elements of HTML and XML format documents, the tags, anchors and identification of each individual object on a page, the DOM is used by JavaScript which harnesses this identification and then manipulates its properties via its ID, manipulation of content is one aspect of this, but when CSS is brought into the mix this trio of technology can further manipulate a page by accessing its styling within a CSS document, completely changing the appearance and therefore giving ultimately full control of a web page via its code.

3.2 XMLHttpRequest

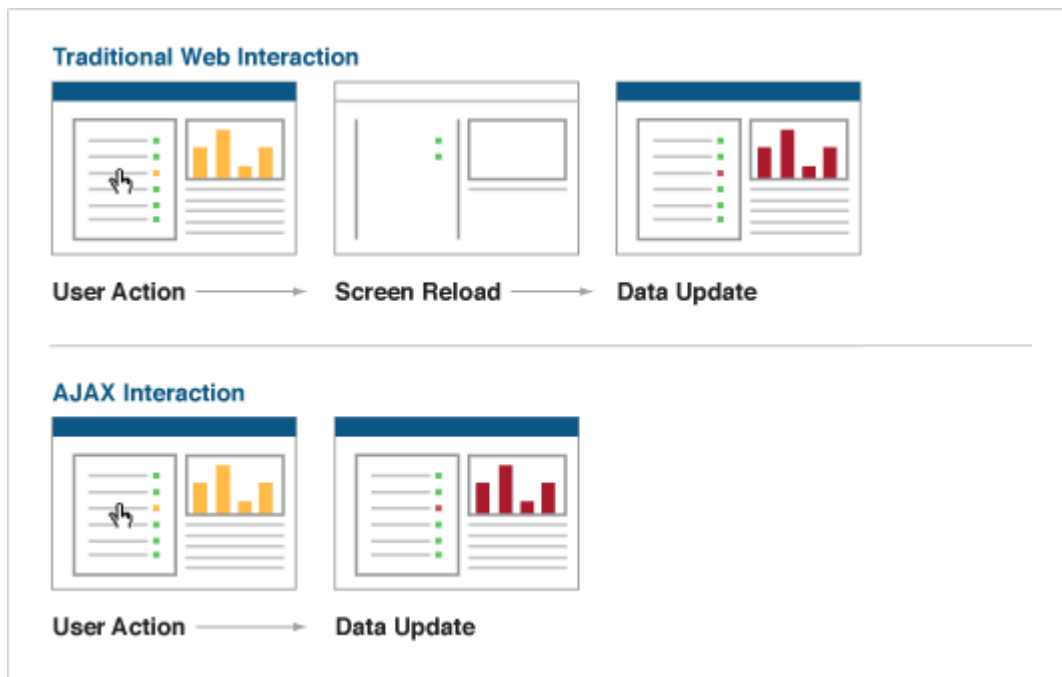
XHR (XMLHttpRequest) is also a part of AJAX, in fact probably the most important part; it's an API (Application Programming Interface) that can be used by JavaScript to transfer XML and other text data 'behind the scenes' between a client and server. It's XHR that is bringing to AJAX and Web 2.0 the bulk of improved interactivity to web pages for it allows the transfer of information without having the entire page refresh, the page remains while the content is updated asynchronouslyⁱⁱⁱ, creating a very responsive interface. It is this responsiveness that is transforming interface design on the web today.

4. The implications of AJAX on design

It may seem odd and you may ask why would AJAX change or affect the way interfaces are designed, after all the technologies aren't new, if they already existed what is there to consider? Well, it's what they can do together that should be taken into consideration, with the ability to asynchronously load information along with manipulating a page structure and design and the increase in interactivity, designers now have to accommodate for this when working with AJAX.

4.1 Changes to interface design

The changes to design primarily revolve around AJAX's ability to asynchronously load information and when used bypass the widely acknowledged page refresh when interacting with web pages, this is great but also a problem, because AJAX can manipulate any part of the DOM, practically everything on the page, however large or small, some changes can potentially go undetected by a user when using an AJAX application, the expected reaction from a web page has changed and because of this designers need to address how the 'communication change'^{iv} comes across to the user, for if they don't that is a very big flaw. See diagram in Figure 1 (by Luke Wroblewski).

Figure 1^v

This shows how web page interaction has changed when working with AJAX, bypassing the need to have the screen reload each time information is requested.

Styling (CSS) is certainly something that AJAX designers will have to pay close attention to and be very aware of its possibilities, with CSS and JavaScript being core technologies of AJAX and having the ability to affect and change the appearance of pages, together user friendly solutions can be found to identify page changes performed by functions, like the XMLHttpRequest, something notably tackled by 37Signals very effectively, with the use of styled fading; 'the YFT technique'.

5. Interface Evolution

AJAX is only a small part of the interface evolution we are seeing, Web 2.0 in general is linked with a style revamp, it is widely accepted that design in Web 2.0 is grand and fresh, user friendly and a much better experience, design has evolved with understanding over the past few years and it has, dare it be said, began to boil down into something very well

received. Template Monster, a leading professional web design and template provider company fairly recently (June 2006) created a new category of templates for Web 2.0 specifically, they describe Web 2.0 design as being functional, user-orientated with a central design, enhanced navigation, strong bright colours, larger text, rich surfaces, reflections and icons, all pertaining to a more qualitative feeling^{vi}, this is Web 2.0 design.

5.1 Designs for Web 2.0

So Web 2.0 is used to describe a new style as well? Surely that just adds to the confusion of what Web 2.0 is? For now let's say 'Design 2.0' and it is summed up nicely in one word in an article by Web Design from Scratch .com as "simplicity"^{vii}. As is further explained simplicity does not mean minimalistic, it simply means that as few features as possible should be used to achieve the goal of the product and this backs up through design what Web 2.0 is all about and that is: the user. Design 2.0 is about uncluttered, simple, engaging page design that is not only pleasing to the eye but does everything the user wants and nothing they aren't expecting. It is important for web designers to realise this and take into consideration every element of a page, the how and why, its necessity, for if it's not explicitly needed to meet the needs of the user it is surely obsolete.

Design 2.0 is such a positive step forward in terms of future web applications, with the user in mind all the time there can be only success at the end of it, of course bad design can still occur, that is down to the individual designer, but overall with simplistic as a guide it is clearly going to produce a lot better end products for the user and therefore benefit everyone.

5.2 New Features

As stated AJAX is only a small part of this interface evolution, but it's a small part making a big difference, by harnessing AJAX new web design features are possible and there is a lot of innovating going on by designers to experiment with its potential and from this is coming the creation of some quite stylish functions.

Let's explore some of these new features, to start with we'll take Google as an example, they are quite the pioneers of AJAX, one nifty new feature hitting the web and utilised by

them is search suggestion in “Google Suggest”^{viii}, they are using AJAX to read from a database and instantly feedback suggestions on what the user is searching for as they type, so before they actually click search they can see some other suggestions, see Figure 2. This is a fairly simple example of how AJAX is being used to push the user friendly and interactive features of Web 2.0 further.



Figure 2

This shows a screenshot of the Google Suggest search tool in action, updating suggestion results live as the user types into the input box.

Facebook is another keen user of AJAX and one of the most popular social networking websites (quite a Web 2.0 thing) on the Internet; it currently has more than 59 million users^{ix}. Quite fetching is their use of layout control adopted for each user account, live interaction with the page allows any user of Facebook to change the layout of their profile by ‘drag and drop’ technique, AJAX and its use of the DOM has been taken to a very interesting place by this display of user control, depicted in Figure 3 and Figure 4 and further builds upon the new interactive user features of Web 2.0. Despite it being new to the web it’s a very intuitive feature, with the feeling close to using a software application like Word when dragging around tables, this bridge of familiarity is quite pleasing.

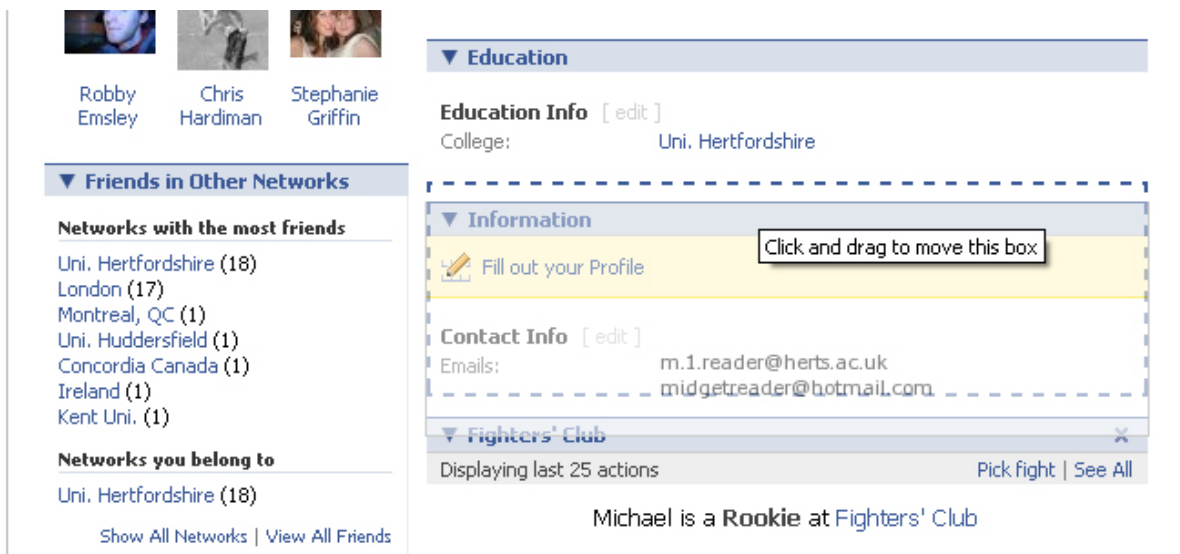


Figure 3

This shows a screenshot of the Facebook “drag and drop” AJAX function on the user profile page, the movement of the “Information” box is outlined in this image.

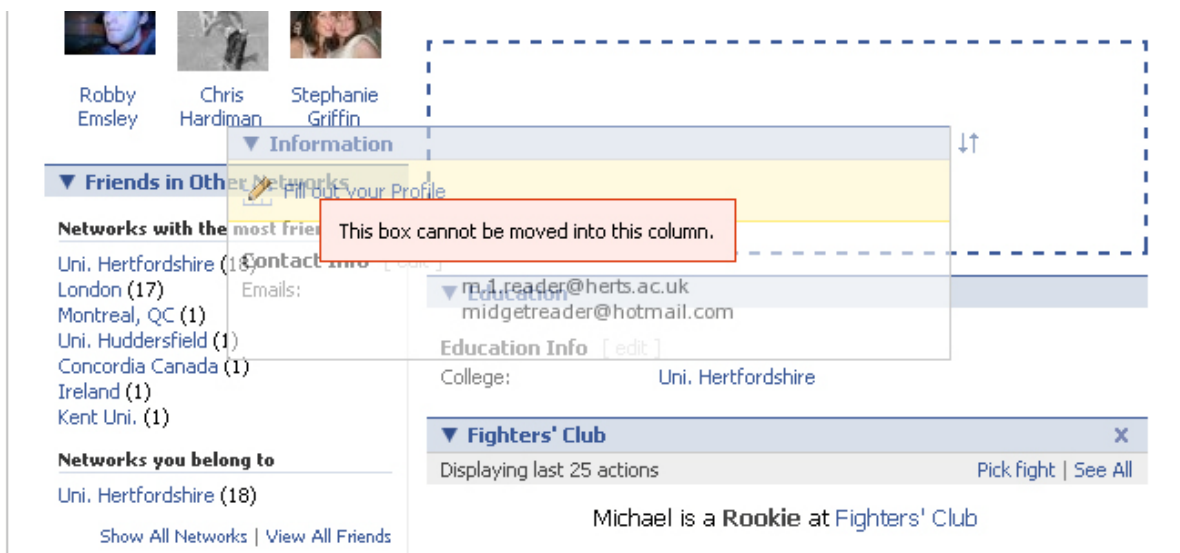


Figure 4

This shows a screenshot of the same “Information” box being moved but this time into a column it is restricted from and the subsequent error message to the user as feedback.

With reference back to “communication change” mentioned earlier, where with asynchronous updates to a page take place it should be taken into consideration how any changes will be pointed out, to remove the possibility of a user missing a page update. This is after all good design; we’ll look at 37Signals as an example of this communication in action. 37Signals developed a method for outlining, or in their words ‘spotlighting’ page updates via something they called the Yellow Fade Technique (YFT)^x in their product Basecamp. The YFT is very effective and a very user friendly design aspect, it uses JavaScript and CSS to briefly change and fade out the background colour property of the updated content area, highlighting the area that has been changed for the user to acknowledge before reverting back to the original, unobtrusive site colouring. This is a very simple method that works perfectly and is a good example of how technologies of AJAX, together, are affecting design features in user systems.

5.3 Cons

With any new changes comes pros and cons, design and AJAX is no different, though these problems existed in JavaScript beforehand, it’s the use of AJAX that causes more problems to be aware of, firstly JavaScript is handled differently from browser to browser, platforms between users differ and not considered properly the desired effect of JavaScript can be wrongly experienced, or not at all, indeed if the user has JavaScript disabled.

Navigation and content design should be taken into careful consideration when using AJAX as well, specifically navigation though, this relates to search engines (web crawlers) not reading JavaScript code, so any links created dynamically using this will be ignored and thus unreadable to a search engine, so web pages cannot be categorised and followed as intended^{xi}. Also with asynchronous data loading the browser ‘back button’ will not work, as the XHR updates to a page are not categorised in the browser history because a whole new page has not been loaded, this changes how a user experiences the application, so careful consideration of this must be in the design.

6. Conclusion

Web design is changing, it's becoming more focused, in the era of Web 2.0 web products are being better tailored to the user and for this all aspects of design are beginning to meet a new set of criteria that dictates user design, Web 2.0 design is fresh, user friendly, functional, interactive, aesthetically pleasing and simple; it does what the user expects and nothing more. Innovative use of new technological-combinations like AJAX are further changing design, features that were not conceived feasible or practical are now coming into widespread use, user enhancing design features that increase productivity, interactivity and functionality of web pages are rapidly being created. The basis of the web is shifting slightly in terms of capability, what can be achieved by a website is becoming vastly more than what was achievable, in terms of where this is heading it can easily be foreseen that the web is adapting into a more desktop application feel, websites are now 'web applications', mimicking the smooth, interactive and immediate flow of data and change present in software applications, this is all thanks to AJAX and specifically the XMLHttpRequest object with its asynchronous data transfer between client and server.

7. References

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