Quality of Life Web Extension for Internet Browsers

David Qin

1. Introduction:

For years now, many websites generate their revenue through the means of advertisements from their viewers. However, for most users, advertisements ruin the web browsing experience as they can be cluttered and distracting. Some advertisements were even known to be malicious, ranging from slowing down your computer to generating popups to dangerous websites that could install malware. As a result, developers created adblockers, software designed for web browsers that block content generated from well known advertising domains. These are constantly getting developed to support new advertisement sources while also improving efficiency. As a result, browsing the web has become safer and more pleasant than ever.

This web extension is designed to further enhance a user's web browsing experience. Its main goal is to be used in conjunction with adblockers and get rid of any unwanted web elements that may appear in the websites they personally browse. For example, many websites may try to insert overlays into the web document, freezing the article until you close it or even are forced to subscribe to view. Multiple banner popups may appear as you're reading, which can also be seen as an unwanted advertisement. Sometimes the article may have an unrelated auto-play video or recommended article sections that the user may just find to be unnecessary bloat. Overall, this plugin provides the user the support to customize the websites they browse and filter whatever content of the website they don't need.

2. The Plugin:

This project is developed as a google chrome plugin. Plugins are essentially software that would run in the background of your browser as you browsed the web. It's built on common web development tools such as HTML, CSS and JavaScript while tied in with their powerful API. We chose to work with this API since Google Chrome is a popular internet browser and because the API has additional support that can perform webpage manipulation, data management, and designing user interfaces. This section will cover the structure and functionality of the plugin as a whole.

The Manifest

Every Chrome Plugin contains a manifest file, a json formatted file that essentially acts as a blueprint for the software. This is the program's current manifest:

```
`
"manifest_version": 2,
"name": "News Filter",
"short_name": "News Filter",
"version": "0.1",
"description": "Grab news documents from webpages and nothing else.",
"options_page": "html/options.html",
"icons": {
        "128": "img/icon.png"
},

"permissions": ["storage",
                "webRequest",
                "*://*.google.com/",
                "activeTab"
    ],
"browser_action": {
  "default_title": "News Filter"
},
"background" : {
  "scripts" : ["js/background.js"],
  "default_icon": "img/icon.png"
},
"content_scripts": [
    {
      "matches": [
        "http://*/*", "https://*/*"
      ],
      "css": ["css/news_filter.css"],
      "js": ["js/main.js"]
    }
  ]
}
```

Figure 1: Contents of the Manifest File

Aside from giving basic details such as titles, software descriptions and icons, the main purpose of the manifest is to determine script behavior and triggers that would control how they run. As seen in the "content_scripts" section, our plugin will try to be active on every domain and will run the script "main.js" upon loading. This domain would be modified if you wanted to tailor your plugin to specific sites but for this plugin, we want it to be active on all websites if possible. We also have another script in the "background" section. This script will persist in the background at all times while chrome is open. For our case its functionality is to load default websites for this plugin to work on and provide a way to access the options page.

We also need permissions for this plugin which would allow us to modify page content if needed. The most notable here is the storage tag, which saves information used for the options page for the user that persists across all sessions.

The Options Page

The options page provides the user tools to utilize the plugin on other websites that aren't included by default. It's a user interface that will tell the plugin which domain to run this plugin on and which elements are to be blacklisted or whitelisted on certain sites. This is a html webpage which contains JavaScript that utilizes chrome's storage API.

The data that's being saved and managed is stored in a key to value relationship. It works alongside the options page and has support for adding, updating and deleting specific elements. This extension uses the web domain as a key, and will have two string arrays as its values: one which will contain web elements the user wants to preserve, and one which will remove specific elements that may have been

included in the preserved elements which the user may want to delete. The options page will automatically update its displayed contents whenever a new change is made within the database. The first time the user installs this plugin, they'll be immediately redirected to the options page in order to see which sites this plugin works on. This page can always be accessed by clicking on the news banner icon present in chrome's browser.
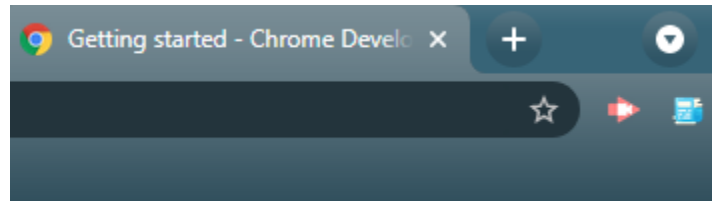

Figure 2: The blue newspaper icon can be clicked to link the user to the options page

Main Script

This is where most of the plugin's functionality is operated. In short it will clear the document's body and replace it with only the content that was preserved and set for this website. Initially, the script would try and pop the body out via an overlay but issues did arise. The biggest issue that was present on most if not all webpages is that latter images wouldn't load at all. This is tied into lazy loading, something which many websites would implement for efficiency but it breaks upon a popup. As a result, the plugin modifies the body directly in order to preserve the webpage's background scripts the best it can in case some exist for the article.

The script will first check the database to see if the webpage's domain is a key. If so then it'll try and see if the page specifically has all the elements of the article. This is to make sure the script doesn't toggle on navigation or search article pages. If the plugin determines it's an article, then it'll start determining which elements to preserve and discard, then finally replace the document's body. The head is kept as many articles rely on their CSS and content scripts. The user can tell if this page is filtered if a banner pops up at the top to confirm. It also contains some functionality: printing, and going back to the main page. The print was added since some webpages may provide their own print functionality but has the chance to mess up. The latter provides the user the option to go back to the main page if they so desire, just in case they want to see what the main page looks like.

Here's an example of a default page setup for Fox News domains. The first figure contains the default webpage layout. The user may find the related articles section on the right to be unnecessary content and only want to preserve the main article body. However, the article body contains a video that's unrelated to the story and the user wants to get rid of it. In this case, the plugin will attempt to remove those elements and only preserve the story.

looking to leave Los Angeles to 'work on their marriage'

The former 'Full House' star and fashion designer both completed their prison sentences after pleading guilty for participating in the college admissions scandal

By Jessica Napoli | Fox News

Fox News Flash top entertainment headlines for April 28
Fox News Flash top entertainment and celebrity headlines are here. Check out what's clicking today in entertainment.

Lori Loughlin and Mossimo Giannulli both completed their prison sentences after pleading guilty for participating in the national college admissions scandal and now they reportedly want to focus on healing their marriage.

The former "Full House" star, 56, and her fashion designer husband, 57, are looking to leave Los Angeles and start fresh in Idaho, a source told Us Weekly.

"They recently downsized from their spacious home in Bel Air, which overlooked the Bel-Air Country Club, to a smaller home in the guard-gated community of Hidden Hills," the insider claimed.

The source added how the couple was worried their two daughters Olivia and Isabella needed support but now since both girls have moved out, Loughlin and Giannulli feel it's time to reconnect out of town.

LORI LOUGHLIN GRANTED RETURN OF PASSPORT BY JUDGE IN COLLEGE ADMISSIONS CASE

"Both girls have their own places and are trying to lead a normal life with their own friends and business opportunities," the source explained. "They can start anew and work on their marriage together as the whole college scandal has taken a toll on both of them, as well as their marriage."

Figure 3: Original Web Layout

LORI LOUGHLIN · Published 2 hours ago

Lori Loughlin and Mossimo Gian... looking to leave Los Angeles to '... on their marriage'

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Figure 4: Modified Web Layout

3. Results and Conclusions:

Overall, this plugin is designed to be a simple and customizable way the modify webpages for the user. For the websites contained in the defaults it works fine with. It's designed to be simple and focuses on preserving the document with only the body content the user wants while preserving the CSS and scripts from the head. It's great for users who just wish to remove content that only involves modifying the document's body content. With that being said there's still limits and room for future work in regards to this plugin.

Firstly, many websites have already developed countermeasures towards client-side plugins that modify webpages such as this. For example, a user utilizing a JavaScript blocking plugin may find it blocking images from one website of a document because the images are tied to JavaScript and won't load without it. Websites may also add additional elements that are designed to coax the user into disabling the plugin. In our case, I discovered that Fox News would request you to disable your adblocker via a banner with a randomly generated id; However, it is inconsistent and occurs rarely. Some websites may even completely freeze their webpage if they detect the document changing and make it unusable. In conclusion, it's not guaranteed that this plugin may work on the website you want.

Secondly, this plugin is requiring too much work from the user. In order to use this plugin, the user has to use inspect element to pick out the class name or id that they want to keep or remove, for every website they plan to use this plugin with. The best plugins are already prepared and ready to use upon installing, which may then have the user doing simple customizing if they wish. Ideally the user wouldn't have to manually do any extra work and the default list should be expansive enough to handle every possible website, though for this project the scope has been reduced only to a handful of websites. The UI could also use more streamlining.

Regardless, this plugin can still provide users an option to tailor specific websites as they wish which don't have any other means of tailoring to their work.