Project Submission

Project Title: Privacy-Enhanced Web Browsing: A Server-Side Approach to Conceal Digital Footprints

Student Details:

Name: Mayank Chawla, Dhruv Sharma, Shrey Verma, Bhavyansh Pareek

Roll Number: E23MCAG0086, E23MCAG0035, E23MCAG0039, E23MCAG0050

Class/Section: MCA – B1

Email: e23mcag0086@bennett.edu.in, e23mcag0035@bennett.edu.in, e23mcag0039@bennett.edu.in, e23mcag0050@bennett.edu.in

Contact Number: +917905842969, +918955438951, +91 9690907490, +918209298691

Project Overview:

In the era of tracking digital activities by prominent entities, we have made a browser that works on user's privacy concern and helps you to be private. This research involves a novel approach to enhance the privacy of a user through a custom-built browser developed in python, our solution works on server-side mechanism to hide the footprint of the users.

When a user initiates, the query is securely transferred to our server, where search is conducted on the behalf of the user. The search then relayed back to the user, ensuring that the sensitive information and user search behaviours remains confidential and shielded from the prominent entities.

The need for a solution to protect our digital privacy has become increasingly urgent. To address this problem, we are diligently crafting a revolutionary web browser that empowers individuals to safeguard their online activities from the watchful eyes of big corporations.

Our browser is engineered to be a fortress of privacy, ensuring that your digital footprint remains your own, free from unwarranted intrusion. With a steadfast commitment to user anonymity and state-of-the-art data encryption, we are on a mission to provide a secure, private, and shielded online experience for all, granting you the peace of mind and control you deserve in the digital realm.

Now a days privacy has been common need for us and tech prominent entities like GOOGLE, BING, FACEBOOK, etc. Are using our data to the fullest, making money by tracking you through your activities and or using it against you breaching you without your concern.

Sometime these data do get leaked by those companies ether by attack or by less safety measures that are taken by them, because of that we receive spam mails or any other medium of contact. Use the enter key to start a new paragraph. The appropriate spacing and indent are automatically applied.

1. Introduction:

Introducing our revolutionary browser designed with your privacy in mind – a digital sanctuary where your online activities remain truly anonymous. In an era where digital footprints are closely monitored, our browser employs cutting-edge technology to conceal your IP address, ensuring a safe and secure browsing experience.

When you perform searches through our platform, your requests are channelled through our dedicated servers, acting as a protective intermediary between you and the search engine. This innovative approach shields your identity, allowing you to explore the vast realm of the internet without leaving a trace. Step into a new era of online exploration, where your privacy takes centre stage, and your digital footprint fades into obscurity. Welcome to a safer, more secure internet – welcome to our private browsing solution.

With our browser, you can rest assured that your online activities are protected from prying eyes. Enjoy the freedom to explore the internet without leaving a trace of your digital footprint. Experience the peace of mind that comes with truly secure, private browsing.

2. Literature Review:

The need for a solution to protect our digital privacy has become increasingly urgent. To address this problem, we are diligently crafting a revolutionary web browser that empowers individuals to safeguard their online activities from the watchful eyes of big corporations.

We are proud to introduce our revolutionary browser, designed to safeguard your privacy and provide a secure, untraceable online experience. Our browser employs a sophisticated system that masks your IP address, effectively cloaking your online identity. When you initiate a search, your request is first routed through our secure server, which acts as a proxy. This server then forwards your request to the search engine, ensuring that your original IP address remains hidden.

THE BROWSER'S SECRET MISSION: GETTING THE JOB DONE!

STEP 1 YOU SEARCH.

STEP 2 YOUR REQUEST GETS ENCRYPTED AND SEND TO OUR SERVER THROUGH YOUR ROUTER .

STEP 3 OUR SYSTEM ASSIGN A RANDOM SERVER TO YOU.

STEP 4 ON BEHALF OF YOU THE SEARCH REQUEST IS CONDUCTED.

STEP 5 REPEAT THE STEPS IN OPPOSITE DIRECTION

Our browser is engineered to be a fortress of privacy, ensuring that your digital footprint remains your own, free from unwarranted intrusion. With a steadfast commitment to user anonymity and state-of-the-art data encryption, we are on a mission to provide a secure, private, and shielded online experience for all, granting you the peace of mind and control you deserve in the digital realm.

3. Methodology:

IP masking: We use a secure proxy server to mask your IP address when you make a request to a website or search engine. This prevents the website or search engine from seeing your true IP address.

Tracker blocking: We use a variety of techniques to block trackers, which are used by advertisers and other entities to track your online activity. These techniques include blocking cookies, preventing third-party scripts from running, and using a content blocker to block known tracker domains.

Safe search: We offer a safe search option that filters out inappropriate and potentially harmful content. This option is particularly useful for protecting children from inappropriate content.

Random Server Selection: Being dependent on single server may harmful for user , server or company we can not hide all the requests or sometimes requests may get blocked by search engines for many request in a time, so we made the server to equally divide the requests so that one server should not have to take all the pressure and harm itself.

Changing the server after specific time: After some time the user request may diverted to some other server because if we will not change the server the user may get tracked and search engine may track there user activity, and our main moto will be vanished.

Not saving the Logs: We do not let the server or the search engine to save the user logs, we send the logs in the encrypted format so that the server or search engine will not save it because they will not understand what is the main purpose of that encrypted codes.

Customizable privacy settings: We give users the ability to customize their privacy settings to their liking. For example, users can choose whether to allow cookies, block third-party scripts, and enable safe search.

4. Design:

Basically, if you can see the figure1 we made a request from our browser to Load URL Function then through while hidden is the function that is going to work in the background, The script will work in the way that only server can understand the formatting.

We made this because if this script will not be private then the hacker can divert the search requests to and can catch the user search history and may send the malicious code to user and hack them.
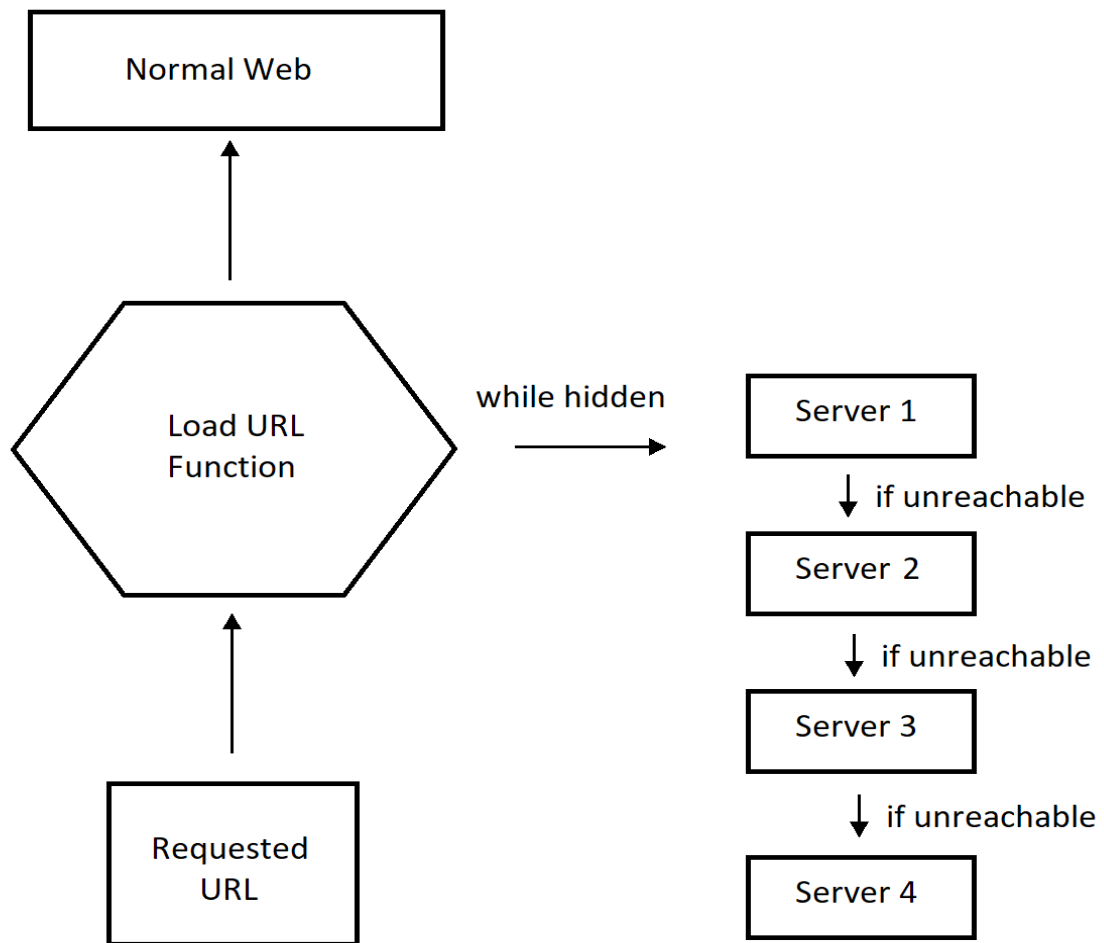
Fig 1. Function Working diagram

The Design of our browser may be changed in the future from figure 1 to updated versions add more features regarding user privacy and safety.

5. Implementation:

Imagine a restaurant. You (the user) walk in and tell the hostess (the web server) what you want is (the URL). The hostess doesn't cook the food herself, but she knows exactly where to find the chef (the storage system) who can provide you.

The chef, in this case, might be in the pantry (static content like images or HTML files) or the refrigerator (database with dynamic content). Once the chef has everything, he hands it to the sous chef (the web server engine) who prepares it according to user specific order (the request).

The sous chef might add some extra sauce (custom scripts) or remove unwanted ingredients (irrelevant data). Finally, your delicious dish (the formatted response) is delivered back to

you by the waiter (the web server). You can now enjoy your meal (the website) and hopefully leave a good tip (come back for more)!

Of course, this is a simplified analogy, and things can get a bit more complex in real life. But it captures the essence of how a web server takes your requests, fetches data, prepares it, and delivers it to your screen in a blink of an eye.
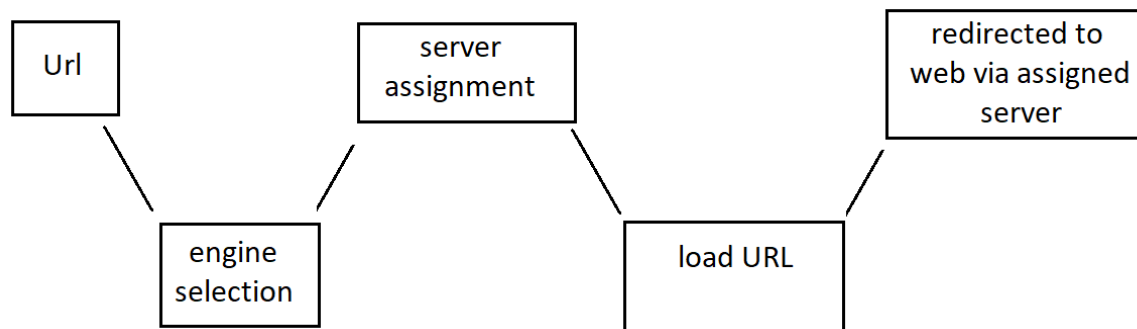
fig 2. Data Processing diagram

A browser comes with python power is the power that can not handle by any other language because making anything works on

Python:

Developer-Friendly: Python's simplicity and readability make it an excellent choice for development.

Rich Libraries: The extensive library ecosystem provides tools for various tasks, enhancing development efficiency.

Pi-Cutie5:

Community Support: The library's strong community support likely played a role in its selection.

Functionality: Pi-Cutie5 might offer features or abstractions that align well with your browser requirements.

6. Testing:

```
135 130.474369962 10.12.36.220        10.12.255.255        NBNS
136 131.230593120 10.12.36.220        10.12.255.255        NBNS
137 131.230593502 10.12.36.220        10.12.255.255        NBNS
138 131.230593557 10.12.36.220        10.12.255.255        NBNS
142 132.711487468 10.12.36.220        10.12.255.255        BROWSER
179 168.346589213 10.12.36.220        10.12.255.255        NBNS
180 168.346590251 10.12.36.220        10.12.255.255        NBNS
181 168.346917659 10.12.36.220        10.12.255.255        NBNS
```

As you can look at the above image the request from the browser is successfully sent to the server with the encrypted format and the sending of something is be seen and but can not look out what format is sent through it even if its logs get cached in local network.

7. Results and Discussion:

Present the results of your project along with any observations or insights gained. Discuss how well your project meets the initial objectives and any limitations encountered.

8. Conclusion:

With the growing concerns surrounding online privacy, it is imperative to develop tools that empower individuals to safeguard their digital footprints. Our privacy-focused browser stands as a testament to this endeavor, offering a comprehensive suite of features that effectively mask IP addresses, block trackers and cookies, and provide safe search options. By adopting our browser, users can reclaim control over their online privacy, shield themselves from targeted ads and potential surveillance, and navigate the digital world with newfound confidence and security. Join us in fostering a more privacy-conscious online environment and empowering individuals to reclaim their digital autonomy.

Unparalleled Privacy Protection

Our browser employs a sophisticated system that masks your IP address, effectively cloaking your online identity. When you initiate a search, your request is first routed through our secure server, which acts as a proxy. This server then forwards your request to the search engine, ensuring that your original IP address remains hidden.

Comprehensive Privacy Features

Our browser goes beyond IP masking to provide comprehensive privacy protection. We employ advanced techniques to block trackers and cookies, preventing advertisers and other entities from monitoring your online behavior. Additionally, we offer

9. References:

Your Secrets Are Safe: How Browsers' Explanations Impact Misconceptions About Private Browsing Mode

https://dl.acm.org/doi/abs/10.1145/3178876.3186088

Safe Internet Browsing Using a Transparent Virtual Browser.

https://ieeexplore.ieee.org/abstract/document/7371517

Evaluating the Manageability of Web Browsers Controls

https://link.springer.com/chapter/10.1007/978-3-642-41098-7_6

Securing frame communication in browsers

https://dl.acm.org/doi/abs/10.1145/1516046.1516066

10. Acknowledgments:

Dr. Suneet Kumar Gupta, Dr. Prateek Yadav, Prof. Manoj Singh, Mr. Sankalp Shukla

11. Appendices:

Pyqt5 documentations, Python, Linux documentations, Network rule catalogue

Submission Guidelines:

1. Ensure that your project report is neatly typed and well organized.
2. Include appropriate headings, subheadings, and a table of contents for easy navigation.
3. Submit your project report(named like yourid_name) in a digital format (PDF and word) through the submission link given below : LINK

Important Dates:

Project Submission Deadline: In your respective lab **(20 Nov-25 Nov)**

Project Presentation Date: In your respective lab **(20 Nov-25 Nov)**

Evaluation Criteria:

Your project will be assessed based on the following criteria:

    A. Originality, Innovation and Creativity
    B. Technical Depth and Complexity
    C. Quality of Documentation
    D. Adherence to Guidelines
    E. Presentation Skills (for Project Presentation)