The dark side of the internet: tor and the deep web

Science, Computer Science

Last year, the world wide web celebrated its twenty-fifth birthday. Only twenty-five years and it has virtually reshaped the culture and function of our society. With a simple wi-fi connection, a young student studying for a doctorate in surgical medicine can become an expert on the human anatomy, a College English professor grading a final essay can check plagiarism for all of his students, and a politician running for governor can see how low his approval rate has fallen in the polls on a day to day basis. This new generation has grown up with a distinct perspective of knowledge and of information that has led them to believe that the most mundane to the most complex of questions can now be answered with a simple Google search. However, although most internet users often feel as if the information available on search engines is unrestricted and all-knowing, the truth of the massive amount of concealed information that the web hides lies just underneath the surface.

In 2002, the U. S Naval research laboratory sought out a form of secure communication that would be completely untraceable and would allow government officials to be protected from interference. The result of this government funded project was Tor. An abbreviation for The Onion Router, Tor was a special type of software that allowed for an anonymous and confidential communication over the web (Chandler). Now, over ten years later, this software program is easily accessible and downloadable to the general public. In addition to providing users with the anonymity of secret agents, however, it now allows users to uncover a side of the web that is not easily visible with conventional sources of internet browsing. Popular search engines, like Google, Yahoo, and Bing, use programs, called crawlers, that

retrieve information and data by detecting hyperlinks. These hyperlinks are electronic loops that connect one electronic document to another (“ What is a Hyperlink?”). By detecting these hyperlinks, crawlers are able to weave a digital map of the web that can be navigated by users with a simple click (Chandler). However, these programs are largely limited and can only access websites that are specifically compatible to these crawler. They can not find and index websites that are private, password locked, or exist outside http and hyperlink protocols (“ The Ultimate Guide to the Invisible Web”). As a result, only a relatively small amount of information is actually available on these “ all-knowing” search engines.

So small is the amount of information that can actually be gathered by conventional search engines, that the most recent studies estimate that they carry only 0. 03% of the total information that is actually available on the web with popular search engines (“ The Ultimate Guide to the Deep web”). Incidentally, the term “ surface web” was coined to describe the seemingly insignificant amount of data that is visible, as compared to the massive underground “ deep web” that consumes a massive 99. 97% of the web (Chandler). Therefore, the “ surface web” is defined as all the data that is indexable by most search engines. In contrast, the “ deep web” is defined as all the data that is not indexable by most search engines.

Although the term deep web is in close relation to the government invented Tor, a common misconception confuses the two together. Tor’s software programming allows for a vast number of deep web websites to be accessible–mostly . ion websites rather than . com websites– but it does not

encompass the entire entity that is the deep web. Although accurate estimates are unclear, most deep web content is essentially junk mail; random bits of storing space, old PDF files, traveling lists, and deleted messages and emails (Yeung). Perhaps much of deep web content is of little importance to us, but a gold mine of valuable information still remains on the deep web that can only be accessible through special programming. So, in order for someone to travel to this invisible side of the web, Tor must be installed into a user's personal computer. After installation, a user can effectively connect to websites that would normally not be visible with a regular firefox browser and a google search engine. More importantly, however, a user can do so with almost complete anonymity. By re-routing a users IP address to other users around the planet, Tor creates onion-like layers of encryption that protects the user's identity (Chandler). Such rare protection of our identity is worth gold in a world where everything we do online seems to be scrutinized and recorded. In turn, we find that the anonymity that Tor provides to users can prove to be a valuable tool for the expression of basic human freedoms and basic human rights to those who yearn for and lack such liberty.

Although the potential that encompasses the deep web is immense and valuable, it is important to first review the controversies that prevent many from surging into and fully exploring the uses that Tor can bring. The complete anonymity available with Tor on the deep web provides for the creation of what many ominously call " the dark web". In essence, it is a safe haven for criminal minds to purchase, act, and gather together without fear of government interference. Most notoriously, is the Silk Road. Said to be a "

free-market", it dedicates itself to providing a safe and an untraceable connection between drug dealers and eager customers. Popular items sold on this electronic black market include LSD, crystal meth, butter chocolate-chip cookies with marijuana, and morrocan hash. Users can purchase these illegal items using an electronic form of currency, called " Bitcoin", which is encrypted and allows for an untraceable transaction. In 2013 the Silk Road was " shut-down" by FBI agents, after years of investigation led them to successfully track down and capture the main host Robert Ulbrich, who went by the name " Dread Pirate Roberts". However, less than two months later, despite the fact that Ulbrich was successfully convicted on several felonies and was sentenced to life in prison, yet another " Dread Pirate Roberts" has emerged and the Silk Road is up and running once again (Grossman). Amongst other illegal websites fall those dedicated to stolen credit cards, hitman services, human trafficking, human experiments, and graphic child pornography. Joel Falconer, a technology news journalist, describes some of the most sinister websites he has encountered during his research on the dark web with Tor:

One link is called The Family Album, described as a place for " exclusive private child sex material by the members" – like a user-generated content site for child porn. Another is called Kindergarten Porn. The website Brimstone Entertainment, on the other hand, provides a place for strippers, escorts and adult entertainers to advertise their services in various cities. And other marketplaces, similar to but less populated than Silk Road, have sections for sex slaves. " Basically, I'm offering myself up for sexual or non-sexual servitude. I'm 5'11" 160 lbs and strong enough to do what you wish. I

have pictures and other details can be hammered out personally," reads one.(Falconer)

The sickest of the sickest are protected from view and can essentially act without any sort of repercussion from government force. However, although the grotesqueness of such sites and criminal uses makes us cringe away from the use of Tor and the deep web, Bright Planet, an investigative organization dedicated to deep web intelligence, reminds us," The key thing to keep in mind is [that] the Dark Web is a small portion of the Deep Web." There is no doubt that we should acknowledge and try to alleviate the degree of maliciousness that takes place on the deep web, but we must also remember to recognize and advocate for the genuine good and the social possibilities that lie just above the murky waters of the deep web.

The internet has, no doubt, changed the function of our relationships, our past times, and even our education. With this shift in digital technology, we have also experienced an array of opportunities that have emerged. Research for students has become far less daunting and much more accessible, news is open and wide-spread, and new ideas for the future can be discussed and collaborated with a simple wi-fi connection. Tor's use of gathering deep web information and providing safety and anonymity can gives all these opportunities to society, and can even prove to go beyond what the surface web provides. Just as Falconer argues:

Most of us in the West understand the importance of free speech – even free speech we don't like – to the integrity of our societies. Services like Tor provide the tools needed for people to communicate openly and freely on an

anonymous level. People living in oppressive countries such as Iran and North Korea or in suppressive countries such as China are able to use Tor as a gateway to the rest of the world, and most importantly as a place to have access to real news and a greater range of viewpoints and more safely contribute their own viewpoints to open discussions. (Falconer)

The amount of good, valuable information and potential found on the deep web is immense in comparison to the corruption that is most often focused on. A vast majority of the deep web concerns things like medical journals, anonymous chat sites, news outlets, whistleblowing sites, and websites concerning human rights. For example, during the famous Arab Spring, deep web access played a key role in its ultimate success. In addition, Andrew Lewman, Tor's executive director, works with victims of domestic abuse who need a safe and anonymous way to communicate without fear of being tracked (" Going Dark: The Internet Behind the Dark Web"). The amount of intellectual enlightenment and social potentials that the deep web brings are just too significant to dismiss simply because some users decide to abuse the freedom that Tor provides. Nathan Chandler, a professional writer for consumer technology, gives us some last thoughts to consider about the deep web as a whole, " It contains an enthralling amount of knowledge that could help us evolve technologically and as a species when connected to other bits of information. And of course, its darker side will always be lurking, too, just as it always does in human nature." So yes, in a sense, the deep web reflects humanity as whole; we can see the cruelty and the corruption that exists, but also the beautiful innovation and the ability to be a source of authentic good to those in need.

Society is always evolving, always improving, always searching for a new form of technology that will bring about new opportunities. The internet is proving to be an essential keystone for this development in a generation that has become almost completely dependent upon digital technology. However, with this dependence, this generation is also sacrificing personal liberties of speech and expression, as government surveillance and company tracking takes control of the internet we use on a day to day basis. To regain a portion of these liberties back, we must take full advantage of the tools that are available for this purpose, and we must advocate and support the technology that will allow for users to once again be anonymous and express their voices without fear. It is indeed a simple fact that downloading and using TOR's software programming is not for everybody. But for those who do yearn for true independence in speech, whether that be a suppressed politician in China hoping to express his ideas to the rest of the world, an oppressed journalist in Afghanistan wanting to publish stories on the latest bombings near his home, or even an average American who simply seeks to feel a little bit less watched while browsing the web, Tor is the gateway to this self-determination of personal expression. But, despite the genuine potentials and the honest uses that that this software provides, it is also important to remember that the information and the anonymity given with Tor is not a pick and choose market; we must accept what TOR provides as a whole: anonymity, freedom, and the choice to do good or bad in the face of total autonomy. For centuries, many have speculated whether the human race is inherently evil or inherently good; with Tor, we are faced with this same speculation. In retrospect, since we known that we cannot eliminate

the defective side of Tor without sacrificing its foundation of immunity and choice, we are left with a choice to decide for ourselves which side will outshine the other and brighten societies role as a generation of unrestricted information and devoted democracy.