



**DigiEduHack Solution**  
**Singapore - SUTD**  
**Challenge: Fake and real**

## CriticalHits

### CriticalHits, using NLP to train critical thinking

CriticalHits provides users with alternative sources of news by detecting what they are reading. Using natural language processing, it can identify keywords in the article and their sentiment. It fosters critical thinking skills in students.

#### Team: CriticalHits

##### Team members

John Lim, Ang Song Gee, Jerome Heng

##### Members roles and background

Jerome: Singapore University of Technology and Design 1st year student, studying general engineering and design and intending to specialise in computer science

John: He is a first year student in Singapore University Technological University, who is interested in social dimension to design and engineering of products and systems.

Song Gee: Freshmore in Singapore University of Technology interested in Computer Science, OpenCV, applications in Engineering

##### Contact details

[www.linkedin.com/in/angsonggee/](http://www.linkedin.com/in/angsonggee/), [jerome\\_heng@mymail.sutd.edu.sg](mailto:jerome_heng@mymail.sutd.edu.sg),  
[john2\\_lim@mymail.sutd.edu.sg](mailto:john2_lim@mymail.sutd.edu.sg)

## Solution Details

### Solution description

We hope to combine the natural language processing technology together with the educational slant to inform and nurture digital literacy amongst our users. In this matter we aim to encourage critical thinking skills by providing users with alternative opinions and views. This can serve to challenge or

affirm the biases in different issues that one is trying to analyze.

Our product is a web browser extension, that is directed towards an educational market. We propose to use it as a learning tool to help to bring real world examples to students and teachers. It readily creates a sandbox out of the world web to be used in a classroom setting for students to conduct analysis on different current affairs issues.

Using Natural Language Processing (NLP), the article on the current page is analyzed, its text used by the program to generate keywords related to the topic, labelling each with either a positive or a negative sentiment, through aspect mining and sentiment analysis. We will start out by using free, open-source NLP Libraries, and developing our algorithm more as we develop.

Our extension does not give a value statement on an article but instead chooses to provide the reader with alternative viewpoints through various sources, adding nuance to the user's reading experience on the web and encouraging to engage critical thinking skills on the articles they are reading.

## **Solution context**

There is a definite concern in Singapore that there is a need better media literacy and resilience against misinformation campaigns. The current consensus in government is that there needs to be a clear line of action where public education imparts critical thinking skills that can foster active and constructive public discourse and responsible online behavior. A 2018 Straits Times survey shows that in spite of Singaporeans confidence in spotting fake news, 90% were wrong when posed with a test.

We believe that we can help fill this gap and need from the community. This solution we propose is one that has a long term goal in mind. To change public attitudes.

## **Solution target group**

There has been serious concerns over fake news and misinformation in Europe and USA that come from Russia. The serious threat of foreign interference is facing countries like Finland. The nation has a multi-pronged approach to prepare citizens for these online threats. One such effort in schools, to inculcate critical thinking. Finland often held up as example of countering foreign influence. As it challenges the cloak and dagger attempts to subvert popular opinions through media literacy that is championed from a culture of transparency, open discourse that upholds public trust in public institutions

We aim to target educators and students aged 15 to 20, who are seeking teaching tools for critical thinking and corroboration to discover biases. This is scalable to the general public through our stakeholders such International Non-Profits and Governmental Organizations whom are interested in improving media literacy in their people.

## **Solution impact**

For the successful implementation is that it is used as a learning tool by students to supplement their learning in schools. At present we are unable how to clearly grade or quantify the projected success of this product.

We believe that an appropriate measure of success, would be the use of a pilot programme in selected Secondary Schools and JCs can help to iron out the implementation challenges of including IT into current lesson plans. We recommend to use a sample that is representative of the different schools and strong collaboration with MOE to make this a successful programme

We can use the the in-depth feedback from the pilot programmes to fine tune our roll out strategy.

A metrics could be gathered through survey after the pilot programme

In order to provide some qualitative analysis of the results a similar survey should be taken before

How willing are teachers to implement it (workhours)	Are students receptive	Are learning objectives achieved critical thinking(teacher's perspective of their students work)
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## **Solution tweet text**

We don't believe in deciding what is real or what is fake - we want to empower people to discover it for themselves. In a world of bias and disinformation, an informed decision makes all the difference in understanding each other.

## **Solution innovativeness**

There are two interesting tools used to encourage critical thinking.

1. Digital Literacy Toolkit is used to scaffold classes on digital literacy from elementary to high school systems in Finland, run by a Finnish fact-checking agency. This, and other digital literacy programs focus on teaching skills during school time - and do not actively utilise the majority of time youths spend on the internet where information, real and fake, proliferates. Our tool is located on an internet browser - and is a click away any time a student is critical of an article and wants other perspectives.

2. Factmata is a trust scoring system to rate pieces of content, from harmful, questionable or good. It aims to identify hateful, biased or misleading statements. It uses natural language processing with input from other academic stakeholders and consultants to make judgements about these articles. We don't aim to impose value judgements, but we want people to come up with their own conclusions based on a plethora of different perspectives. This helps to grow their own critical thinking skills rather than relying on someone else to tell them what to think

## **Solution transferability**

At present this product is based on current affairs and its related school subjects such General Paper, KI, SS and History for secondary and Pre U students - subjects that aim to teach critical thinking. It primarily acts as a teaching or learning tool.

Such a reading tool would helpful in universities. The basic tools are present for it to learn and work with academic works and books, where peer reviews of certain papers can be suggested to help a affirm or challenge what the sources the student has chosen. This machine learning could aid the breadth of learning of a student, exposing him to more texts than the ones he is assigned.

It is important to note that calibrating the machine learning to different needs of each academic subject or sphere.

As general tool, the current iteration of our product that looks at current affairs and potential biases in reporting can be released along side more public awareness campaigns. Stakeholders that may be interested may be the Media Literacy Council in Singapore, or like-minded NGOs (Reporters without Borders), where this tool can be used to promote their message on media literacy and critical discernment over online media amongst the general public.

## **Solution sustainability**

We aim to obtain funding from global NGOs that share the same goal as us - promoting media literacy and critical thinking. For instance, ISTE (International Society for Technology in Education) or Reporters without Borders. This would allow us to develop our product without compromising on our core values and beliefs, and being able to reach a far wider audience than we could on our own.

Another way we are considering to expand is by taking our software open source. This is so that like-minded individuals worldwide can also help to contribute to the development of this software and reach a far wider audience than we can on our own. This way, we can lower borders between people, bringing closer our dream of an interconnected world.

## **Solution team work**

We are a team of classmates and friends, so we knew each other before this event. But living and working in a small space for 24 hrs was a new experience for all of us. Despite all the ways it could have gone disastrously, I think we were able to work harmoniously with each other to make a really interesting product.

John was the scholar - he'd go and look up a vast variety of articles, carefully summarising them and selecting only the most relevant points for our discussion. He helped us immensely to gain enough content to cover our bases during market research.

Song Gee was our programmer - since none of us had any experience coding before, he spearheaded our efforts to look at the backend technologies which were necessary in our project - Natural Language Processing, Sentiment Analysis. His subject matter expertise was invaluable in our designing of the product.

Jerome was the ideator - his passion and acumen in identifying such a unique perspective to this common topic, really won our group members over. This clarity helped our group in remain on task and develop the correct answers to various challenges such as stakeholders, users and how we should keep its relevant to the marketplace and the community.