Group 5 - FactNews

1.1 Team Members

- Kamron Afshar
- Shreejaya Bharathan
- Andrew Eaton
- Samarth Inani
- Sunny Kwong
- Akansha Shrivastava
- Ivette Sulca
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- Bing Wang
- Kathy Yi

MVP: Dashboard with multiple features to explain how to cross-check a source using the SIFT method and machine learning.

1.2 The Goal

Improve digital media literacy to the general public (not just students) by dynamically analyzing an input (text/url or perhaps also images) from users and returning a page on HOW and WHY the app rated it a certain way based off of its:

- text
- website url, like .org/.edu/.com or the domain (if applicable)
- its cross references of the main idea with the top x searches on Google.

This is achieved by automating Mike Caulfield's SIFT method for cross-checking a news source and by explaining a comprehensive machine learning approach of analyzing a url/text in layman's terms with its "trustability" score.

1.3 Idea

This app allows users to improve their media literacy by taking a critical eye towards what news items are forwarded to them in a quick, informative dashboard. This "one-stop shop" will automate cross-checking for quick verification and provide a more complex approach of machine learning as an option, so they can understand why and how to verify digital information.

1.4 Business Plan

1. Summary:
    a. Given a url or text, this will return a dashboard for the user to quickly cross-check the article and, if they want, to understand a machine learning approach that includes looking at the input's text, sources, related pages -- all in one page.

2. Description:

a. From checking an article's validity to testing the media bias in their main source of news, we want to help improve media literacy in multiple aspects, each addressed in different features. Some features will automatically analyze the data (text on website, sponsored ads, sources mentioned) and give a summary of the results for the users.

3. Motivation:
    a. In a time of immediate sharing and fake news, social media giants are not taking responsibility for disseminating disinformation. Additionally, their recommendation systems prioritize maximizing watch time for more clicks or views, instead of blocking videos promoting fake, or even harmful, messages.

       The responsibility to determine the legitimacy of information now lies with users. Sometimes, the best tool to stop the spread of fake news isn't always in new machine learning algorithms, but in more people improving their media literacy and getting into a habit of cross-referencing what they read. But we will include a machine learning model to determine a "trustworthiness" score and an explanation of the model in layman's terms, so the general public can understand what's happening behind the scenes. Hopefully, this will encourage them to also try to understand what's happening in other similar algorithms.

       While there are websites out there that utilizes state-of-the-art machine learning methods to measure a legitimacy/controversy/ truth score, they don't try to connect and teach the general public how to do it themselves or what is happening behind the scenes with these complex algorithms. We want to bridge that gap.

4. Project Plan:
    a. **MVP:** Dashboard
        i. A clear infographic showing each feature
        ii. Home page inputs text or url
        iii. Next page returns this dashboard, first showing the SIFT cross-check results, then the ML tab/ page if the user wants to learn more
        iv. Requires html and design skills
    b. **Feature 1:** Analysis of validity in an article via website url or text
        i. If available, use fact-checking websites including Snopes and PolitiFact to rate an article via title match.
            1. Check to see if this is already debunked by a reputable source
        ii. Check the url/ domain of the input, if applicable, and return an analysis or caveats.
            1. We will look at the source to determine credibility - For example if it is from a reputed site like Economist or NPR, we can assign a higher weight to the source to claim it is credible.
            2. However if it is from a source like say Breitbart (fake news site), we will assign a low score meaning the news is more likely fake.

3. In order to assign weights we will curate a list of credible and fake news sites.

iii. Cross-check the top 10 web searches that say something similar or the opposite
1. Are they reputable? How many are from blogs? How many are from only right-wing/ left-wing news sources?
2. What are they saying? Are all of the main ideas in the original text also connected in the top 10 web searches, or was it patch-worked from different sources?

iv. Analyze the text using NLP and ML
1. What is the main idea?
2. Is the purpose for informing or fear-mongering?
3. Are the claims supported or cited?
a. Follow the citations

v. Requires NLP, modeling, and data acquisition skills

c. **Feature 2:** Apply Mike Caulfield's SIFT method (https://hapgood.us/2019/06/19/sift-the-four-moves/)

i. Automate the cross-checking process and provide an infographic of the process
1. Stop
2. Investigate the source
3. Find better coverage
4. Trace claims, quotes, and media to the original context

ii. Requires html and data acquisition skills

5. Organization and Management Team:

a. Roles will be flexible depending on an individual's interest, but at any given time, someone will be responsible for only one of the following roles:

i. **Data Acquisition (DA) experts (2 individuals):**
1. Come up with the base code to retrieve or isolate text for the other features; be comfortable with Selenium
2. Seamlessly integrate the data acquisition code to the features
3. Responsible for upkeep
4. If done, they can work on other features

ii. **MVP/dashboard (1):**
1. Make sure the design and website works before moving to a different task
2. Integrate all features to the dashboard
3. Tests the website on different devices and checks for uniformity and functionality

iii. **Feature 1-2 (3 per feature, 6 total):**
1. Works with the DA experts to clean and prep data for further analysis
2. Making sure their respective code works by each deadline
3. First one to seek help if there's any blockers

4. (anyone can work on these features, but whoever is assigned to this feature is responsible organizing what's happening/ completed by deadlines/ squashes bugs/ removes blockers)
5. In constant communication with their respective partner about direction and issues, then updates the entire group about progress/ issues

iv. **Server upkeep/webmaster (1)**:

1. Set up AWS and website
2. Responsible for integrating the features with the Person A and B above to a cohesive website that functions smoothly
3. Making sure the server is always working
4. Makes sure the auto-documentation is working

6. Contract: talk with group
   a. *Conflict Resolution Process: How do you plan on dealing with conflict when it arises? If two team members are disagreeing with each other, what is the process by which it will be resolved?*

      The non-conflicting team members will speak with each conflicting member separately, and collectively determine the appropriate resolution. If the two members cannot come to an amicable agreement we can assign them tasks that are not directly related to avoid conflict.

   b. *Work Schedule: How much time and energy are each of you committing to do per week? When are you planning on working and when are you going to verify your work against the plan you have put together above?*

      We will each commit 30-50% of our available hours for schoolwork to working on this product.

      Schedule
      -Each group focusing on a particular feature: Meeting on ad hoc basis, at least once per week
      -Weekly standup meeting with whole group: Tue 12pm

   c. *Ownership: Given what we have learned in the first week of the class, how will ownership of the project be handled? What percentage of your company is given to each of you?*

      We will be splitting the company evenly across each team member; a total of 10 members with 1/10th share each.

   d. *Fair Work Process: How will you make sure that the work does not fall on only a few individuals? Specifically document how you will identify, to the professors, when a*

person is slacking. How will you modify your ownership in order to reflect the actual work?

We will be using Trello to document the tasks we need. People will assign themselves to tasks, and we will discuss as a group to be sure people have a fair workload. During our meeting, we will discuss the amount of work each member is completing.

If an issue arises one member can notify other team members first to open a conversation about workload and maybe getting some help or taking up a different task. After having at least one conversation about workload or changing tasks, the team will notify the professor via email that the member is not contributing.

Assuming a team member isn't contributing and we as a group agree they are not cooperating with efforts to help them contribute in the future, we will redistribute their share of the company among the remaining members.

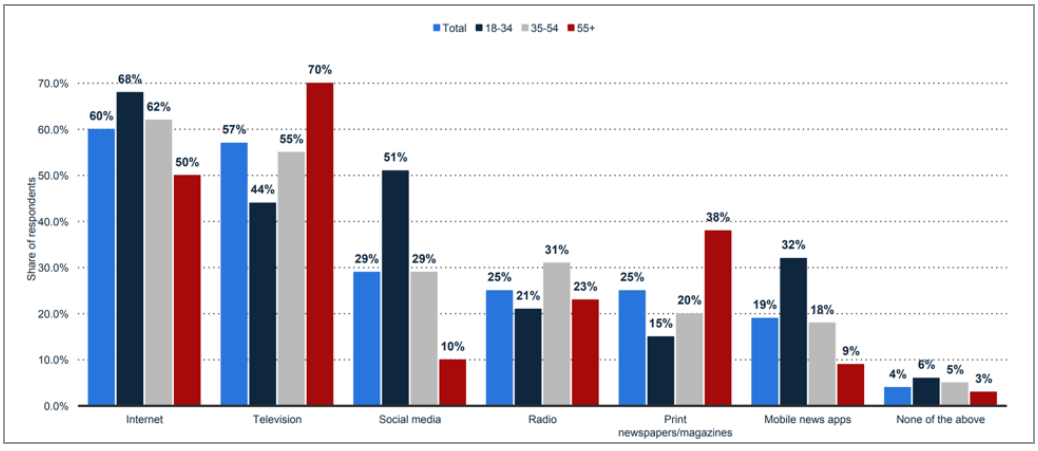
2.1 Market Analysis

1. Who is the customer?

   Our customers are political news readers who want to identify fake information and become digital media literate. The characteristics of these customers are:

- **Demographics**:
  - Location: US only
  - Age: 18 - 55 years old (older people are more likely to watch TV only based on AACE information shown in the plot below).
  - Gender: All
- **Psychographics**:
  - Interests: The user uses mainly internet for news research

Most popular news platforms among users in USA (2018)
Source: https://www.aace.org/review/social-media-and-fake-news/



2. Why would they be willing to purchase this product (motivation)?

Approach to monetize the app:

Our website is free to access,but the free tier is limited to 5 searches per day per customer. We would have two main revenue sources:

1. Ads
2. Premium subscription service
    a. TLDR feature (document summarizer)
    b. Educational resources to gain media literacy
    c. Ad-free experience
    d. Unlimited searches per day

3. Who are your competitors?

From our research, the main competitors are fact-checking platforms which most of them don't offer instant analysis or are limited to some preselected popular fake news. Although they are useful and reliable at the US level, they don't give a detailed explanation about how the cross-checking process was done or how they computed the final reliability score which could allow us a clearer interpretation, awareness, and education for self long-term fact-checks. The main competitors are:

- Snopes
- FactCheck.org
- Politifact
- Unslanted
- Educational websites

We also analyzed the main features of each one of our competitors and propose how we will be different from them:

Product	Price	Market segment	F0: Search box (URL/Topic)	F1: Instant fact-checking	F2: Topics	F3: Trace Explanation	F4: Truth Score
Snopes	Free	General public	Topic	Limited (only popular news but accepts new proposals)	Limited (analyzes only popular news)	Text explanation (sources)	Two categories
FactCheck .org	Free	US political news readers	Topic	Not available	Politics only	Text explanation (sources)	Not available
Politifact	Free	General public	Topic	Limited (only popular news	Limited (analyzes	Tex explanation	Five categories

				but accepts new proposals)	only popular news)	(sources)	
Unslanted	Free	US political news readers	URL/topic	Available	Politics	Not available	Four categories/ Three NLP models
Our platform	**Free and Premium version**	**US political news readers**	**URL/topic**	**Available**	**Politics**	**Available**	**Available with NLP models**

4. What is the “size” of this market:

(a) How many potential customers are there?

Based on the information of the Association for the Advancement of Computing in Education, around 65% of all US population between 18-55 years old use the internet as the main platform for consuming **news**. These users are the ones most likely to use our platform and therefore would be the total potential market:

- US Population (18-55 years): 140 MM people (Census data, 2019)
- **Potential market:** 84MM people (65%)

In addition, we observed that our main competitor Snopes has around 20MM unique visitors per month, which serves us a base number to calculate our **target market** in the short term.

(b) What is their willingness to pay?

Part of our revenue would come from advertisers who are interested in marketing to the users on our platform. It will be difficult to generate ad revenue in the early stages. We will commit to building our b2c functionality first so we can build a user base we can later monetize. By focussing on the integrity of the platform and transparency with users, we can develop trust with our user base to build their trust in the future.

Customers who are frequent users of the app would be interested in getting access to all the premium features such as unlimited searches, ad-free experience, document summarization. We also appeal to the section of customers who see value in curbing disinformation from an ethical standpoint and hence willing to contribute to our app.

(c) What part of the market do you believe you can reasonably capture?

We believe our market is the online news market, so we have projected our potential ad revenue in comparison to the market at large to calculate our **market share** which will be a north star metric for the business.

- Snopes receives 6 million viewers a month, and we could receive this much over an entire year(https://en.wikipedia.org/wiki/Snopes).
- Based on the average per users ad revenue for other sites (Emarker, 2019), we estimate generating $5 in ad revenue per user over a year is reasonable.
- We found a rough estimate of 10 billion online ad revenue for local media companies (Emarker, 2019).

*6 million users * $5 ad rev per user / 10 billion in digital ad rev for news media = 0.3% of market*

5. What makes your product special or gives you the ability to protect your market share?

Unlike other media literacy apps out there which either focus on educating students, or fact checking apps we provide a comprehensive report which includes a truth rating on an article and also explaining how we got there. This app will bridge the gap between fact-check sites and educational sites. Unlike other sites, our unique approach combines source check, content check using ML and also explains the score.

2.2 Feature Plan

Note: Feature 2 - SIFT Method team currently fleshing out core ideas into detailed plan; will break down core component tasks (currently in feature plan below) into granular tasks by 4/10

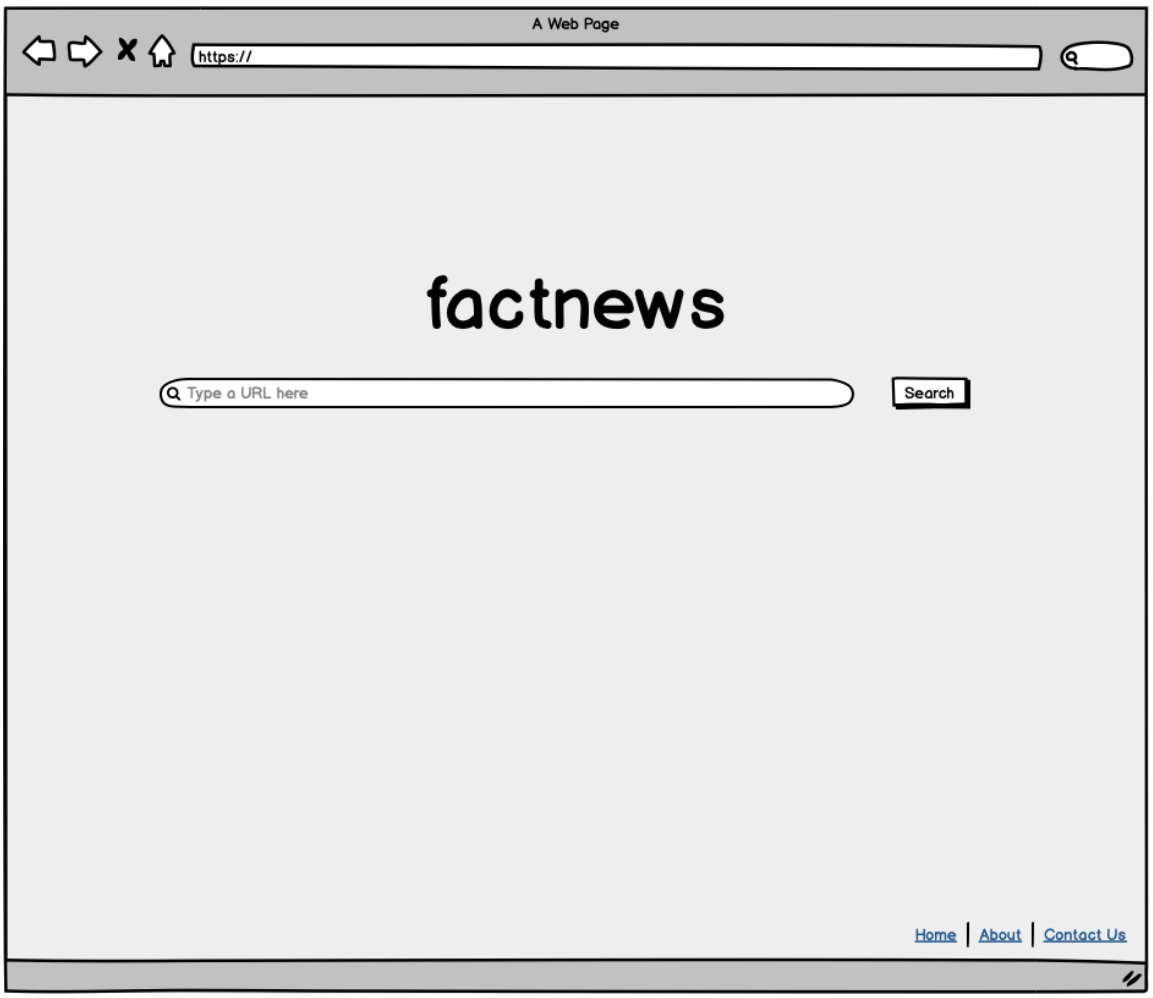
Main group	**Feature details**	**Complete by**	**Person in-charge**
Data Acquisition	Produce Scripts to Acquire Data for NLP	04/01/20	Sunny, Kamron, Akansha, Samarth
Data Acquisition	Clean/Format Data, put into AWS	04/08/20	Sunny, Kamron, Akansha, Samarth
Dashboard	Create mock up	3/27/20	Ivette
Dashboard	Create home page and Results rough outline	4/3/20	Aakanksha, Kathy
Dashboard	Create Results page layout	4/10/20	Aakanksha, Kathy
Dashboard	Integrate Feature #2 to Results page	4/17/20	Aakanksha, Kathy

	Dependency: Feature #2 completion		
Dashboard	Integrate Feature #1 to Results page *Dependency: Feature #1 completion*	4/24/20	Aakanksha, Kathy
Dashboard	Create About page	5/1/20	Aakanksha, Kathy
Feature 1 - ML / NLP	Create baseline models for detecting fake news *Dependency: Data Acquisition*	04/03/20	Shreejaya, Akansha
Feature 1 - ML / NLP	Create models using fast.ai library *Dependency: Data Acquisition*	04/03/20	Ivette, Aakanksha Nallabothula Surya, Samarth
Feature 1 - ML / NLP	Explore existing libraries and research papers on fake news detection	04/03/20	Samarth, Ivette, Akansha
Feature 1 - ML / NLP	Use transfer learning from BERT in PyTorch *Dependency: Data Acquisition*	04/10/20	Shreejaya, Aakanksha Nallabothula Surya, Samarth, Akansha
Feature 1 - ML / NLP	Verify source domains *Dependency: Feature #2: 'I' of SIFT method*	04/17/20	Shreejaya
Feature 1 - ML / NLP	Train fast.ai and pytorch model on bigger data *Dependency: Data Acquisition*	04/17/20	Shreejaya, Ivette, Akansha
Feature 1 - ML / NLP	Analytics model for verifying top 10 sources	04/17/20	Shreejaya, Samarth

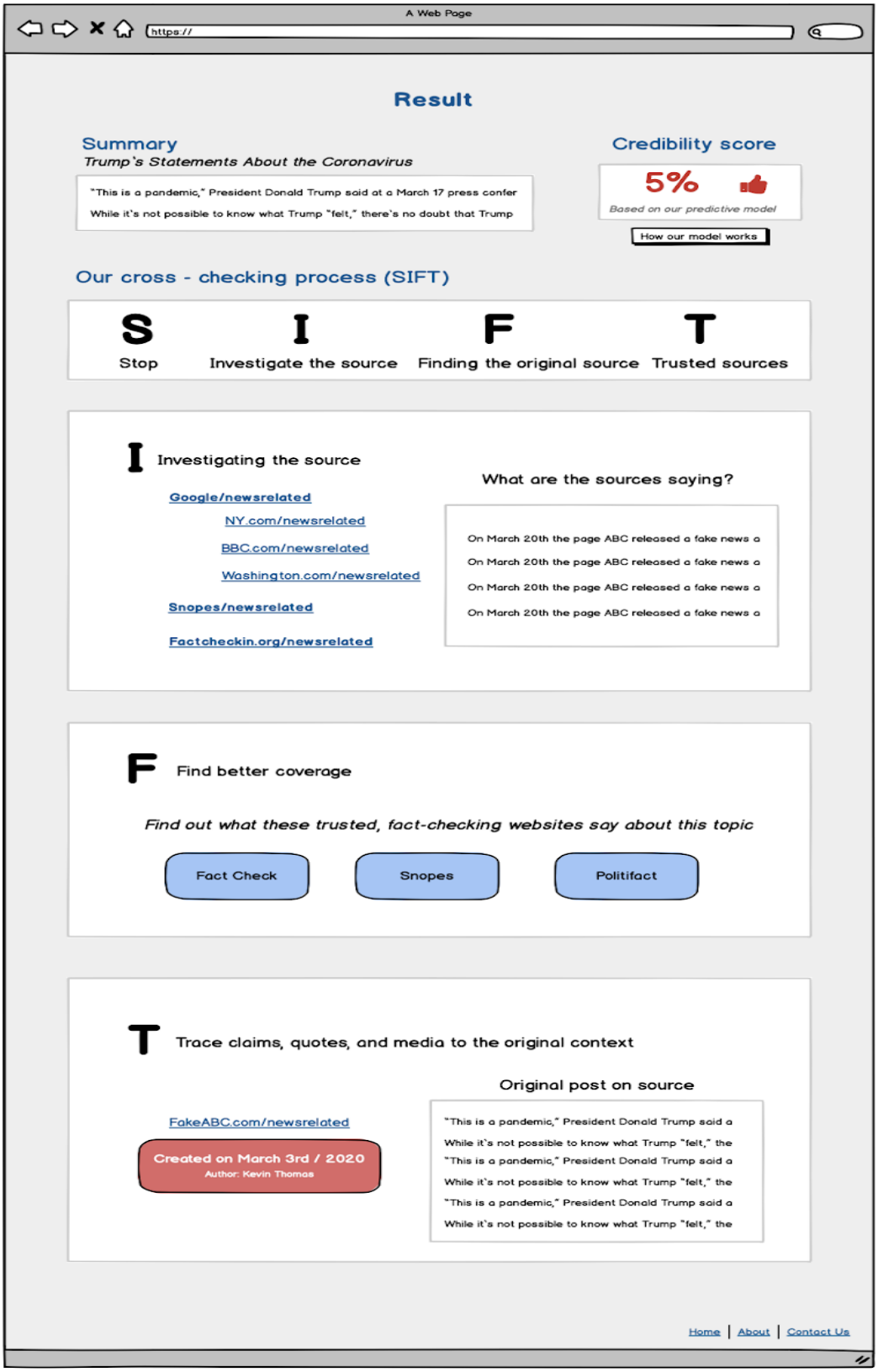
	Dependency: Data Acquisition		
Feature 1 - ML / NLP	Integrate best model with frontend, get a weighted score *Dependency: Feature #1*	04/24/20	Shreejaya, Aakanksha Nallabothula Surya, Akansha
Feature 1 - ML / NLP	Getting final model into production - hyper parameter tuning, refactoring *Dependency: Feature #1*	05/01/20	Shreejaya, Akansha
Feature 2 - SIFT Method	Explore combining newspaper and Google packages	04/07/20	Bing, Sunny, Kamron, Kathy
Feature 2 - SIFT Method	Implement “I” in SIFT Method *Dependencies: Data Acquisition, and Feature 2: Explore combining newspaper and Google packages*	04/14/20	Bing, Sunny, Kamron, Kathy
Feature 2 - SIFT Method	Implement “F” in SIFT Method *Dependencies: Data Acquisition, and Feature 2: Explore combining newspaper and Google packages*	04/21/20	Bing, Sunny, Kamron, Kathy
Feature 2 - SIFT Method	Implement “T” in SIFT Method *Dependencies: Data Acquisition, and Feature 2: Explore combining newspaper and Google packages*	04/28/20	Bing, Sunny, Kamron, Kathy

Appendix

Mockup - Homepage



Mockup - Results Page



Addressing concerns from previous feedback from professors:

Why our app is different from Snopes:

- Snopes provides a static service whereas our app provides a dynamic service with instant fact checking
- Snopes is also restricted to only popular news articles while we provide the flexibility of searching with a link/URL
- Moreover, our app serves as an educational tool which helps the public learn how to identify disinformation by explaining how our methodology works

Why we need SIFT if we are presenting a score:

- Presenting a standalone score does not educate the user on how to identify misinformation
- Our app aims to educate users on how to identify misinformation and bridges the gap between educational websites and fact-checking websites

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Project Plan Evaluation
Update #3
03APR20

1. **In the previous update you mentioned that some goals were hit and some were missed. Please comment on those and how it will affect your end product.**

   We did not miss any goals yet, but we did have to redistribute responsibilities because of some issues with implementing the front page. Our resident front end expert came into the front end team this week and will probably help out more in the future if she has time. The original team will try her best in the future-- if she does not figure the front end infrastructure out, however, this will negatively affect this group's end product.

2. **How would you change your project plan in order to make it more useful for you and your team (what could you have done to avoid any of the problems above)?**

   Originally, we organized by what people were interested in (front or back end). Even though it was a good way to motivate us to work on what we are passionate about, it did not take team imbalance into consideration. We ended up being a bit imbalanced for some groups and had to redistribute work to hit our project goals.

3. **Do you foresee any issues going forward, given what you have learned so far?**

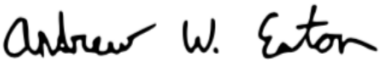
   The Flask implementation with integrating the different features might be an issue because we're all new to it. Even though we have the machine learning part functioning, the impact of our work is diminished if we cannot display it. Also, our feature 2 (SIFT method) is still being discussed, and there can be potential disagreements in the near future about implementation.

1.5 Signatures

- Kamron Afshar

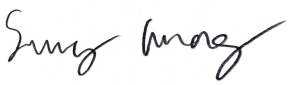
- Shreejaya Bharathan

- Andrew Eaton



- Samarth Inani

- Sunny Kwong



- Akansha Shrivastava

- Ivette Sulca

- Aakanksha Nallabothula Surya

- Bing Wang

- Kathy Yi

Build Log

Task	Status	Blockers	Assigned Worker
Acquire NYT Data	Complete	N/A	Kamron
Acquire Guardian Data	Complete	N/A	Akansha Shrivastava
Acquire “Fake” Data Part 1	Complete	N/A	Sunny Kwong
Build Baseline NLP Model	Complete	N/A	Shreejaya
Research on Github and published papers	Ongoing	N/A	Samarth, Ivette
Create homepage and results outline	Complete	N/A	Aakanksha Nallabothula Surya, Kathy Yi
Create Results page layout	Ongoing	N/A	Aakanksha Nallabothula Surya
Create About page	Ongoing	N/A	Kathy Yi