Truthlytics: Trust in Media Reimagined

A New Model of Transformation for Journalism in the 21st Century

White Paper

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Abstract

Journalism today is facing multiple crises that have led to an overall distrust in the industry: a broken economic model, the presence of niche programming, and the rampant spread of misinformation. In order to address these problems on a large scale, while taking into consideration the 24-hour news cycle, a technological and automated solution must be embraced.

Our model implements fact-checking for news articles as a service, and does so using machine learning, natural language processing, and blockchain technology to verify statements against databases maintained by official sources. This technical framework is manifested in a service marketplace and media content platform that will connect local news organizations and freelance journalists with readers seeking to consume fact-checked content.

In the long term, Fact Checking as a Service can be used not only to verify news articles, but also podcasts, social media posts, and other forms of media. This project has the power to restore trust in journalism, while cultivating the informed citizens crucial to maintaining democracy.

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CHAPTER 1

The Problem

1. Journalism in Crisis

Because of journalism's broken economic model, niche programming, and the proliferation of misinformation, there is a dire need to create a technological model for journalism that will restore trust. Without it, members of society will not be fully informed and able to make important decisions. Without it, our nation's democracy is at stake.

What images did the word "news" conjure 50 years ago? Most likely trusted individuals such as CBS' Walter Cronkite, the Huntley-Brinkley team at NBC, radio and television newscaster Fahey Flynn, and America's first celebrity weatherman, Clint Youle. Receiving the local Sunday newspaper was a nationwide habit. From Woodward and Bernstein's coverage of the Watergate scandal for the Washington Post to Miami Herald reporter Julie Brown's Jeffrey Epstein expose, local newspapers have relentlessly provided the truth. Journalism's intent was perceived as deeply rooted in producing an unbiased and comprehensive report of world events. Accordingly, news held the confidence of people across the globe.

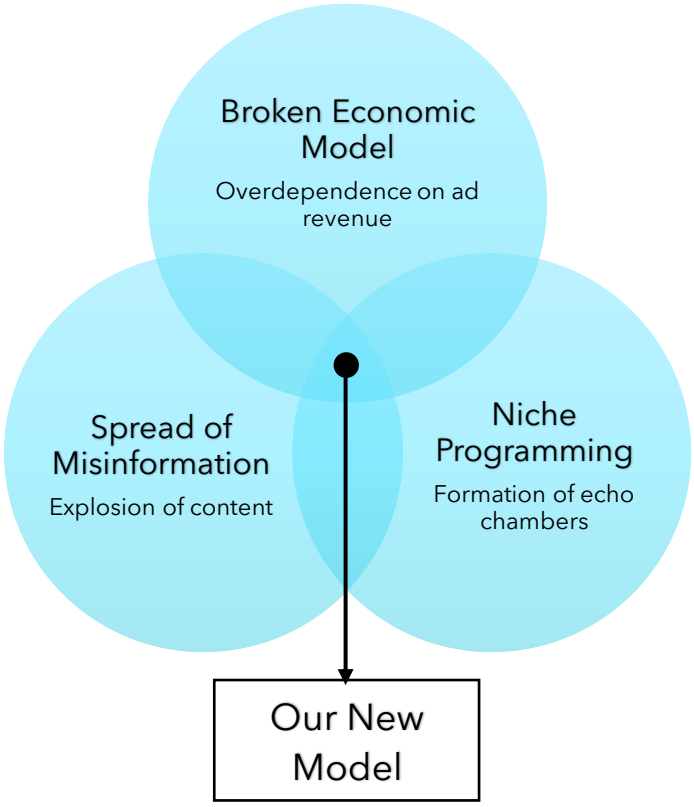
Comparing this history with the connotations of the word "news" today, it is apparent that the media and its nuanced relationship with the public has altered drastically. Newspaper groups bought and run by hedge fund investors such as Alden Global Capital have led to the downfall of local newspapers, the primary source of truth. Half-truths, biases, and one-sided articles plague reporting, resulting in growing distrust in journalism worldwide.

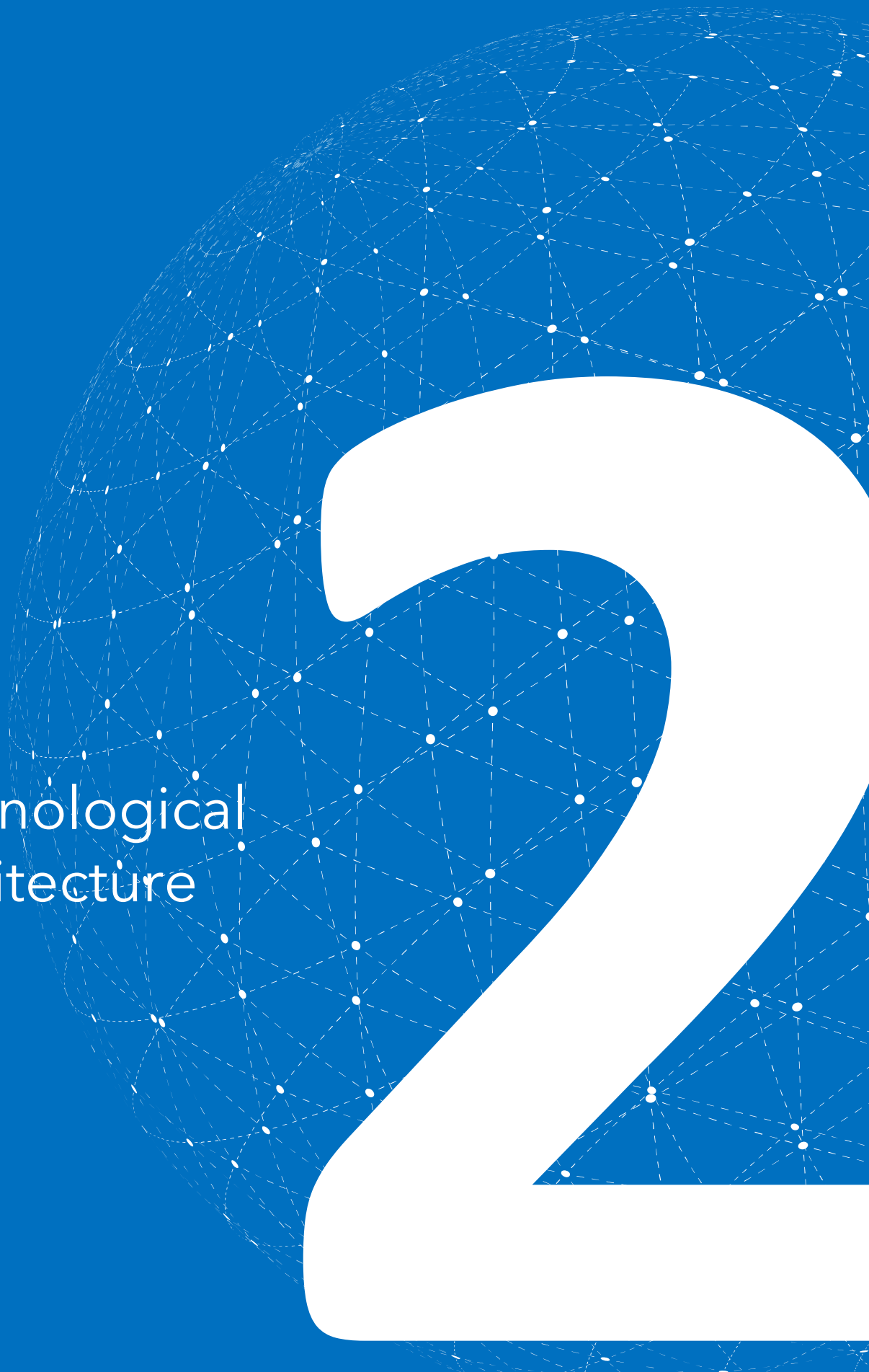
Our new model for journalism has three underlying solutions that address each of these problems. To fix the broken economic model we are creating a platform that will revitalize local newspapers by giving them a business infrastructure so they can focus on creating high-quality content. In order to address niche programming, we provide readers with a complete picture by encouraging them to read different perspectives. To combat the proliferation of misinformation, we will implement an automated and robust verification process.

Factually accurate articles will be prioritized on our platform, incentivizing news organizations to produce objective content. Shifting the focus back onto quality will also reduce the problems associated with overdependence on ad revenue.

63%

of Americans believe that news stories are often inaccurate, according to two decades worth of Pew Research studies.



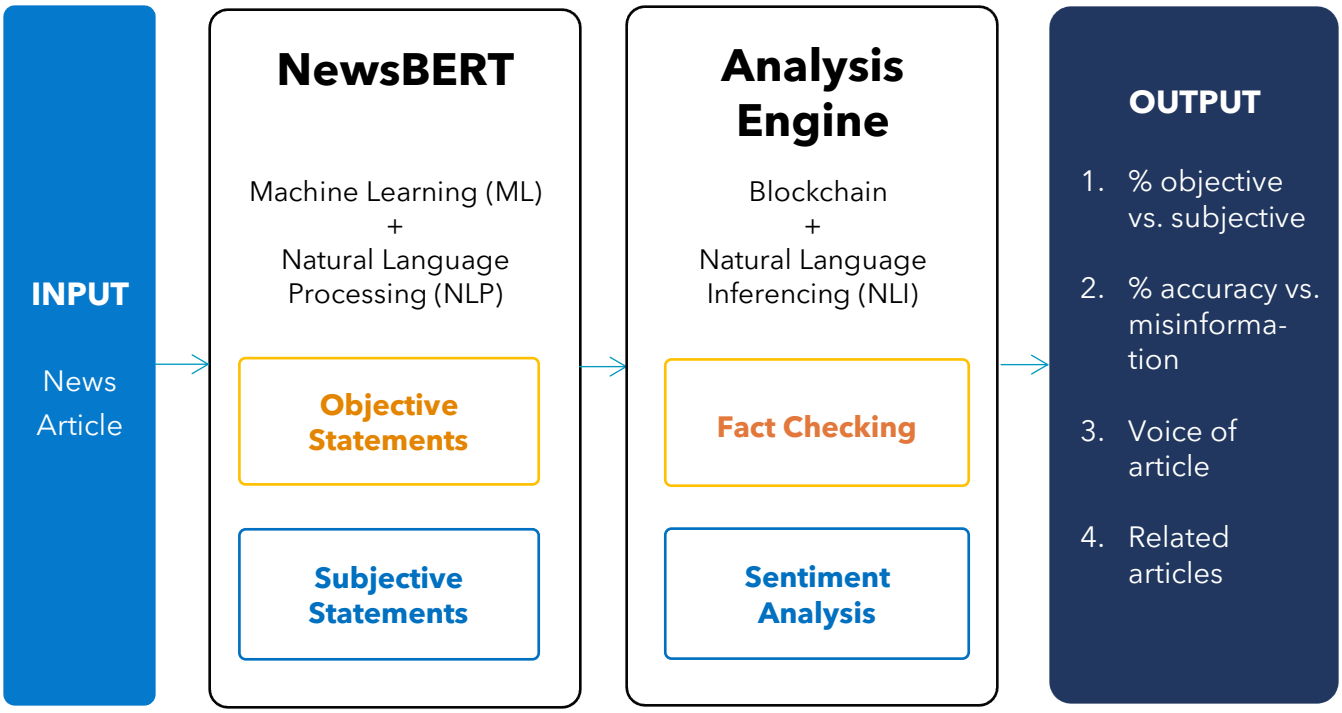


CHAPTER 2

Technological Architecture

2. Tech Overview

In order to address these problems, a technological model that can be scaled to handle the large amount of news produced must be used. The technological model we have designed targets two of the main problems in journalism: niche programming and the spread of misinformation. The technological model in the overview below will be integrated into a media content platform.



Given an article as input, it is first labeled with a category, whether that be "Health," "Sports," or "Entertainment." Depending on the category, a different algorithm will be trained due to varying syntax and style used in the articles. The model has two main modules:

1. **NewsBERT:** An algorithm which splits objective and subjective statements (Appendix I)
2. **Analysis Engine:** A verification system that analyzes objective and subjective separately
    a. **Objective Statements:** Fact-checked through a blockchain called **"TruthChain"** and web-search verification (Appendix II, III)
    b. **Subjective Statements:** Analyzed for sentiment and bias (Appendix III)

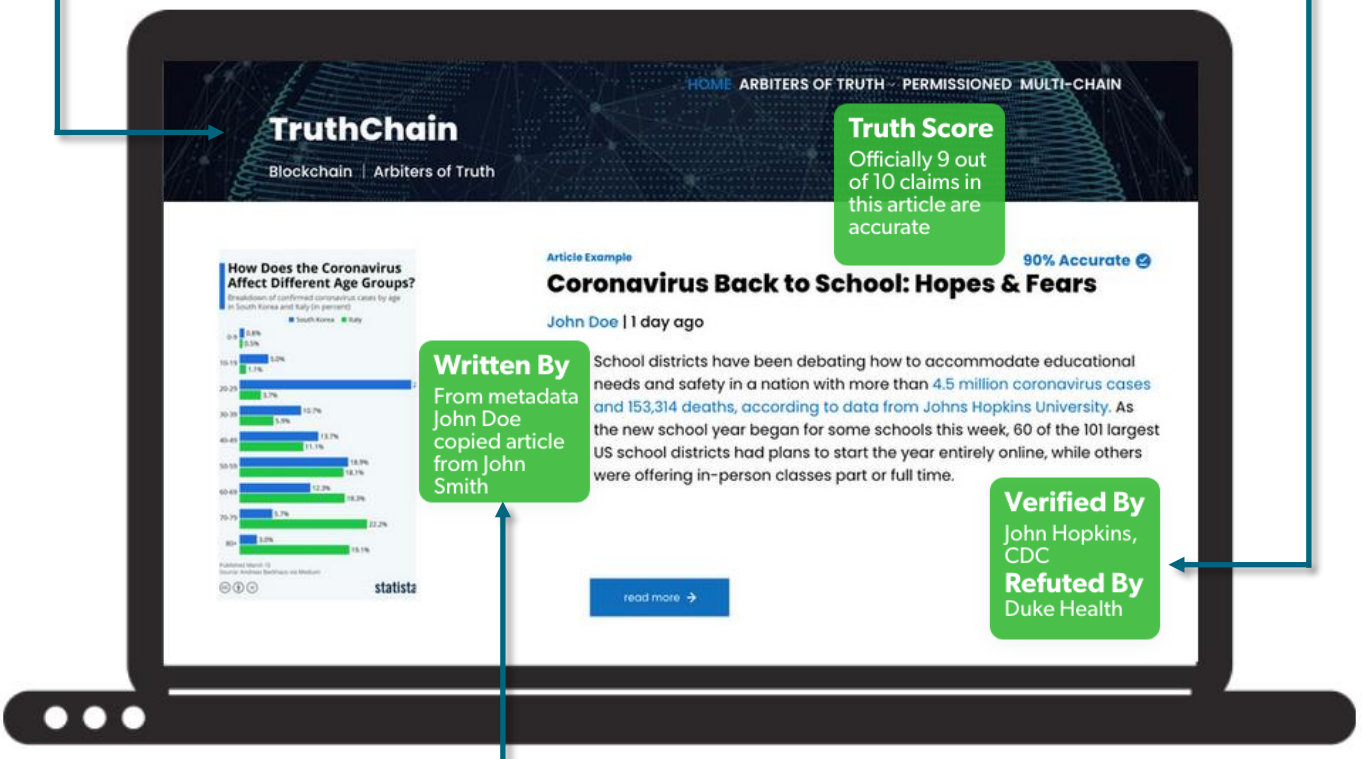
3. The Power of Blockchain

TruthChain

This "TruthChain" is a permissioned blockchain that consists of nodes that will validate objective statements within an article. We call these nodes the "arbiters of truth." They will form a decentralized peer network to analyze the validity of a given objective statement and assign a "Truth Score" to any given news article. The three features below explain our blockchain design choice:

Decentralization – Currently, Google and Facebook control 70% of all internet traffic, robbing journalists of their valued content and ad revenue. A decentralized blockchain ensures that no central organization, tech company, or government owns the news.

Transparency – Our blockchain will transparently capture a story's multiple sides and effectively display it to the reader. Like Grammarly, the beauty of this blockchain is that it doesn't create a verdict on the truth of a statement but rather provides all the relevant information for the reader to decide.



Immutability – No node can alter the truth score, maintaining the security of the data. Furthermore, with people retweeting and reposting content on social media, the original creator's efforts are seldom recognized. However, through immutability, metadata can be used to track an article's genesis.

CHAPTER 3

Business Plan

4.0 Bringing the Idea to Market

After designing our core technological frameworks, the next step is turning them into a set of products targeted at specific customer segments. Later we will market those products, acquire customers, generate revenue, and evolve across several phases. First let's take a look at what the market wants, who our customers are, and how we plan to create value for them.

4.1 Customer Preferences and Key Market Insights

Through conducting extensive market research of readers and journalists, we have identified a set of key behavioral trends and preferences that will help drive our product strategy:

80%

of responding journalists agreed that journalism's overdependence on ad revenue cuts subscription revenues, reduces content quality, and creates distrust amongst readers

88%

of journalists who responded stated that they would use an automated fact checker if it were robust and addressed flaws such as reliability and speed

70%

of responding readers gave an answer between 3 and 5 (inclusive) when asked: On a scale of 1 (highly trust) to 5 (highly distrust), how much do you trust the news

93%

of readers who responded would consider reading news from less-trafficked sources (i.e. local newspapers and freelance journalists) if those articles were thoroughly fact-checked

4.2 Target Customers

Based on these insights, it becomes clear that there are different stakeholders in the journalism industry. Our target customers fall into two categories -- news consumers and news creators -- each of whom have distinct needs and wants. In accordance with this, the products we create will deliver a value proposition that satisfies the different needs of all our customer segments.

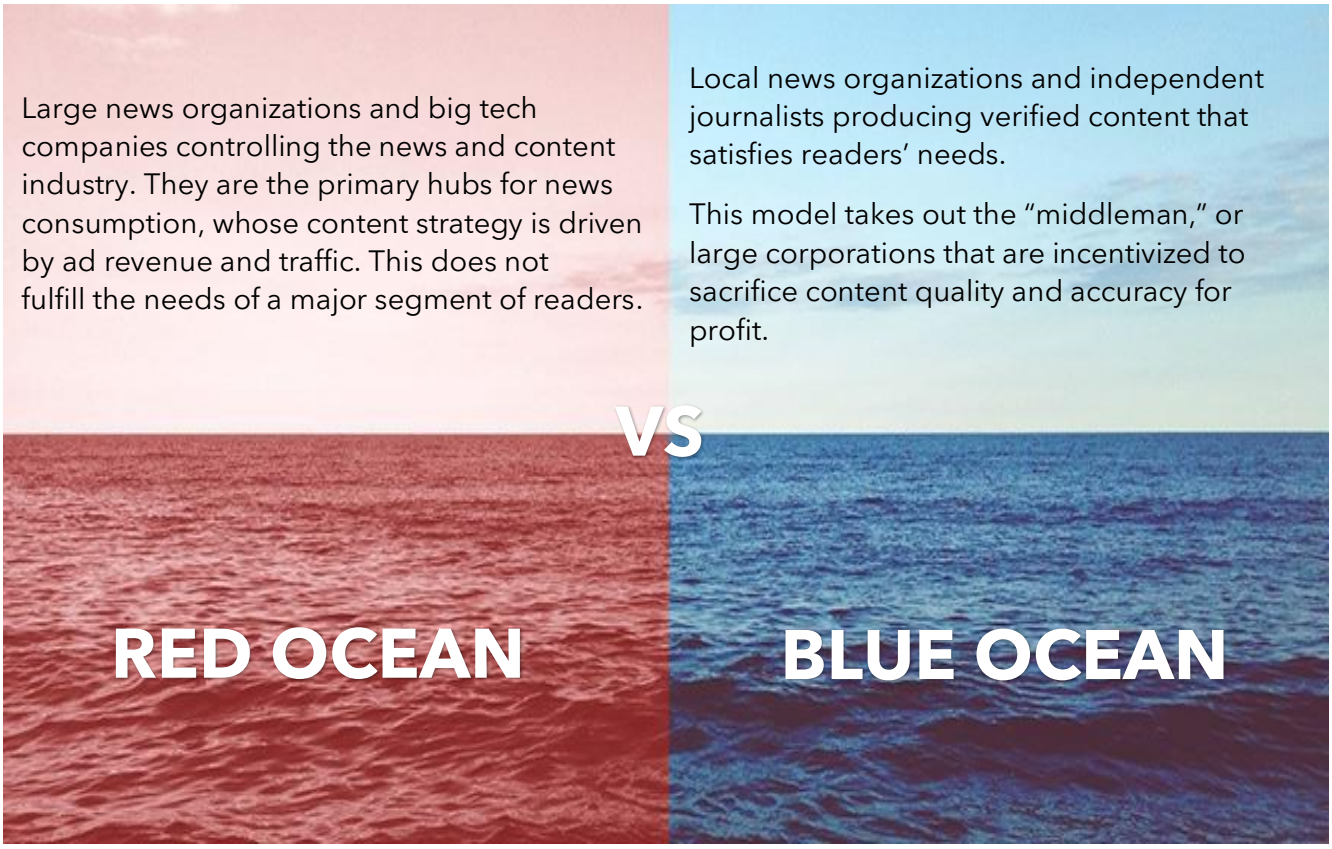
News Consumers want to read factually accurate news and be exposed to a range of differing viewpoints while consuming news. Thus, the value we must provide is delivering fact-checked content from local newspapers and independent journalists.

News Creators want to reach larger audiences, build credibility and trust among readers, be compensated fairly, and maintain profitability. Thus, the value we must provide is the ability to build and manage their own *news microsite*, create fact-checked news, reach target audiences, and maintain consistent, parallel revenue streams.

4.3 Creating a Blue Ocean Strategy

As discussed, the issues of digitization, content explosion, and flawed business models have affected the business landscape of the news industry -- effectively turning it into a red ocean dominated on one hand by large, incumbent news corporations which struggle to remain relevant, and big tech companies commanding the lion's share of ad revenue on the other hand. Local news organizations and freelance journalists bear the brunt of this competition -- in terms of reader churn, declining subscription revenues, and razor thin margins.

To change this, we propose creating a blue ocean strategy that can truly transform the industry for the better, by making the competition irrelevant; creating an uncontested market space; and creating new demand instead of exploiting existing demand.



4.4 Truthlytics for Readers

We propose the creation of a modern news hub, acting as a truth search engine, that takes two distinct forms for the two primary stakeholders. First, a news platform where readers can engage with diversified and verified news. Secondly, a platform powered by NewsBERT and the TruthChain which is used by independent journalists and local news organizations for the creation of fact-checked news.

PLATFORM FOR READERS

On this platform, readers will have access to a news feed of *fact-checked* articles from local news organizations and freelance journalists. The highly personalized feed for each reader prioritizes articles with higher Truth Scores.

Scrolling through the feed, the reader will be able to see the composite truth score of each article, computed after passing through the TruthChain.

The goal of Truthlytics for Readers is to intuitively provide access to in-depth fact checking and sentiment analysis, and not "decide" or "censor" what is true vs. what is misinformation. Such level of detail transparency will empower the reader to ultimately make their own decisions after being much better informed.

Each article will have annotations as highlights:

Red: Statement refuted by a majority of arbiters of truth

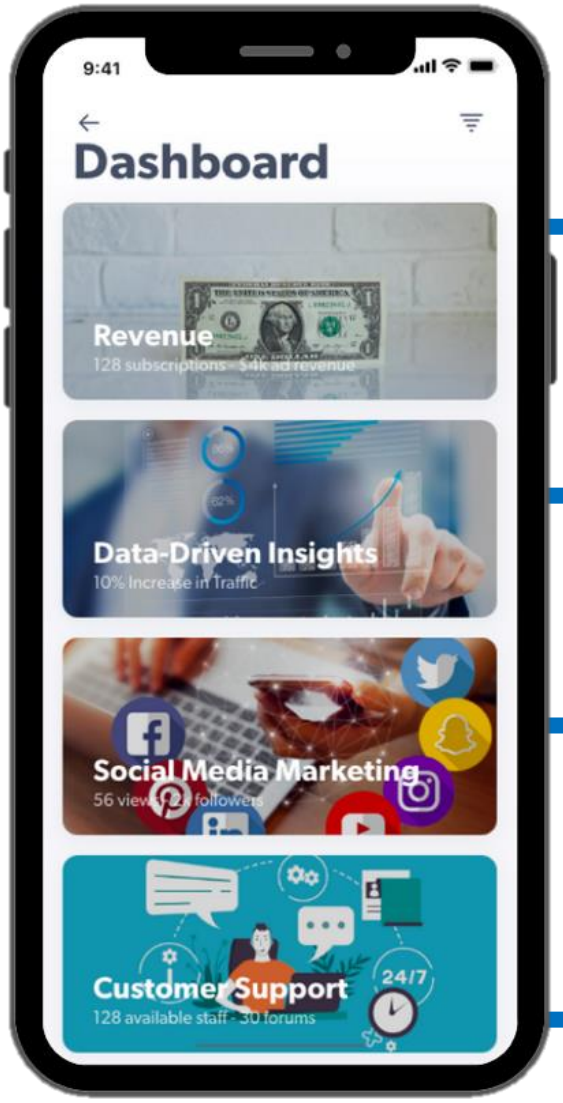
Green: Statement supported by a majority of arbiters of truth

Yellow: Statement refuted and supported roughly equally

4.5 Truthlytics for Journalists

PLATFORM FOR JOURNALISTS

This platform will allow the creation of digital newspapers to be embedded within the larger Truthlytics platform. Currently, news creators must handle both content creation and revenue generation, which is difficult to manage. To solve this, Truthlytics will take the responsibility of managing and automating several business and technological operations. This will allow journalists to focus on producing less biased and more objective news content by using our algorithm. The Truthlytics for Journalists suite includes:



Revenue Sharing – Journalists will receive a share of the subscription and ad revenue paid by readers on the platform. They will be aided by a sales team that connects them to trusted ad providers that do not overcharge.

Data-Driven Insights – The suite will provide data-driven insights on customer behavior, traffic, sales, etc. We will also have a data sciences team enabling journalists to parse data to find trends that support their claims.

Marketing Strategy – A marketing team will connect news creators to wider audiences than before. Partnerships with social media platforms and digital campaigns will further provide additional ways for journalists to increase the viewership of their content.

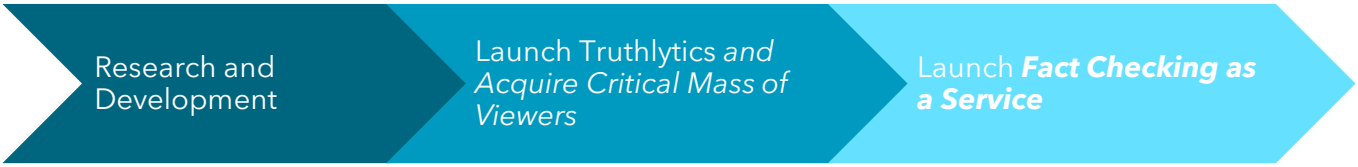
Service and Support – Journalists will also be provided with web hosting capabilities, which would allow for zero downtime and unlimited traffic volume. Additionally, 24/7 technical support will be provided with help from a design team, development team, and forums.

4.6 Commercializing Truthlytics

To create a sustainable business model, the platform will provide three main revenue streams: subscription fees from readers and journalists; a share of journalists' revenues from Truthlytics; and licensing fees from the Fact Checking as a Service.

1. **Readers –** The freemium model is a free plan that shows only the percentage accuracy of articles and gives access to a limited number of free articles per month, with ads every few articles. This will encourage readers to upgrade to the premium plan, which includes unlimited articles per month, a detailed breakdown with colored annotation, and display of verifying sources.
2. **Journalists -** A tiered monthly subscription with varying degrees of services within the suite, a revenue sharing model covering subscription and ad revenues generated from their microsite, and an agreement to be fact-checked by the algorithm on our platform.
3. **Fact Checking as a Service -** Going forward, we will license our fact-checking and sentiment analysis technology to larger news companies and other organizations that commercialize content, as well as businesses that need it. For individual users, we will launch an extension or plugin that can fact check and analyze any content on their web browser and local file system.

4.7 Timeline for Success



Phase 1

First phase starts with the development of the technological architecture. The key step in this phase will be the partnering with the Arbiters of Truth on the **TruthChain**. This phase will take two years to be completed.

Phase 2

Next we will design, develop, and launch the **Truthlytics** platform. The key steps in this phase will be to partner with content creators, followed by launching a website, mobile app, and daily newsletter. It will take an estimated two years to gain a critical mass of users and journalists.

Phase 3

Lastly, we will launch our **Fact Checking as a Service**, or licensing our fact-checking algorithm in the form of APIs to bigger, centralized news organizations, social media companies, and organizations that rely on factually accurate content. Finally, we will create a browser extension for individual users.

5. Conclusion

While our interconnectedness has exploded during this digital age, our innate trust in journalism has eroded as misinformation, disinformation, propaganda, and lies have proliferated. The media's focus has been forcibly shifted from objective content toward profit-making. An overall feeling of distrust in social media and digital content has spilled over into the news industry. This distrust poses an existential threat not only to the media, but to our nation's democracy. Without an objective and unfettered Fourth Estate, corruption flourishes in business and government, and civil society deteriorates as citizens retreat to their news silos.

In order to restore this essential trust, our model addresses three core problems facing journalism: a broken economic model, niche programming, and the spread of misinformation. Our news platform, powered by a machine learning, natural language processing, and blockchain-based algorithm, addresses these problems by prioritizing news articles that are more factually accurate and unbiased.

Furthermore, our multi-sided media content platform encapsulating this technology will provide business support and revenue streams that enable journalists to devote more time and energy to producing quality content. Our Shopify-style platform revitalizes interest in local and independent journalism by providing the business infrastructure to empower news creators to run their own production, reach the right audience, and receive fair compensation, thus reversing the detrimental effects that digital media has had on journalistic integrity.

Our "TruthChain" will generate revenue as as a fact-checking service, purchased by media companies and applicable to every type of media from tweets to YouTube videos. Eventually, Fact Checking as a Service will be a plug-and-play solution that can be used by anyone to determine the accuracy of a fact mentioned in any piece of content. This "seal of credibility" not only addresses the proliferation of misinformation, but also curbs niche programming by incentivizing readers to step out of their echo chambers.

Our technological solution addresses the main problems of traditional journalism while acknowledging the current state of digital media. Journalism holds the power to address and redress the polarized nature of our society. Our project will reach its true potential with the help of investors, readers, and journalists who understand that truth is power, that an informed electorate is an effective electorate, and that a robust Free Press is essential to our democracy.

Appendix I - NewsBERT

NewsBERT will leverage ML and NLP to determine whether a sentence is objective or subjective. For example, the sentence "The climate change conference had more than 1,000 attendees," would be characterized as objective and would be fact-checked. Alternately, "The conference's atmosphere was energizing," would be characterized as subjective. NewsBERT's components include:

1

Gathering Training Data
In order to detect patterns and make accurate prediction, our ML algorithm will be trained on a large volume of topic-specific data, ranging across time (using articles from the past 5-10 years), voices (different biases and news organizations), geography (local context), and disciplines.

2

Labeling the Data
Sentences will be manually labeled as either objective or subjective by a large number of extensively trained and educated volunteers from varying belief backgrounds. While manually labeling, multiple volunteers would have to reach a consensus to avoid errors and minimize implicit biases in the model.

3

Language Representation
Google BERT (Bidirectional Encoder Representations from Transformers) will capture the various aspects of a sentence as experienced by humans, such as structure or semantics. BERT transforms the sentences into high dimensional vectors accounting for contextual meanings and relationships between words (such as the significance of pronouns).

4

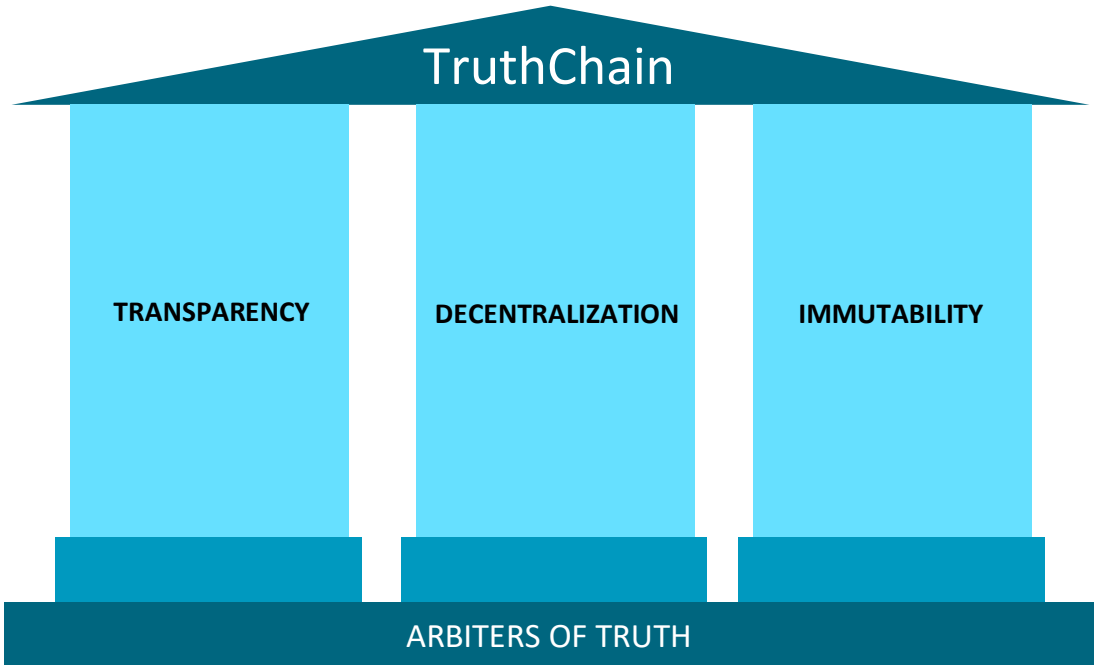
Pattern Recognition
With the help of manually labeled data and the BERT transformer, an algorithm, also known as a classifier, can be trained to find patterns that help predict whether a sentence is objective or subjective.

5

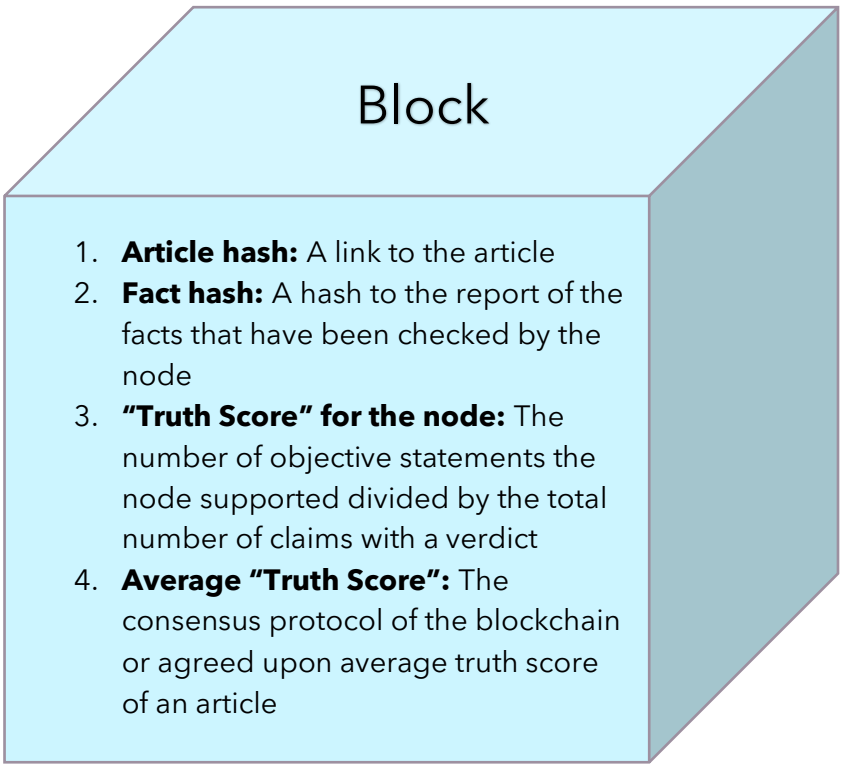
Redirection to Analysis Engine
If a sentence is labeled as an objective statement, it will move on to our verification architecture, consisting of a blockchain of truth arbiters and web search verification. If a sentence is labeled as subjective, it will go through a sentiment analysis to discern the voice and bias at the article level.

Appendix II - TruthChain

The "TruthChain", a private multi-blockchain, consists of nodes that will validate objective statements within an article. We call these nodes the "arbiters of truth." They will form a decentralized peer network to analyze the validity of a given objective statement and assign a "Truth Score" to any given news article. The three pillars below is the foundation of this network:



The purpose of this blockchain is to take the objective statements of an article and verify them individually from official and primary research sources that are relevant to a specific news category. As a private blockchain, there will be a strict protocol to ensure only trustworthy nodes are approved to join the network. These nodes will be required to maintain a database of facts in a standard format which will build on Claim Review's tagging tool. These databases of facts will be used to fact-check the objective claims in an article and each node will add a block to the chain.



TECH ARCHITECTURE

Appendix III - Web Search Verification and Sentiment Analysis

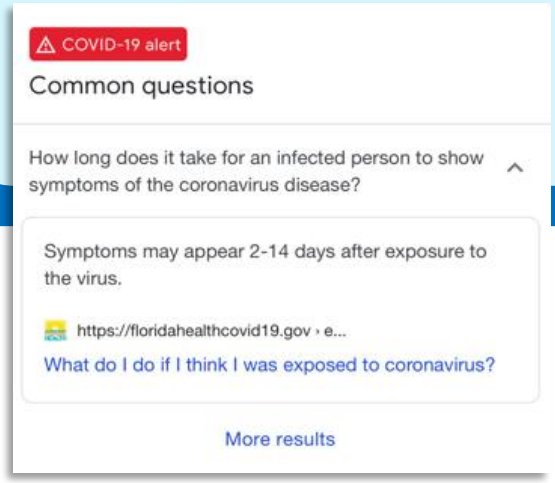
The second component of the verification architecture is web search verification, which has two sub components – Question and Answering, and Claim Search.

Question and Answering

This takes each objective claim and generates relevant questions which are then put into:

1. Wolfram Alpha's "Short Answers API," a question answering engine from which results are extracted.
2. A Google Answer Box search, which extracts information if the answer appears as shown below.

The process of generating relevant questions uses the methodology from "Question Generation via Overgenerating Transformations and Ranking."



Claim Search

Additionally, we will search the original objective statement on Google, and use a custom-built web crawler to search through relevant official websites to find similar statements.
We will use a model outlined in "Simple Compounded-Label Training for Fact Extraction and Verification" which will build upon the FEVER TASK algorithm, which uses BERT and Semilar. Essentially, this algorithm will be broken down into document retrieval (finding relevant websites), sentence retrieval (finding relevant sentences from the documents), and claim verification (using NLI to output support, refute, or not enough info).

Both the TruthChain and Web Search Verification will provide insights that can be presented to the reader so that they can make their own decisions on believability. This will mitigate the spread of **misinformation**.

Sentiment Analysis

Understanding the overall sentiment of an article is critical to uncovering inherent bias and being able to recommend articles that have contrasting opinions. We will construct a ML and NLP algorithm that will allow articles to be classified by voice and make article recommendations that will deviate from a reader's everyday perspective.

The Sentiment Analysis algorithm will achieve our ultimate goal of further exposing readers to the truth from as many perspectives as possible to combat **niche programming**.

Appendix IV – Business Model Canvas