



**Geppetto: Fake News Detection**  
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After the 2016 US presidential election, many people shocked with the outcome, looked for the cause of the “surprising” result. Some blamed the outcome on the fake news phenomenon during the election: it painted false images of candidates for better or for worse. A majority of the most viral news articles covering the election turned out to be fake stories [1]. With 62% of Americans getting their news from social media platforms instead of professional news sites [3], these platforms were flooded with fake news articles.

Tech leaders such as Tim Cook publicly called on Mark Zuckerberg to help crack down on fake news, as articles were commonly funneled through American Facebook feeds [2]. Under pressure from public figures and various governments, social media and search engine giants began to tackle the problem. Germany instituted a 50 million euro fine for each social media that keeps fake news on their platform [4],

Prior to the 2016 election, websites like Snopes, Politifact, and Factcheck manually fact-checked news to assess the validity of articles. The process was manual, relying on human screeners and limits fact checking coverage and scalability, in addition to human error. Google has been trying to revamp their page rank system to order pages based on the facts they contain, not just their relevance and popularity. While this sounds like a great solution, building the right algorithm is a complex process requiring a lot effort and time, and Google is currently far away from a practical solution [5].

Facebook was able to approach the problem with a very pragmatic approach by detecting bots and suspicious users with in-house algorithms and third-party verifications. However, because Facebook mostly relies on manual, 3<sup>rd</sup> party fact-checking services such as Snopes and Politifact to verify news, many fake news go viral before they are flagged. Beyond timely detection and flagging of fake news, Facebook is facing major challenges with curbing the consumption of fake articles. In fact, their platform solutions have had an inverse effect on what they flagged as fake by attracting more readers through curiosity. There is a conflict of interest between fake news detection and Facebook’s business model because Facebook generates a lot of revenue through clicks, regardless of the legitimacy of the shared link. This is one of the reasons why some users do not trust Facebook to accurately identify what is fake [6,7,8].

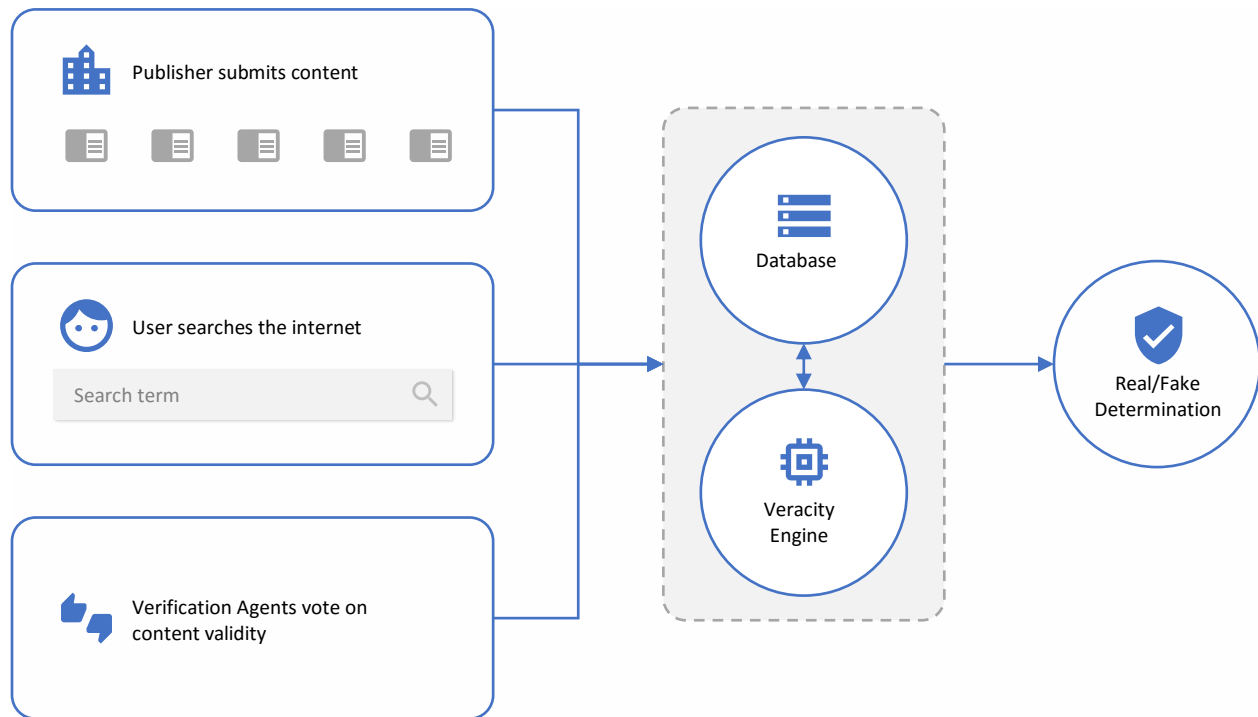
To address these gaps, we created Geppetto. Geppetto is a platform that identifies valid contents in a news article. Geppetto can accurately identify and screen fake news in real-time, using tamper-proof and cost-effective methods that preserves trust in the process.

Users can communicate with the Geppetto platform in three ways; (1) as a publisher who can publish its own article on the platform, (2) as a voter to validate/dis-validate a news, (3) as a consumer who searches a news on this platform (Fig1).

The platform requires a database to store the newly published news and verified news by the voters. There is a veracity engine which consists of several natural language processing and machine learning models that can score the legitimacy of the articles and the reliability of validators (voters) and publishers.

Because fake news evolves rapidly, the performance of any model built on the historical data can decay rapidly. To address this, we use a continuous learning (CL) algorithm to update the model continuously.

The CL component requires a knowledge base to store historical data and re-evaluate the models [9]. Geppetto uses blockchain technology to ensure the system's data is tamper-proof and decentralized [10].



**Fig1: Geppetto Platform**

#### References:

- 1) <https://www.vox.com/new-money/2016/11/16/13659840/facebook-fake-news-chart>
- 2) <http://money.cnn.com/2017/02/11/media/fake-news-apple-ceo-tim-cook/index.html>
- 3) <https://techcrunch.com/2016/05/26/most-people-get-their-news-from-social-media-says-report/>
- 4) <http://www.bbc.com/news/technology-40444354>
- 5) <http://www.seoskeptic.com/knowledge-based-trust/>
- 6) <http://www.breitbart.com/tech/2017/04/13/facebook-to-stop-fake-news-same-way-as-click-bait-via-algorithm/>
- 7) <http://www.independent.co.uk/life-style/gadgets-and-tech/news/facebook-fake-news-feature-uk-election-2017-a7720506.html>
- 8) <https://www.forbes.com/sites/amitchowdhry/2017/03/05/facebook-fake-news-tool/#4df5158c7ec1>
- 9) Lifelong Machine Learning, by Zhiyuan Chen and Bing Liu, Morgan & Claypool Publishers, Nov 2016.
- 10) <https://ordina-jworks.github.io/blockchain/2017/05/10/Blockchain-Introduction.html>