**Fake News Detector**

*“Introduction" and "Literature Review/Application Survey"*

*of*

**Bachelor of Technology**

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**Introduction**

*Fake news has become one of the biggest problems in today’s digital world. With the growth of social media and online news platforms, information spreads faster than ever before. While this makes it easy to stay updated, it also makes it easy for false information to reach a large audience in a very short time. Fake news is nothing but misleading or incorrect information that is shared as if it were true. It can be created for many reasons such as political influence, financial gain, or even just to create confusion. The effect of such news is dangerous because it can change public opinion, create panic, and even disturb the peace of society.*

*Earlier, fact-checking was done mostly by experts and news agencies. But the amount of content generated today is so huge that manual checking is almost impossible. This is where technology can help. With the use of Machine Learning (ML) and Natural Language Processing (NLP), it is possible to build systems that can automatically analyze text and identify whether the news is genuine or fake.*

*Our project, “Fake News Detector,” is designed with this purpose. The aim is to create a tool that can classify news articles or social media content into real or fake categories. By applying machine learning algorithms and text processing methods, the system can recognize patterns in writing that usually appear in fake content. This project is useful not only for individual users but also for media companies and organizations that want to prevent the spread of misinformation. In the long run, it contributes to building trust in digital information.*

**Literature Review/** **Application Survey**

1. ***Literature Review / Application Survey***

*The problem of fake news has been studied widely in the last few years because it has become a serious issue in almost every part of the world. Researchers from computer science, media studies, and social sciences have all tried to build systems or methods to detect it. Many approaches have been proposed, starting from simple rule-based systems to advanced deep learning models. In this section, we review the important work that has been done and also look at how fake news detection is being used in real-world applications.*

1. ***Early Approaches to Fake News Detection***

*In the beginning, fake news detection was mainly handled by fact-checkers and media experts. They compared claims with official sources and verified if something was true or not. While this was accurate, it was very slow and could not handle the huge amount of news spreading on the internet. Some researchers then tried simple rule-based methods or statistical approaches. For example, techniques like the* ***bag-of-words (BoW)*** *model and* ***Naïve Bayes classifier*** *were used to analyze word frequency and predict if a piece of text looked suspicious. Later,* ***Support Vector Machines (SVMs)*** *also became popular. These models worked on features like word counts, sentiment, and sentence structure. However, they mostly relied on surface-level patterns and could not properly understand the deeper meaning of the content.*

1. ***Machine Learning Approaches***

*As computational power improved, machine learning became the most common way to detect misinformation. Algorithms like* ***Logistic Regression, Random Forests, Gradient Boosting****, and SVMs were trained on labeled datasets of fake and real news. These models used features such as n-grams, part-of-speech tags, readability, and writing style. Researchers observed that fake news often uses* ***sensational headlines, emotional words, or very simple sentence structures*** *to attract people.*

*Public datasets like* ***LIAR*** *and* ***FakeNewsNet*** *were created to support research. These datasets contained news articles marked as true, partly true, or fake, which helped in training and testing models. Although these machine learning models performed well, they had problems with context. For example, a headline like “Government gives free money to all citizens” might be flagged as fake if trained wrongly, even if in some context it was true (like a one-time subsidy scheme).*

1. ***Deep Learning and NLP Approaches***

*In recent years,* ***deep learning*** *has become a major breakthrough in fake news detection. Models such as* ***Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM) networks****, and* ***Convolutional Neural Networks (CNNs)*** *were applied to text classification. Unlike older models, these could capture the sequence of words and the meaning of a sentence better.*

*An even bigger improvement came with* ***transformer models*** *such as* ***BERT, RoBERTa, and GPT-based architectures****. These models are trained on massive amounts of text and can understand context more deeply. For example, they can notice when an article is using sarcasm or exaggeration, which simple models often miss. Many studies show that transformer-based models give the best accuracy for fake news detection today.*

1. ***Hybrid Approaches***

*Some systems use a* ***combination of text analysis and social media behavior*** *to detect fake news. This is because fake news does not just differ in content but also in the way it spreads. For example, fake news often gets shared more quickly, has unusual retweet patterns, or comes from low-credibility accounts. By combining both text features and social network features, hybrid systems are more accurate.*

1. ***Applications in Social Media Platforms***

*Social media platforms are the biggest sources of misinformation today. In India, fake forwards on* ***WhatsApp*** *during elections or the COVID-19 pandemic created panic among people. To fight this, companies like Facebook, Twitter, and Instagram use AI to automatically flag suspicious posts. Twitter uses classifiers to detect harmful tweets, while Facebook works with fact-checking organizations and adds warning labels. Still, these companies face challenges because fake news creators constantly change their methods, and there are also debates around freedom of speech.*

1. ***Fact-Checking and Verification Tools***

*Outside of social media, many independent organizations focus on fact-checking. Websites like* ***Snopes, PolitiFact, and FactCheck.org*** *have become popular globally. In India, portals like* ***AltNews*** *and* ***BoomLive*** *play a big role in debunking fake claims. While these are mostly human-driven, machine learning is being integrated to make them faster. Tools like* ***Google Fact Check Explorer*** *also allow users to check whether a particular claim has been verified by trusted sources.*

1. ***Challenges in Fake News Detection***

*Even with so many advancements, fake news detection is still not perfect. Some of the main challenges are:*

* ***Limited and unbalanced datasets****: There are not enough high-quality datasets in all languages, and fake news keeps changing in style.*
* ***AI-generated content****: Tools like ChatGPT can generate very realistic text, which makes fake news harder to detect.*
* ***Multimedia misinformation****: Fake news is not always text-based; it often includes edited images, deepfake videos, and misleading memes.*
* ***Language diversity****: Most research is done in English, but in countries like India, misinformation spreads in Hindi, Telugu, Tamil, and many other local languages.*

1. ***Future Directions***

*Researchers are now focusing on* ***Explainable AI (XAI)*** *so that users can understand why a particular article was marked as fake. Real-time detection is also important because misinformation spreads quickly, and delay reduces the usefulness of detection. Another future direction is* ***multimodal detection****, which means analyzing not just text but also images and videos. Also,* ***cross-language fake news detection*** *is becoming important in multilingual countries.*

1. ***Applications in Society***

*Fake news detection has many practical uses:*

* ***Media houses*** *can check the credibility of news before publishing.*
* ***Governments*** *can control the spread of rumors during elections or health crises.*
* ***Educational institutions*** *can teach students digital literacy and critical thinking.*
* ***Individuals*** *can be more confident about the authenticity of the news they read online.*