

Project title: MedLens – AI-Powered Health
Misinformation Detection

Team name: Innovators

Team members: Mehak Naz W Dharwad

Pooja A Hanamasagar

Rasiq faraz Danbal

Mohammed Rasheed

Date: 12-04-2025

ABSTRACT

Health misinformation has become a widespread digital threat, with over 60% of people encountering false or misleading health content online. Such misinformation can lead to dangerous outcomes like self-medication, vaccine hesitancy, and erosion of public trust in healthcare systems. To address this critical issue, our team developed MediLens—an AI-powered web platform designed to detect and flag health misinformation from text, image, or URL inputs. MediLens analyzes user-submitted content using natural language processing (NLP) and machine learning models to verify the accuracy of medical claims. It provides an accuracy rating, cites trustworthy sources (like WHO or PubMed), and offers verified alternatives when misinformation is detected. Additionally, the platform features an intelligent chatbot to assist users with medical queries and explain flagged results. MediLens empowers users to make informed decisions by promoting digital health literacy and building trust in credible health information.

CONTENT

| Chapter no. | Description |
|-------------|--------------------------------|
| 1. | Introduction |
| 2. | Problem Statement |
| 3. | Objective of the Solution |
| 4. | Proposed System Overview |
| 5. | System Architecture & Workflow |
| 6. | Technology Stack |
| 7. | Novelty & Advantages |
| 8. | Conclusion |

Chapter 1

INTRODUCTION

In the digital age, access to health information has become faster and broader—but so has the spread of misinformation. From misleading home remedies to false vaccine claims, medical misinformation online poses a significant threat to public health and safety. According to global studies, a majority of internet users have come across false or unverified health claims on social media and unregulated websites. This not only misguides individuals but can also lead to harmful practices, delay in treatment, and loss of trust in medical professionals.

To counter this growing concern, innovative technological solutions are required—solutions that can analyze and verify health-related content in real-time. This is where MediLens comes into play. By combining the power of Artificial Intelligence, Natural Language Processing (NLP), and trusted medical databases, MediLens serves as a smart assistant for identifying and combating health misinformation online. It empowers users to make safe, informed decisions based on verified medical facts.

Chapter 2

PROBLEM STATEMENT

The internet has become a primary source of health-related information for millions worldwide. However, this convenience comes with a critical challenge—widespread health misinformation. From social media posts promoting unproven remedies to blogs spreading false claims about diseases and treatments, unverified medical content is easily accessible and rapidly shared.

Studies show that over 60% of users have encountered misleading or false health information online. This misinformation can lead to serious consequences such as self-medication, avoidance of proper treatment, vaccine hesitancy, and panic during public health crises. The lack of a reliable, user-friendly tool to verify the credibility of online health content further aggravates the problem.

There is a growing need for a smart, accessible, and scalable solution that can help users identify and avoid misleading medical claims in real time—thus protecting individual well-being and enhancing public trust in accurate healthcare information.

Chapter 3

OBJECTIVE OF THE SOLUTION

The objective of MedLens is to address the growing threat of health misinformation by providing an AI-powered solution that verifies the credibility of online medical content. Our platform aims to identify and flag misleading health claims submitted in the form of text, images, or web links. By leveraging machine learning and trusted medical databases, MedLens assigns an accuracy score to each claim, helping users gauge the reliability of the information they consume. When misinformation is detected, the system not only alerts the user but also provides credible alternatives from verified sources such as the World Health Organization (WHO) or PubMed. Additionally, to enhance user understanding and engagement, an integrated chatbot assists with follow-up questions and clarifies flagged results. Through these features, MedLens strives to promote digital health literacy and empower individuals to make informed, fact-based healthcare decisions.

Chapter 4

PROPOSED SYSTEM OVERVIEW

MedLens is a web-based AI-powered platform designed to detect, evaluate, and counteract health misinformation across digital mediums. The system allows users to input health-related content in the form of text, images (containing text), or URLs. Upon submission, the content undergoes real-time analysis using natural language processing (NLP), image-to-text extraction (OCR), and machine learning models trained on verified medical datasets.

The system identifies key health claims and cross-references them with trusted sources such as WHO, PubMed, and verified medical journals. It then generates an accuracy score (e.g., High, Medium, or Low) to indicate the reliability of each claim. If misinformation is detected, MedLens provides evidence-based corrections and links to authentic medical resources. Additionally, the platform integrates a chatbot that offers explanations, assists with user questions, and promotes deeper understanding of complex medical topics.

Through this multifaceted approach, MedLens aims to become a reliable companion in navigating digital health information responsibly and accurately.

Chapter 5

SYSTEM ARCHITECTURE & WORKFLOW

The architecture of MedLens is designed to ensure seamless data processing, fact-checking, and user interaction through modular components. The workflow follows a clear, step-by-step process:

1. User Input Layer:

Users can submit content in the form of text, images (converted to text via OCR), or links (URLs).

2. Preprocessing Module:

Text is extracted and cleaned. If an image is submitted, OCR is used to identify embedded text.

3. Claim Detection & NLP Engine:

Natural Language Processing is applied to extract key medical claims and phrases from the content.

4. Verification Engine:

The extracted claims are matched against verified medical databases (e.g., WHO, PubMed, Mayo Clinic) using AI models trained on trusted datasets.

5. Accuracy Scoring & Classification:

Each claim is analyzed and assigned an accuracy level (High, Medium, or Low) based on confidence scores and evidence strength.

6. Result Generation:

The system classifies the claim as “Verified” or “Misinformation,” displays the score with a color indicator, and suggests reliable alternatives if needed.

7. Response Interface:

The output is presented through an intuitive UI, supported by a chatbot that explains flagged claims and answers user queries in real-time.

This layered architecture ensures scalability, real-time analysis, and an interactive user experience while maintaining accuracy and credibility.

Chapter 6

TECHNOLOGY STACK

Frontend:

- HTML5
 - Defines the structure and layout of the user interface
- CSS3
 - Used for styling, color theming (e.g., teal/green), animations, shadows, and responsive design
- Images (e.g., logo.png)
 - Used for branding visuals and chatbot icons

Backend (Optional – for dynamic classification and processing):

- Python
 - Implements backend logic such as real/fake classification and chatbot response handling
- Flask
 - Lightweight Python web framework to serve pages and manage communication between frontend and backend
- scikit-learn / NLP Models
 - Used to detect and classify health misinformation in text
- Tesseract OCR
 - Extracts text from uploaded images (used for analyzing health-related claims in image format)

Directory Structure (Sample):

- /static/style.css
 - Custom CSS file for UI styling
- /templates/index.html
 - Main HTML page with chatbot interface

- /model/model.pkl
 - Optional pre-trained machine learning model
- /utils/fetch_link_content.py
 - Script to extract article text from user-submitted URLs
- /utils/ocr_image.py
 - Script to perform OCR on uploaded images
- /app.py
 - Flask backend application
- /requirements.txt
 - Lists Python dependencies needed for deployment

Key Features of the Stack:

- Lightweight and modular
- Minimal JavaScript – relies heavily on CSS
- Expandable with Flask and Python backend
- Easy integration with machine learning and chatbot systems
- Supports input from text, image, and links for misinformation detection

Chapter 7

NOVELTY & ADVANTAGES

1. Real-time Misinformation Detection:

- **Novelty:** MedLens analyzes health claims in real-time from user inputs such as text, images, and links.
- **Advantage:** Users receive immediate feedback, empowering them to verify claims instantly and make informed decisions.

2. Multi-format Input Handling:

- **Novelty:** The platform accepts various formats, including text, images (via OCR), and URLs, to assess health-related claims.
- **Advantage:** This flexibility ensures that users can easily verify information from different sources, including social media, articles, or images.

3. AI-powered Claim Verification:

- **Novelty:** MedLens uses a pre-trained NLP model (DistilBERT) to analyze claims and determine whether they are scientifically backed.
- **Advantage:** The AI-powered classification provides objective, accurate, and consistent verification, reducing reliance on human judgment and biases.

4. Integration of WHO-Verified Alternatives:

- **Novelty:** When misinformation is detected, the platform provides users with verified alternatives sourced from trusted organizations like the WHO.
- **Advantage:** This ensures that users receive accurate, scientifically-backed information as replacements for the flagged misinformation.

5. Chatbot for User Interaction:

- **Novelty:** MedLens integrates a chatbot to answer users' queries and clarify doubts related to flagged claims.
- **Advantage:** The chatbot provides an engaging, interactive experience, making it easier for users to get detailed explanations and resolve uncertainties.

CONCLUSION

MedLens presents a novel and effective solution to the growing issue of health misinformation online. By combining advanced AI models, real-time analysis, and multi-format input support, it empowers users to verify the accuracy of health-related claims instantly. The integration of trusted resources like WHO-verified alternatives ensures that users are not only informed but also directed to reliable information, promoting better health literacy.

The addition of an interactive chatbot further enhances the user experience, providing personalized guidance and clarification on flagged claims. With its scalable architecture, MedLens is well-positioned for future expansion, adapting to the ever-evolving landscape of health information.

Through these innovations, MedLens aims to foster a more informed society, helping individuals navigate the complexities of health information and make decisions grounded in scientifically accurate knowledge.