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Medical Assistance for Visually Impaired using AI

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ABSTRACT: The quick development of articifical intelligence (AI) generation has created possibilities to decorate scientific guides for people who are visually impaired substantially. Using Flask for internet development, Google Cloud Speech-to-Text API for particular speech recognition, and GTTS (Google Text-to-Speech) to transform textual content responses into speech output, this study's assignment by and large makes use of Python as its programming language.he integration of modern-day technology, which includes effective device mastering and the Google Cloud Speech-to-Text API, highlights the project`s willpower to enhance usability and accessibility inside the healthcare sector.

KEYWORDS: **Natural Language Processing (NLP), device mastering, healthcare technology.**

I. INTRODUCTION

Millions of global humans are afflicted by visible impairment, making it vital to discover innovative answers tailor-made to this group`s precise clinical requirements. Although many gear and technology have been created to assist the blind in their normal lives, there may be a developing want for whole hospital therapy this is catered.

The aim of this assignment is to rent synthetic intelligence (AI) to its fullest volume in order that visually impaired humans can acquire complete clinical care. Python`s big library and flexibility make it the favored number one programming language. With clean HTTP request handling, the Flask-evolved consumer interface ensures an easy-to-use experience. Speech popularity and text-to-speech competencies are many of the AI-pushed features. The Google Cloud Speech-to-Text API is used to correctly translate spoken phrases into text, and GTTS is used to convert textual responses into speech output.

A relational database gadget is used to deal with critical clinical data, offering flexibility and a choice among SQLite and PostgreSQL. Natural Language Processing (NLP) libraries inclusive of spaCy or NLTK, collectively with Scikit-examine for type tasks, are integrated for non-obligatory system learning based totally symptom matching. Through clinical databases or APIs, the gadget ensures get right of entry to correct and up-to-date information. Web scraping strategies are used to retrieve extra data.

The person interface makes use of HTML and CSS for web-primarily based totally interfaces and become created with accessibility in mind. JavaScript may be blanketed optionally to growth interactivity and enhance the person enjoy in general. The advised device intends to empower visually impaired humans with an AI-pushed scientific guide platform that gives seamless data access, symptom matching, and an interactive person interface with the aid of using merging those technological components

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II. RELATED WORK

Research Paper Title	Year of Publication & Authors	Methodology Adapted	Major Findings
1.A Survey on Recent Advances in AI and Vision-Based Methods for Helping and Guiding Visually Impaired People.	Publication Year: - 23 February 2023 Authors: - Helene Walane, Cyril de Runz, Barthelemy, Saras Gilles, Venturini	PRISMA selection diagram that explains the main steps of our survey, on Assistive devices; Preferably using deep-learning technologies; aiming at fulfilling navigation, obstacle detection, and/or object recognition tasks; designed for BVIP.	In this paper, we studied recent advances in the field of AI techniques for developing assistive technologies for BVIP. This survey was made by assessing recent case studies in the field with a well-defined research methodology.
2.Assistance System for Visually Impaired using AI.	Publication Year: - 13-06-2021 Authors: - Ms. Kavya. S, Ms. Swathi, Mrs. Mimitha Shetty	With the application of a neural system, an effective model can be developed in a very simple way to use an API. To change the voice input to text the Cloud Speech API helps the designer.	The output is obtained from the Android application. The Output shown in the chatbot is according to the training given to the machine with the help of Dialog-Flow and the responses according to the input given to the machine.

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3. Smart Technologies for Visually Impaired: Assisting and conquering infirmity of blind people using AI technology.	Publication Year: - 14-05-2020 Authors Fatma A l Muqbali; Noura Al-Tourshi; Khuloud Al-Kiyumi; Faizal Hajmohidden.	The detection process is manifested by notifying the visually impaired person through either a sound alert or vibration. Additionally, this study presents a palpable survey that entails visually impaired people from the local community. Subsequently, the project uses both Open CV and Python programming and implementation.	It demonstrates how this smart device could detect certain physical objects and how it could send a warning signal when faced with any obstacles. Overall, this research will be a positive addition to the world of healthcare sector by supporting bling people with the use of smart technology.

III.ALGORITHMS

For these Research Paper we will use different algorithms such as Symptom matching algorithm , different machine learning libraries such as NLTK or spaCY and scikit-learn along with that we will also use Web scrapping and also Information Retrieval.

A. Symptom Matching Algorithm

For the purpose of symptom matching, mathematical models,specifically Logistic Regression, will be employed. The logistic regression equation is defined as follows:

P(Disease) = 1 / (1 + e^(-z)) z = b0 + b1*Symptom1 + b2*Symptom2 + ... + bn*Symptom P(Disease) = Probability of Disease .

z = Variable

b0, b1, …, bn = Constant

In symptom matching algorithm we get the probability of a disease . We take inputs and multiply it with some constant value to get a logistic regression equation . Logistic regression then will give output in the form of probability.

The algorithm works by comparing the input symptoms with a database of symptoms associated with various conditions. It uses various algorithms and applications, such as pattern recognition, statistical analysis, or machine learning, to find the best match or matches for the given symptoms. The output of the algorithm is typically a list of possible diagnoses ranked by likelihood, which can help health care providers make informed decisions about further testing or treatment.

B.Naive - Byes Classifier

For classification tasks, a probabilistic machine learning model called the Naive Bayes classifier is employed. It is predicated on the assumption that the traits are independent of one another (hence the term "naive"). Bayes' theorem, which expresses the likelihood of a hypothesis given the evidence, forms the basis of this theory. Using the Naive Bayes classifier, the probability of a class Ck is determined by applying Bayes' theorem to an input feature vector.

X = (x1,x2,x3,….,xn)

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$$P(C_k|x) = \frac{P(x|C_k) \cdot P(C_k)}{P(x)}$$

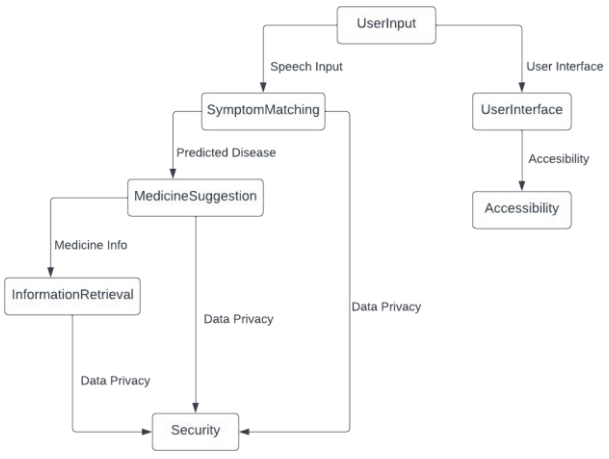
Fig.1

Where:
P(Ck|x) is the posterior probability of class Ck given the input x,
P(x|Ck) is the likelihood of observing the input x given the class Ck,
P(Ck) is the prior probability of class Ck
The key assumption in Naive Bayes is that the features x1,x1,x3,….,xn are conditionally independent given the class Ck.

C.K-nearest Neighbors
A simple algorithm called K-nearest Neighbors keeps track of all instances that are available and categorizes new cases based on an analogy measure. KNN was employed to identify patterns and estimate statistics. In order to forecast a new instance (x), KNN searches the whole training set for the k most comparable examples, resuming the output variable in each of those k cases. This could be the medium output variable in a regression. In a classification, the most similar k-sets in the training data set to the new entry may be found using the mode class.

D.Text Classification
Text classification is the task of automatically categorizing a piece of text into predefined categories or classes. In our case we will use to text classification to classify symptoms and diseases.As text classification or we can say it is semi supervised learning algorithm so we will require a labeled data set will contains all the diseases and its symptoms

IV. PROPOSED MODEL FOR PREDICTION



For the purpose of classifying analytical performance, this section offers suggested models, datasets, descriptions, data visualization, and methods.

V. IMPLEMENTATION

A.Dataset Description
The data set, which includes [number of samples] samples with [number of features] functions apiece, is used to educate and take a look at device studying models. Carefully taken into consideration pre processing strategies had been used, including [normalize, manage missing values, etc.].

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B.Model Selection

This has a look at using a whole lot of AI strategies and systems to get to know algorithms, such as [list models or techniques]. Careful assessment of factors inclusive of interpret ability, computational efficiency, and overall performance signs served as a manual for the choice process.

C.Evaluation Metrics

Various metrics had been used to evaluate the fashions` performance, inclusive of accuracy, precision, recall, and F1-score. These measures had been decided on due to the fact they at once cope with the complicated necessities of humans with visible impairments and offer records approximately how nicely the fashions discover and count on applicable scientific data.

D.Baseline Performance

A baseline overall performance became created through putting [basic models or rule-based systems] into practice. This baseline acts as a factor of comparison, making it simpler to look how a long way alongside the later, greater state-of-the-art gadget studying fashions have come.

E. Model Training

The education manner is done with high-quality care, inclusive of [explain the training procedure and any hyper parameter tweaking that was done]. Additionally, [discuss any methods used, if appropriate] to clear up any capacity imbalances inside the data set.

F.Model Evaluation

A thorough presentation of overall performance measures, inclusive of visualizations such as confusion matrices, ROC curves, and precision-take-into-account curves, is furnished for each version of the check dataset. These visible gear assist offer a greater complicated information about the overall performance traits of the models.

G.Comparative Analysis

A thorough comparative evaluation highlights the benefits and drawbacks of every version because it explores the overall performance of numerous models. A cautious dialogue of the trade-offs made at some point of version choice and schooling is presented, deliberating elements like computing efficiency, interpretability, and accuracy.

H.User Feedback

User comments contain essential findings from trying out with visually impaired customers and take perceived efficacy, usability, and consumer revel into account. This section explains any modifications made in reaction to consumer comments, ensuring that they're in step with what the consumer wants.

I.Generalisation to Real Scenarios

The models` ability to generalize to real-global instances and a whole lot of consumer populations is tested significantly in a dialogue. The studies conclusions' realistic effects are visible from a nuanced perspective, with demanding situations regarded and concerns for wider applicability taken into account.

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VI. EXPERIMENTAL RESULTS AND ANALYSIS

Designing and evaluating medical assistance technologies for visually impaired individuals requires careful consideration and ethical conduct.

Study Design: Develop a study protocol that outlines the research objectives, methodology, and ethical considerations. Consider factors such as sample size, recruitment criteria, and study duration.

Participant Recruitment: Recruit visually impaired individuals who are willing to participate in the study. Ensure that participants are provided with informed consent and that their privacy is protected.

Technology Evaluation: Evaluate the medical assistance technology using both quantitative and qualitative measures. Quantitative measures may include task completion time, error rates, and user performance metrics. Qualitative measures may include user satisfaction, perceived usefulness, and usability.

Conclusion and Recommendations: Summarize the findings of the study and provide recommendations for the development and implementation of medical assistance technologies for visually impaired individuals.

VII.CONCLUSION

To sum up, the project "Medical Assistance for Visually Impaired People Using AI" is a big step in the right direction towards eliminating healthcare disparities by utilizing artificial intelligence in a revolutionary way. This research endeavor has demonstrated the potential of artificial intelligence (AI) to improve accessibility and independence for those with visual impairments. It has also highlighted the significance of creative technological solutions in promoting a more inclusive and equitable future.

Throughout the project, we've taken gain of AI`s capacity with the aid of making use of present-day equipment like GTTS, Google Cloud Speech-to-Text API, and gadget-studying algorithms for symptom matching. The integration of Flask, Python, and relational databases has enabled the introduction of a resilient device that may correctly store, retrieve, and technique clinical data. The user-friendly, available web-primarily based totally interface demonstrates the determination to foster an inclusive healthcare environment. The interface ensures a clean and interactive enjoyment for visually challenged customers with the aid of making use of HTML, CSS, and perhaps JavaScript, allowing them to without difficulty get entry to crucial clinical information.

With the research of device mastering fashions for symptom matching and an in-depth evaluation of the literature, this painting places our studies at the vanguard of AI-powered clinical aid for human beings with visible impairments. Continuous optimization and refining had been made feasible through the insights won into the overall performance of diverse fashions via comparative evaluation and evaluation measures. The task has used a human-centric approach, seeking out consumer comments to beautify the machine primarily based totally on real consumer experiences, similar to its technological components. The clinical resource machine`s typical effectiveness, usability, and consumer revel have all been significantly prompted through the entry of visually impaired users.

Going forward, this study has ramifications that pass past the scope of an unmarried project. Future advances may be modelled after the a success integration of AI technology into healthcare practices for sufferers with visible impairments. It is crucial to hold in thoughts the feasible consequences on quite a few consumer populations as we negotiate the connection between era and healthcare. This initiative prioritizes the autonomy and wellness of visually impaired people, demonstrating the moral software of AI.

Essentially, the "Medical Assistance for Visually Impaired People Using AI" initiative represents a dedication to societal inclusion in addition to a technical demonstration of AI`s capabilities. It's a step in the direction of a time when scientific improvements will decrease barriers and sell autonomy, self-determination, and a higher fashion of residing for everyone, blind or not.

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