Project Proposal

Semester	W2023, SEM 2
Course Code	AML-2404
Section	Section 2
Group Name	Group D
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Title: GlowAI: Advanced AI-Driven Skin Care Recommendations

1. Abstract:

In this project, artificial intelligence (AI) and machine learning (ML) are implemented and evaluated for prescribing skin medications. The goal of this research is to create a system that can offer tailored advice on skin drugs based on unique skin problems and symptoms.

A dataset was created for the recommendation system by scraping pertinent data from dermatology and skin care websites. Numerous different skin disorders, their associated symptoms, and treatment options are included in the collection. Each instance in the dataset includes a number of variables, including the kind of skin problem, how severe it is, how long it has been, and other pertinent information.

In this project, NLP gives the system the ability to comprehend and analyze text from a variety of sources, including medical literature, patient records, and web resources. The recommendation system can more accurately and specifically identify the recommended medications by utilizing NLP to analyze and classify the skin disorders and symptoms provided in the dataset.

The outcome of the project is to improve the efficiency and accuracy of recommending skin medication, ultimately benefiting individuals seeking appropriate treatment. The findings from this project contribute to the advancement of AI and ML applications in the field of dermatology and can potentially assist dermatologists, patients, and individuals seeking reliable and personalized skin medication recommendations.

Roles and Duties of each member:

Sai Divya Madhuri: Data Collection using web scrapping, front-end development

Monil Rupawala: Data Collection using web scrapping, front-end development

Nivedini Kathagonda: Data Cleaning and Pre-processing

Keval Parmar: Data Visualization, Extraction of features

Jash Vaghasiya: Modelling and Testing.

2. Statement of Need:

There is a pressing need for an intelligent system that can assist dermatologists and individuals in making informed decisions regarding skin medication recommendations. Dermatology and skin care present challenges in accurately identifying the most suitable treatments due to the vast array of medications available and variations in individual skin types. An AI and ML-based recommendation system would analyse symptoms, skin condition characteristics, and medication information to provide tailored, evidence-based recommendations. This approach would help dermatologists make

better decisions and provide patients with better care while giving patients and those looking for self-care alternatives access to trustworthy and individualised treatment options. We can progress dermatology, enhance patient outcomes, and empower people to take charge of their skin health by attending to this demand.

3. Project Activity, Methodology, and Outcomes:

To achieve our goals, we will undertake the following activities:

- **Data collection:** Compile a wide range of skincare product-related data, including details on components, product descriptions, user evaluations, and star ratings. Utilise surveys, questionnaires, and internet resources to get more information about user preferences, skin types, and skin issues.
- **Data cleaning and pre-processing:** Pre-process data by cleaning, normalizing, tokenizing, and removing stop words and extraneous information from the text. Based on the unique context, handle missing data and employ procedures like imputation or elimination.
- **Extraction of Features:** Extract pertinent details about ingredients, features, and consumer feedback from the data on skincare products. Use methods like word embeddings and TF-IDF (Term Frequency-Inverse Document Frequency) to represent textual data.
- **Model Training:** Build the recommendation system using machine learning algorithms including collaborative filtering, content-based filtering, and hybrid approaches. To train models on the gathered data and improve their performance, use AI and ML approaches. Use NLP approaches to understand user preferences and analyse user reviews and sentiments.
- **Assessment and Validation:**
  Comparative Analysis: Contrast the NLP-based skincare suggestions with those from other well-known e-commerce platforms or other existing skincare recommendation systems. To gauge the NLP system's effectiveness, compare the recommended goods' innovation and distinctiveness to the industry norm.
  Surveys of user satisfaction: To get feedback from customers about how satisfied they are with the skincare items you propose, conduct surveys or questionnaires. Request user feedback on the recommendations' relevancy, usefulness, and efficacy. Obtain user feedback on the system's accuracy in identifying their skin concerns and preferences.

Methodology:

AI and ML Techniques

- Collaborative Filtering: Find similar users or goods to recommend skincare products based on user behaviour and interests.
- Content-Based Filtering: Suggest products based on attributes like ingredients, product category, concern, and user preferences.
- Hybrid Methods: To improve suggestion accuracy, combine collaborative and content-based filtering.

Natural Language Processing (NLP) Techniques

- Sentiment analysis: Examine user comments to ascertain how they feel about particular skincare products.
- Text Classification: For better product recommendations, group user reviews according to various skin issues or product characteristics.
- Named Entity Recognition: Extract properties, ingredients, and names of skincare products from unstructured text.

Our expected outcomes:

- **Personalized Recommendations:** The skin care recommendation system will provide customised recommendations for skincare products based on each user's unique needs, skin problems, and preferences. Users will receive personalised advice based on their requirements, which will enhance their overall skincare experience.
- **Improved User Satisfaction:** The system will be able to comprehend user preferences and provide more accurate and pertinent recommendations by utilising AI, ML, and NLP approaches. User feedback and satisfaction questionnaires will be used to gauge increased user happiness and engagement.

4. Development Workflow:

Project Flow -
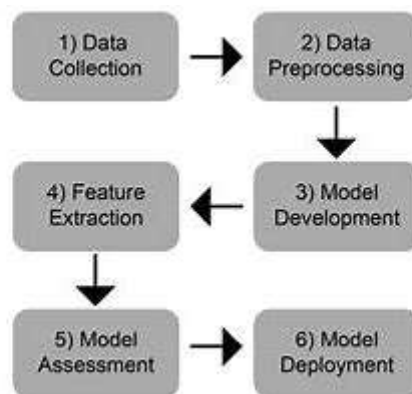
Text Processing -
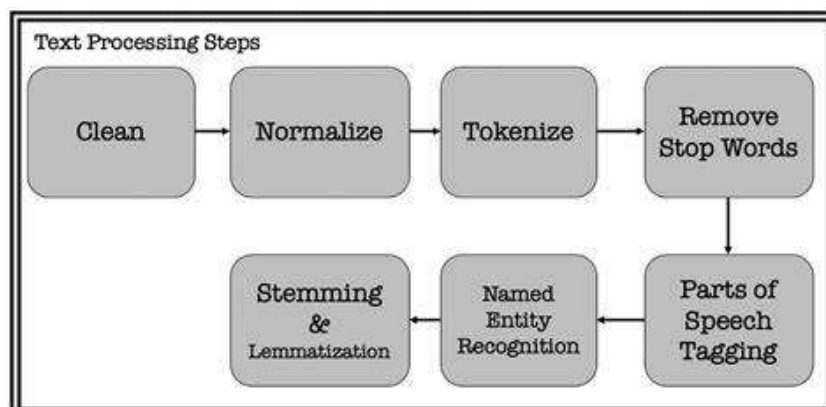
5. Timeline:

- **Weeks 1 and 2:** Project proposal research and completion.
- **Weeks 3 and 4:** Data collection phase, in which we will extract data from several flight sources such as aviation industry data and satellite data.
- **Weeks 5 and 6:** Data exploration phase, during which we will restructure the massive extracted data into a usable format and execute Data transformation, Data analysis, and Data visualization.
- **Weeks 7 and 8:** Machine learning, Natural Language Processing, and Optimisation. We will create solid machine-learning models and apply them to the data acquired to achieve the project's goal.
- **Weeks 9 and 10:** Front-end Development. We will design an interactive user interface to aid in usability and deliver more understandable results.
- **Weeks 11 and 12:** Conclusion and Evaluation Phase, Finally, we will evaluate our product using real-life circumstances and generate a comprehensive report on it.

6. Evaluation:

To assess the project's success, we will employ the following evaluation methodology:

- **Data coverage and diversity:** Evaluate the dataset's coverage and diversity for training and recommendation generation. A diversified dataset that includes a wide selection of skincare products, brands, and user preferences can help to provide more thorough and reliable suggestions.
- **Personalization effectiveness:** Assess the system's capacity to offer recommendations that are tailored to the preferences, skin types, or particular requirements of the user. This can be assessed by looking at how well the system responds to the feedback and user profiles of various users.
- **User feedback and satisfaction:** Describe the procedures used to collect and measure user feedback and satisfaction. Surveys, user interviews, and usability testing may be included. Analyze the input to determine the system's strengths, flaws, and areas for development.
- **Validation and testing in the real world:** Real-world test of the recommendation algorithm with a varied group of users. Assess the system's accuracy, relevance, and usefulness in assisting consumers in making informed judgments about skincare products.

By offering personalized product suggestions to users, the skin care recommendation system utilizing AI, ML, and NLP approaches has the potential to revolutionize the skincare sector. This document's project activity, methodology, and projected outcomes serve as a road map for the system's development and deployment. Feedback and continuous evaluation

References:

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