Project Proposal: Intelligent System for Melanoma Detection

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***Abstract*—Melanoma is one of the most aggressive types of skin cancer. An early detection is key to do an effective treatment. This project proposes the development of an application that, through computer vision , Natural language processing and deep learning techniques, can identify images of skin lesions and classify them with a certain level of uncertainty interacting with the users.**

I. Introduction

This project aims to develop a computer vision-based system to analyze images of skin lesions and classify them as melanoma or non-melanoma. To enhance classification accuracy, a deep learning model will be implemented to optimize the detection and diagnosis process.

Additionally, a conversational assistant based on Natural Language Processing (NLP) will be designed to collect additional user information, such as medical history and lesion characteristics. By incorporating advanced intelligent systems techniques, the system will optimize its functionality, providing efficient support for medical evaluation and helping in the decision-making process for the diagnosis of skin diseases.

II. Methodology

A. Data Collection

Acquisition of skin lesion images from medical databases such as ISIC (The International Skin Imaging Collaboration) or own images.

After the acquisition of the database it is important to do the image preprocessing incorporating, normalization, noise removal, segmentation of the area of interest.

B. Computer Vision Model

To classify the images, it is going to use convolutional neural networks (CNNs) and also it is going to use model evaluation using metrics such as accuracy, sensitivity, and specificity.

C. NLP Integration

The chatbot is going to be developed by language models to interact with users. All the information acquired can be used as results with the classification system to enhance accuracy.

D. Intelligent Systems

It is going to be modeled a chatbot as an agent that interacts with the user and decides if more information is needed.

In addition, we will be doing a scratch implementation of Greedy Search, a fundamental algorithm in the field of artificial intelligence and problem-solving. This implementation will serve as a practical tool to apply and understand the search algorithms covered in class, such as Breadth-First Search, Depth-First Search, and A* Search. By building Greedy Search from the ground up, we aim to deepen our comprehension of heuristic-based approaches and their role in optimizing search processes. This hands-on exercise will not only reinforce theoretical concepts but also provide valuable insights into the trade-offs and decision-making involved in selecting the most appropriate search strategy for a given problem.

III. Conclusion

This project represents an innovative approach to melanoma detection by combining advanced artificial intelligence techniques. In the future changes on the methodology or future improvements can be incorporated to the project to enhance diagnostic accuracy.