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HMM (HIDDEN MARKOV MODEL) BASED SKIN ALLERGICE IDENTIFICATION WITH THE HELP OF ANISOTROPIC SEGREGATOR

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Abstract – *This paper proposes the identification of skin disease growth rate based on image processing technique. Skin disease affect around 3% of the population worldwide. There are number of skin diseases which are found in humans, animals and plants. They tend to be itchy and spread over the body easily. Among them, Psoriasis is a common chronic, inflammatory skin disease characterized by scaly patches. It causes severe skin inflammation and the treatment for such cases are determined based on the severity evaluated by Psoriasis Area Severity Index (PASI) scoring system. Currently, these scores are estimated visually and hence suffers from inter and intra-observer difference. This severely affects the way; the disease is treated. To control them from spreading it is necessary to identify the growth rate of the disease. Hence we adopted many technologies to identify these diseases hence our proposed system focuses on like filtering, feature extraction, segmentation and scaling of 2D digital images, bifurcation, identification and disease classification of Psoriasis. This computer assisted system removes erythematic from the selected psoriasis image and considers other skills cells for analysis and treatment. The "Feature Space Scaling Algorithm" uses color, contrast and image texture along with a combination of SVM classification filters and Markov random fields to come up with a treatment solution. The algorithm is tested with different skins under different lighting condition and is proved to be reliable.*

Key Words**: image processing, Skin diseases, Segmentation, image pre-processing, filtering, classification.**

1. INTRODUCTION

The human body have largest organ called skin. It separates the inner parts of body and also form outer environment. It is major organ which protect body from the allergy, viruses, infection, bacteria and it also controls the temperature of body. There are many symptoms like swelling, burning, redness and itching which can change or damage the texture of skin. They may be caused by allergies, irritants, genetic problems and immune system problems. In order To control them from spreading it is necessary to identify these diseases at their starting stages or its exact growth rate to give them that particular treatment to be recovered quickly. Hence there we are using various techniques of image processing like filtering, feature extraction, segmentation, bifurcation, identification, disease classification. these are utilized to detect these skin diseases. The image processing techniques are applied only on digital image so we need to convert image into digital form. This digital image is used to get meaningful information or to get improved image by performing functions onto image. The process continues by firstly taking an image, for noise reduction filters are applied on it and after that the various segment of image is utilized to extract the information. then image segmentation will be done although there are many types of segmentation process, we are using canny edge detection because it will separate only high density area which was actually affected, then the background image will be removed using classification, then bifurcation process is done by comparing segmented picture by original picture to identify by matching the boundary of that particular affected area and after identifying it, the type of disease and its exact growth rate is displayed.

2. SYSTEM DESIGN

System design is the process of defining the elements of a system such as the architecture, modules and components, the different interfaces of those components and the data that goes through that system. It is meant to satisfy specific needs and requirements of a business or organization through the engineering of a coherent and well-running system. Design is multi-step process that focuses on data structure software architecture, procedural details, (algorithms etc.) and interface between modules. The design process also translates the requirements into the presentation of software that can be accessed for quality before coding begins. Computer software design changes continuously as new methods; better analysis and broader understanding evolved. Software Design is at relatively early stage in its revolution. Therefore, Software Design methodology lacks the depth, flexibility and quantitative nature that are normally associated with more classical engineering disciplines. However, techniques for software designs do exist, criteria for design qualities are available and design notation can be applied.

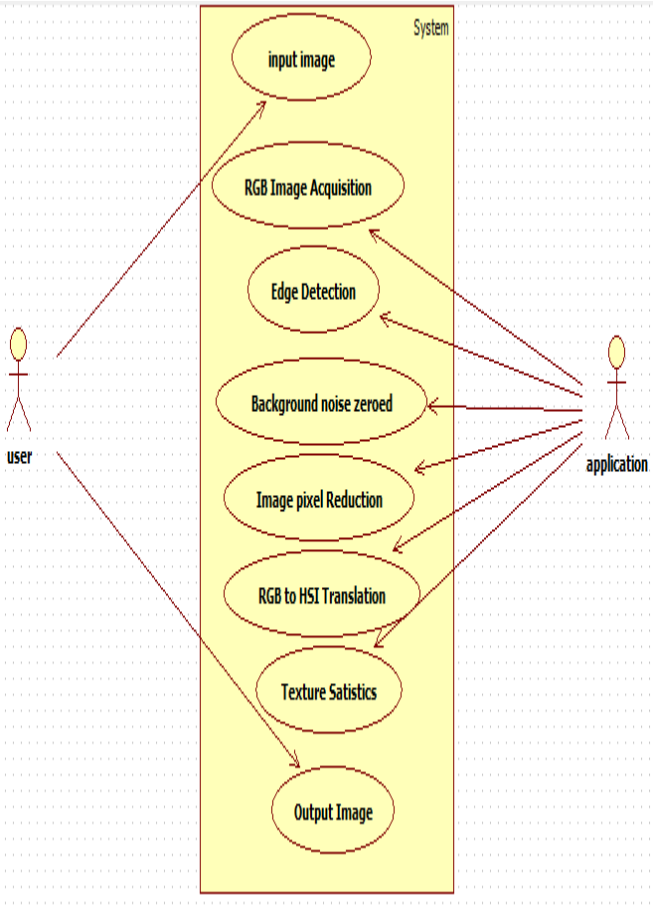

Fig-1: Case Diagram

3. SOFTWARE DESCRIPTION

3.1 Features of c# .Net

The .NET Framework is a new computing platform that simplifies application development in the highly distributed environment of the Internet.

3.1.1 Objectives of .Net framework

- To provide a consistent object-oriented programming environment whether object codes is stored and executed locally on Internet-distributed, or executed remotely.
- To provide a code-execution environment to minimizes software deployment and guarantees safe execution of code.
- Eliminates the performance problems. There are different types of application, such as Windows-based applications and Web-based applications. To make communication on distributed environment to ensure that code be accessed by the .NET Framework can integrate with any other code.

3.2 Asp.Net

ASP.NET is the next version of Active Server Pages (ASP); it is a unified Web development platform that provides the services necessary for developers to build enterprise-class Web applications. While ASP.NET is largely syntax compatible, it also provides a new programming model and infrastructure for more secure, scalable, and stable applications. ASP.NET is a compiled, NET-based environment, we can author applications in any .NET compatible language, including Visual Basic .NET, C#, and Script .NET. Additionally, the entire .NET Framework is available to any ASP.NET application. Developers can easily access the benefits of these technologies, which include the managed common language runtime environment (CLR), type safety, inheritance, and so on.

3.3 Visual studio .Net

Visual Studio .NET is a complete set of development tools for building ASP Web applications, XML Web services, desktop applications, and mobile applications In addition to building high-performing desktop applications, you can use Visual Studio's powerful component-based development tools and other technologies to simplify team-based design, development, and deployment of Enterprise solutions. Visual Basic .NET, Visual C++ .NET, and Visual C# .NET all use the same integrated development environment (IDE), which allows them to share tools and facilitates in the creation of mixed-language solutions. In addition, these languages leverage the functionality of the .NET Framework and simplify the development of ASP Web applications and XML Web services.

3.4 Software requirements

Operating system : Windows 10
Front End : Microsoft Visual Studio 2010
IDE : C#.Net
Data Base : SQL Server 2008 R2

3.5 Hardware requirements

System : Intel inside i3
System Type : 64-bit Operating System
Storage : 500GB
RAM : 4 GB

4. ARCHITECTURAL DESIGN

The design process for identifying the sub-systems making up a system and the framework for sub-system control and communication is architectural design. The output of this design process is a description of the software architecture. Defines an abstraction level at which the designers can specify the functional and performance behaviour of the system. System architecture is a conceptual model that defines the structure, behavior, and more views of a system.

An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structure and behavior of the system.

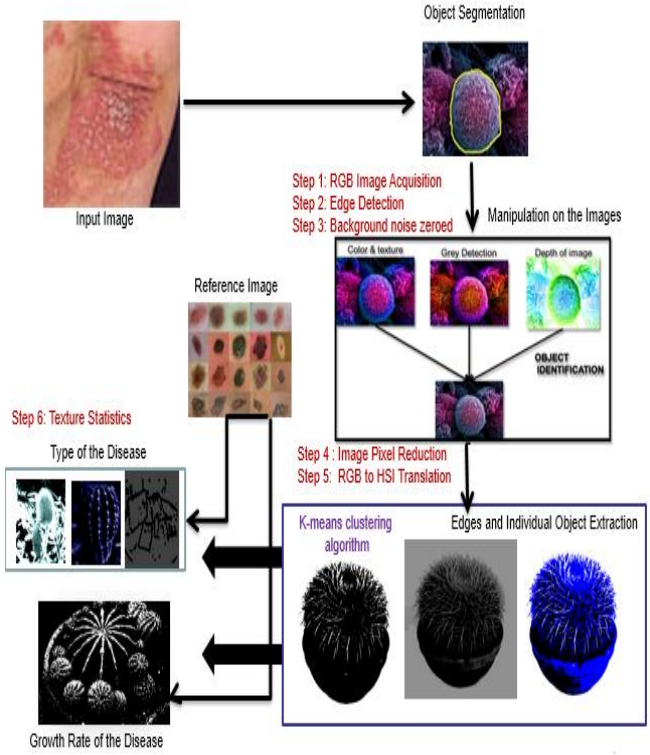

Fig-2: Architecture Diagram

4.1 Architecture Design Representation

Architecture design can be represented using the following models.

1. Structural model: Illustrate architecture as an ordered collection of program components.

2. Dynamic model: Specifies the behavioral aspect of the software architecture and indicates how the structure or system configuration changes as the function changes due to change in the external environment.

3. Process model: Focuses on the design of the business or technical process, which must be implemented in the system.

4. Functional model: Represents the functional hierarchy of a system.

5. Framework model: Attempts to identify repeatable architectural design patterns encountered in similar types of application. This leads to an increase in the level of abstraction

4.2 E-R Diagram

An entity relationship model, also called an entity-relationship (ER) diagram, is a graphical representation of entities and their relationships to each other, typically used in computing in regard to the organization of data within databases or information systems.

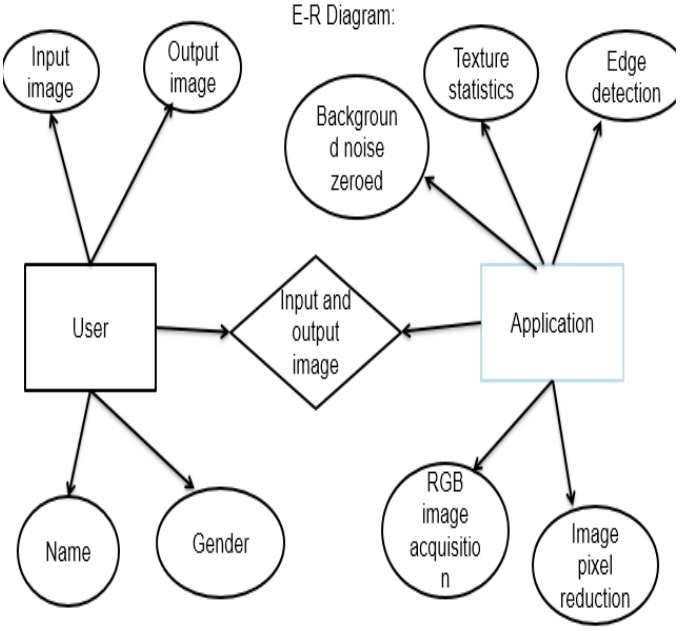

Fig-3: E-R Diagram

5. IMPLEMENTATION OF MODULES SPECIFICATION

A module is a part of a program. Programs are composed of one or more independently developed modules that are not combined until the program is linked. A single module can contain one or several routines. The project contains the following main modules.

- End User – Data Access Module
- Cloud Data Upload Module
- Cost Manipulation Module
- Admin Access Console – Data Staging Arena
- Intermediate Data Generation – Staging Module
- Security Management Module

5.1 End user- data access module

Data Access is simply the authorization you have to access different data files. Data access can help distinguish the abilities of Administrators and users. E.g. Admen's may be able to remove, edit and add data, while a general user may not be able as they don't have the access to that particular file. In this module, the users are provided with the privilege to access the data from the cloud server.

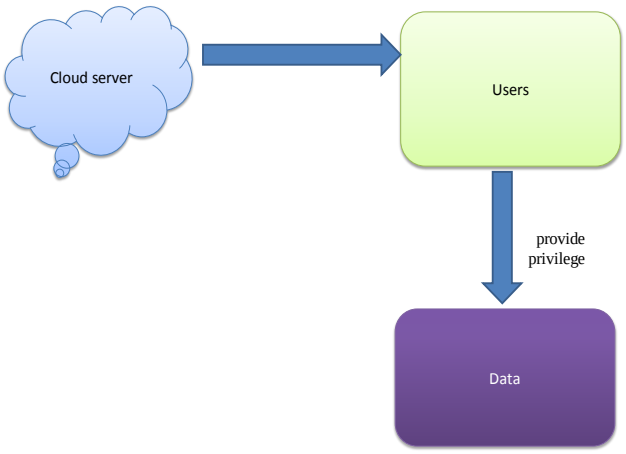

Fig-4: End user- data access module

5.2 Cloud data upload module

Cloud storage is a term that refers to online space that can be used to store data. Online storage solutions are usually provided using a large network of virtual servers that manages files and organize virtual storage space. Moving your files to the cloud for the first time can be frustrating. In this module, the user s are supposed to upload their data in the real cloud server.

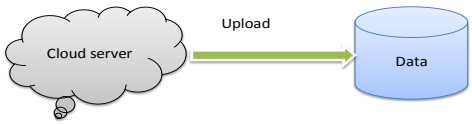

Fig-5: Cloud data upload module

5.3 Cost manipulation module

Manipulation is treating or operates with or as if with the hands or by mechanical means especially in a skillful manner. The manipulation is defined as act of artificially inflating or deflating the price of a security. In this module, the accessibility of data from the cloud has been monitored and charged based on the usage of the cloud storage.

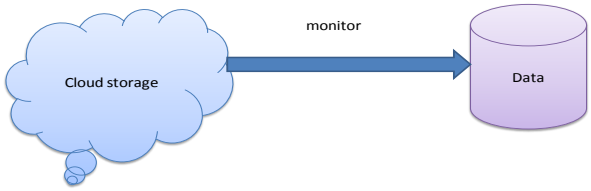

Fig-6: Cost manipulation module

5.4 Admin access console – data staging arena

The data staging process imports data either as streams or files, transforms it, produces integrated, cleaned data and stages it for loading into data warehouses, data marts, or Operational Data Stores. The Arena Stage specializes in non-profit theater. The Arena stage is located in Southwest Washington D.C. The theater was established in 1950 and reopened in 2010.In this module, the frequent data that are accessed in the staging server are accessed and maintained by the admin in the admin console point.

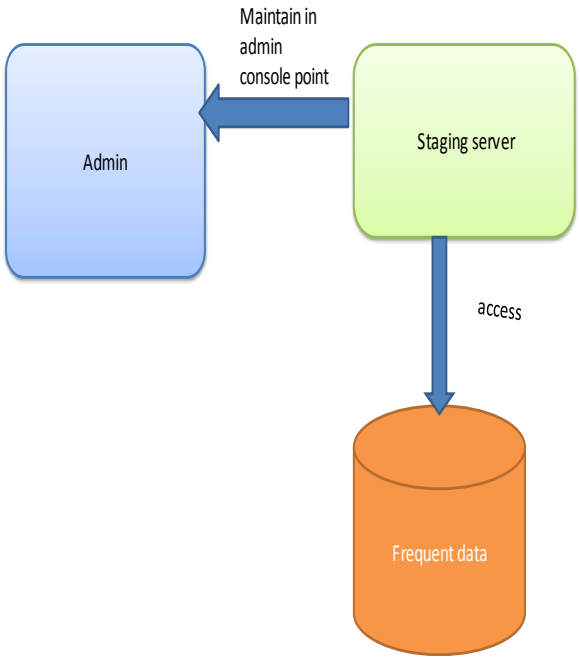

Fig-7: Admin access console – data staging arena

5.5 Intermediate data generation – staging module

The purpose of the staging server is to act as a temporary stage to test new or revised page for responding the request.

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In this module, frequent data's are processed intermediately by this staging module this in turn avoid the same request that has been raised to server.

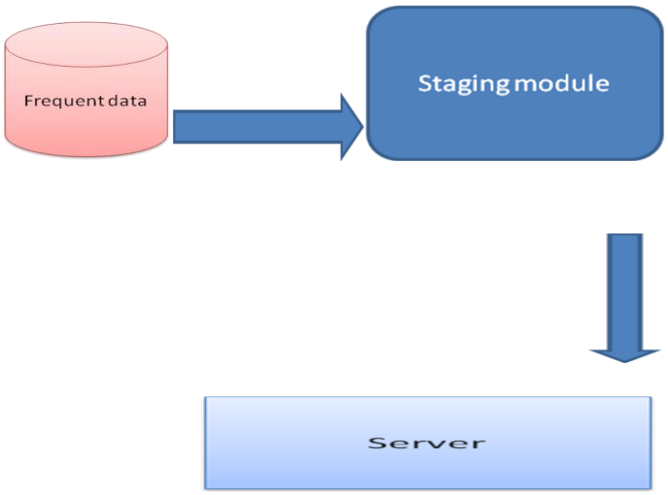

Fig-8: Intermediate data generation – staging module

5.6 Security management module

The legal definition of securities is that they are documents used to represent rights. Bank notes, stocks, bonds, certificates of deposit (CDs) are examples of securities. Security is the degree of resistance to, or protection from, harm. It applies to any Vulnerable and valuable asset, such as a person, dwelling, community, nation, or organization.

In this module, the token that has been generated in the system for transaction of data are validated and checked to maintain secure transaction from the cloud to the requestor.

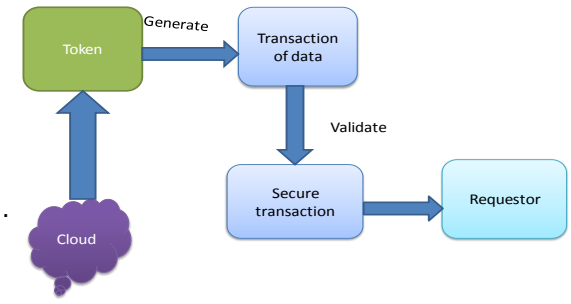

Fig-9: Security management module

6. CONCLUSION

Main focus of the paper is to provide the accurate growth rate of the disease to treat patients easily, the proposed system in this paper provides a feasible solution for skin disease detection providing up to 80% efficiency by using different techniques. As no technology assures 100% accuracy of detection so there is scope of further improvement. Also skin diseases which can be detected through analyzed techniques are limited. In later stage model can be devised to detect skin diseases in animals and plants. Also it can be expanded to include all kinds of skin problems.

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