Skin cancer detection with image processing

Cancer Detection Using Image Processing System

Early detection of skin cancer **is crucial for successful treatment . Medical image processing can significantly** increase the accuracy and speed of diagnosis.

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Methods for identifying and classifying skin lesions

Color-based methods

Color analysis of skin lesions to differentiate between benign and malignant lesions.

Texture-based methods

Examining skin texture patterns for diagnosis

The shape of the waste. The structure and

Geometry-based methods

Using geometric features of lesions such as diameter, and boundaries to classify them. Shape,

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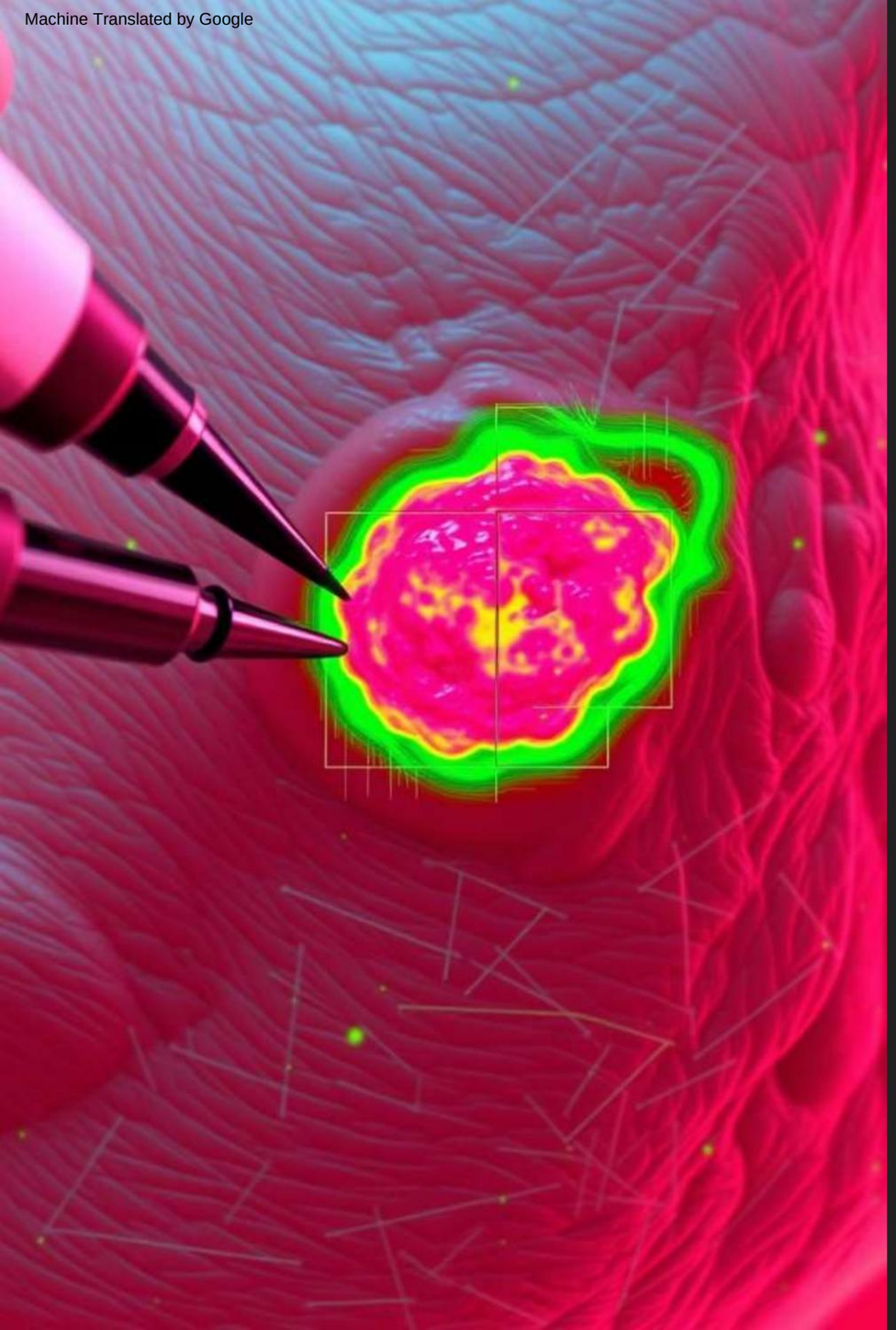

Using normal and uniform distribution in waste classificatio

Normal distribution

To model the appearance of healthy skin and lesions.

Uniform distribution

To display unexpected changes in

The color and texture of the skin in the area of the lesions.

Precise segmentation

Using these distributions, skin lesions can be separated from healthy skin with high accuracy.

Did.

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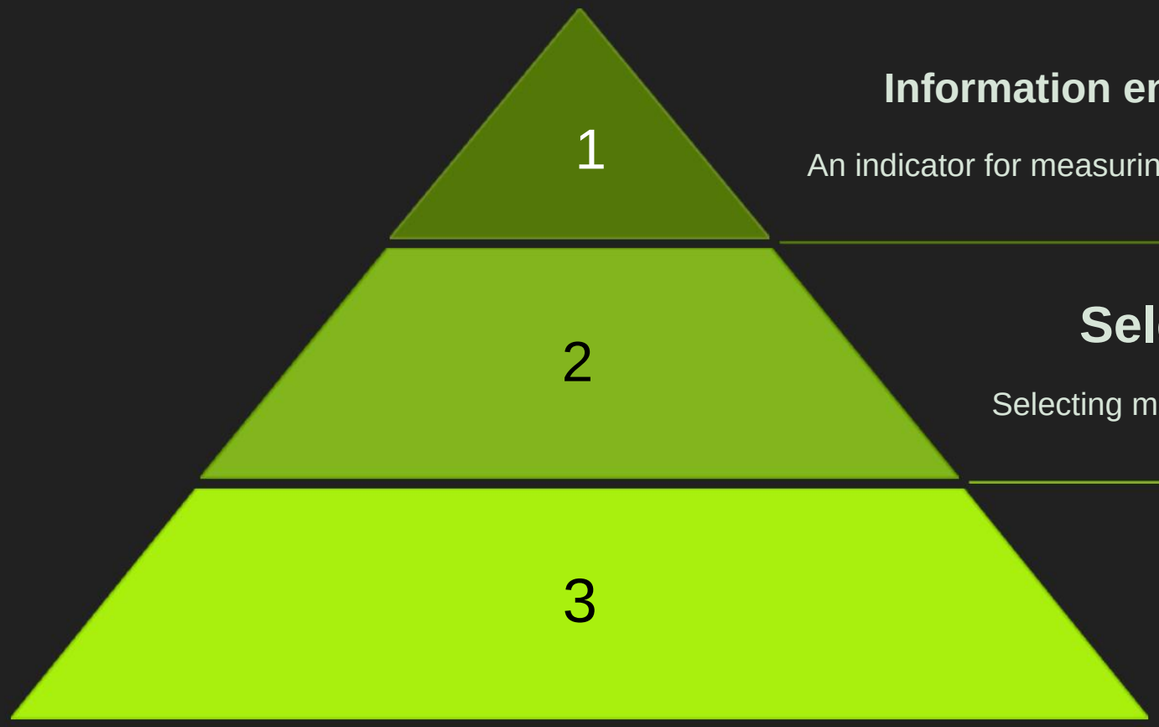
A new entropy-based method for feature selection



Information entropy

An indicator for measuring uncertainty in information.

Select features

Selecting more powerful features for waste classification.

Dimension reduction

Removing unnecessary features and simplifying the model.

performance results of the proposed method. Accuracy and

95%

Accuracy

Proposed method for high accuracy in cancer diagnosis

It shows skin.

0.8

Sensitivity

Ability to accurately diagnose malignant lesions.

0.9

Speciality

Ability to correctly diagnose benign lesions.

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Extracted features of dermoscopic images

Color

Changes in the color of skin lesions, such as unusual or uneven colors.

Shape

and bumps in the lesions. Irregular shape, unclear borders, or presence of curves

Texture

The presence of unusual patterns in the skin texture, such as spotting or scaling.

Challenges in the skin lesion classification process

1

Variety of lesions:

There is great variation in the shape, size, and color of skin lesions.

2

Noise in images:

The presence of noise in dermoscopic images can make diagnosis difficult.

3

Data shortage:

Insufficient data to train and evaluate machine learning models.

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Common algorithms in skin image processing

1

Convolutional neural networks (CNN) for detecting complex patterns in skin images.

2

Support Vector Machines (SVM)

To classify lesions into two categories: benign and malignant.

3

K-Nearest Neighbors (KNN)

To classify lesions based on their similarity to previous lesions.

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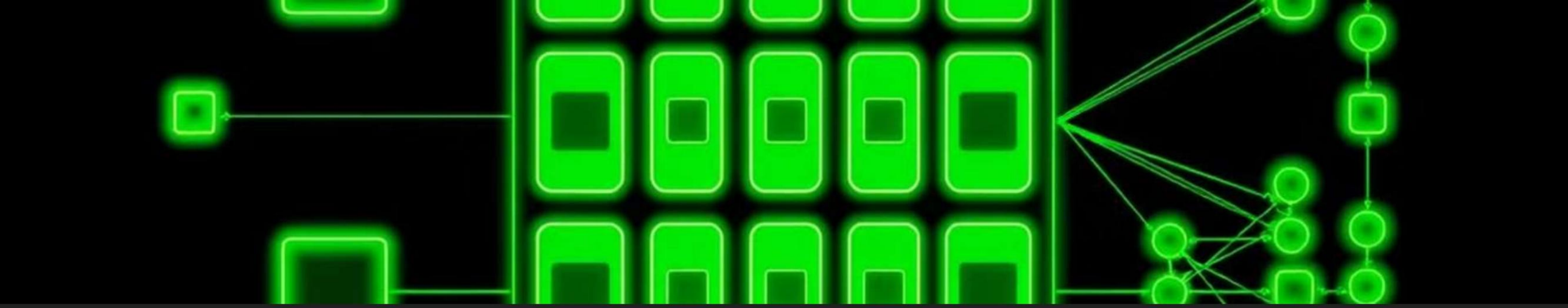

CNN (Convolutional Neural Networks)

1

Feature extraction

Extracts important features from images using CNN convolution layers .

Deep Learning 2

CNN uses deep layers to learn complex patterns in images .

3

Classification

Using fully connected CNN layers , it classifies waste into different categories.

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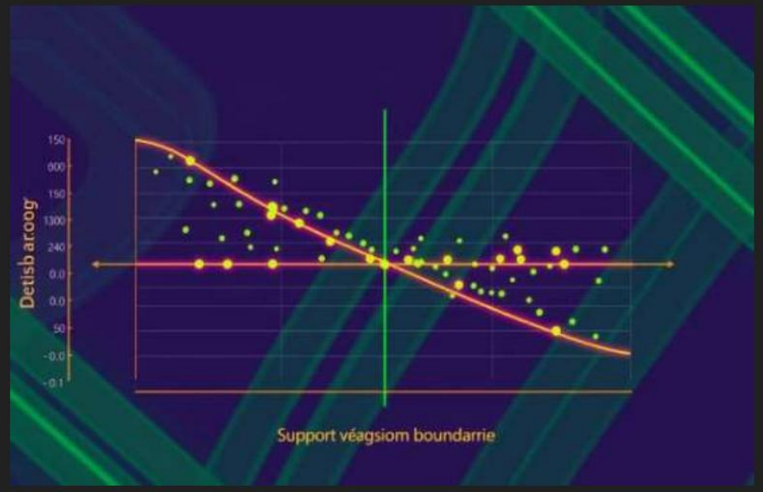
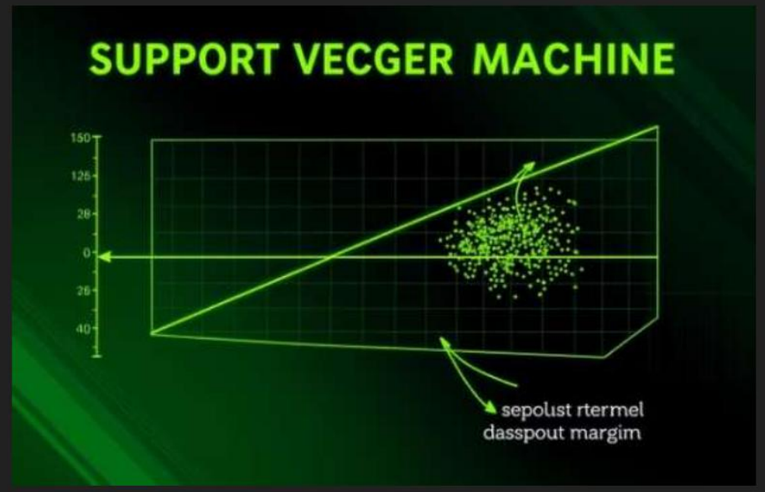
Support Vector Machines (SVM)





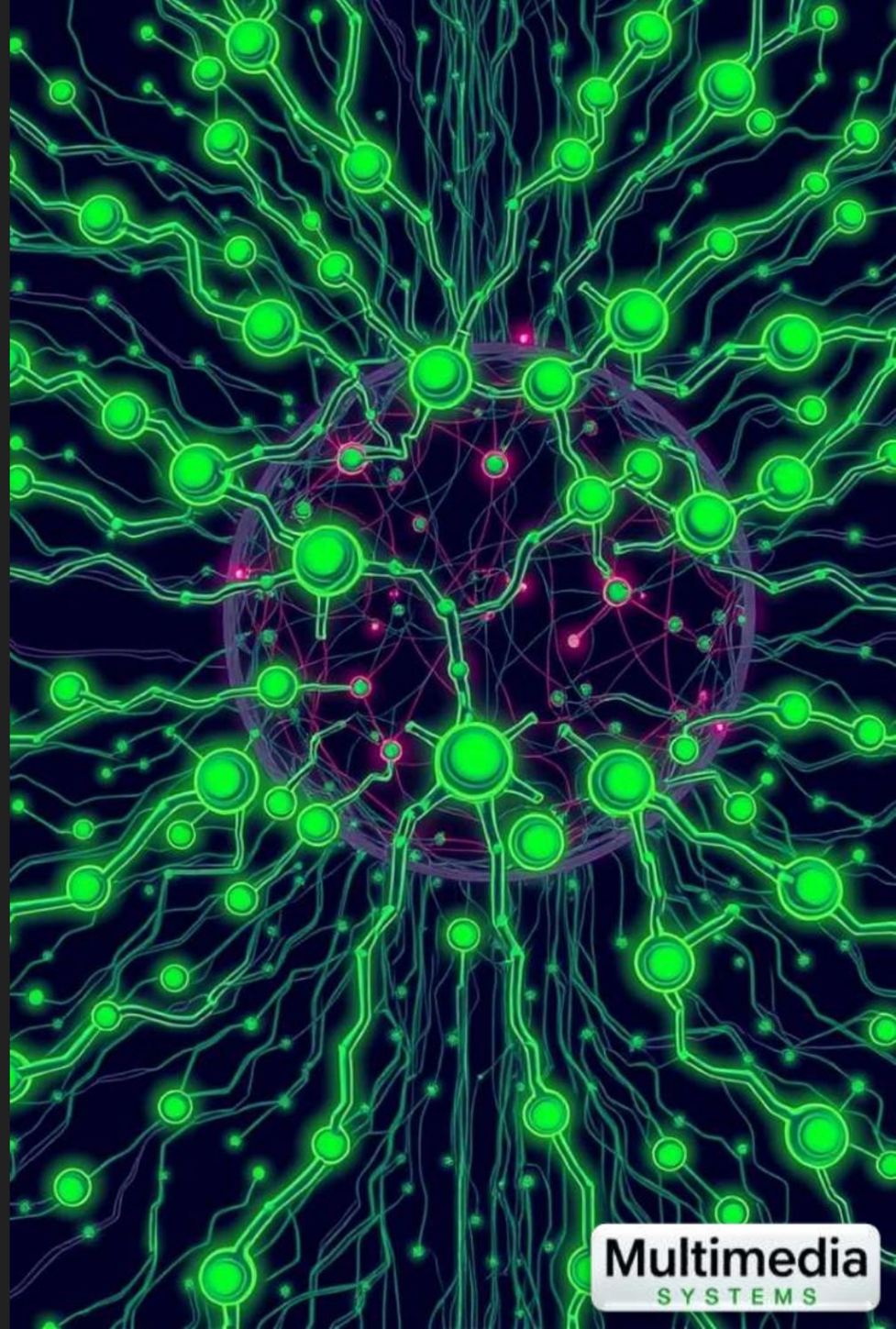
Introduction to the KNN algorithm

Introducing KNN

The K-Nearest Neighbors (KNN) algorithm is a simple machine learning algorithm that identifies new examples based on their similarity to known examples.

Applications in medicine

This algorithm is widely used in the field of medical diagnosis, such as skin cancer diagnosis . By comparing new skin images with known skin cancer images, a more accurate and faster diagnosis can be achieved.



Criteria for diagnosing skin cancer

Color (Color

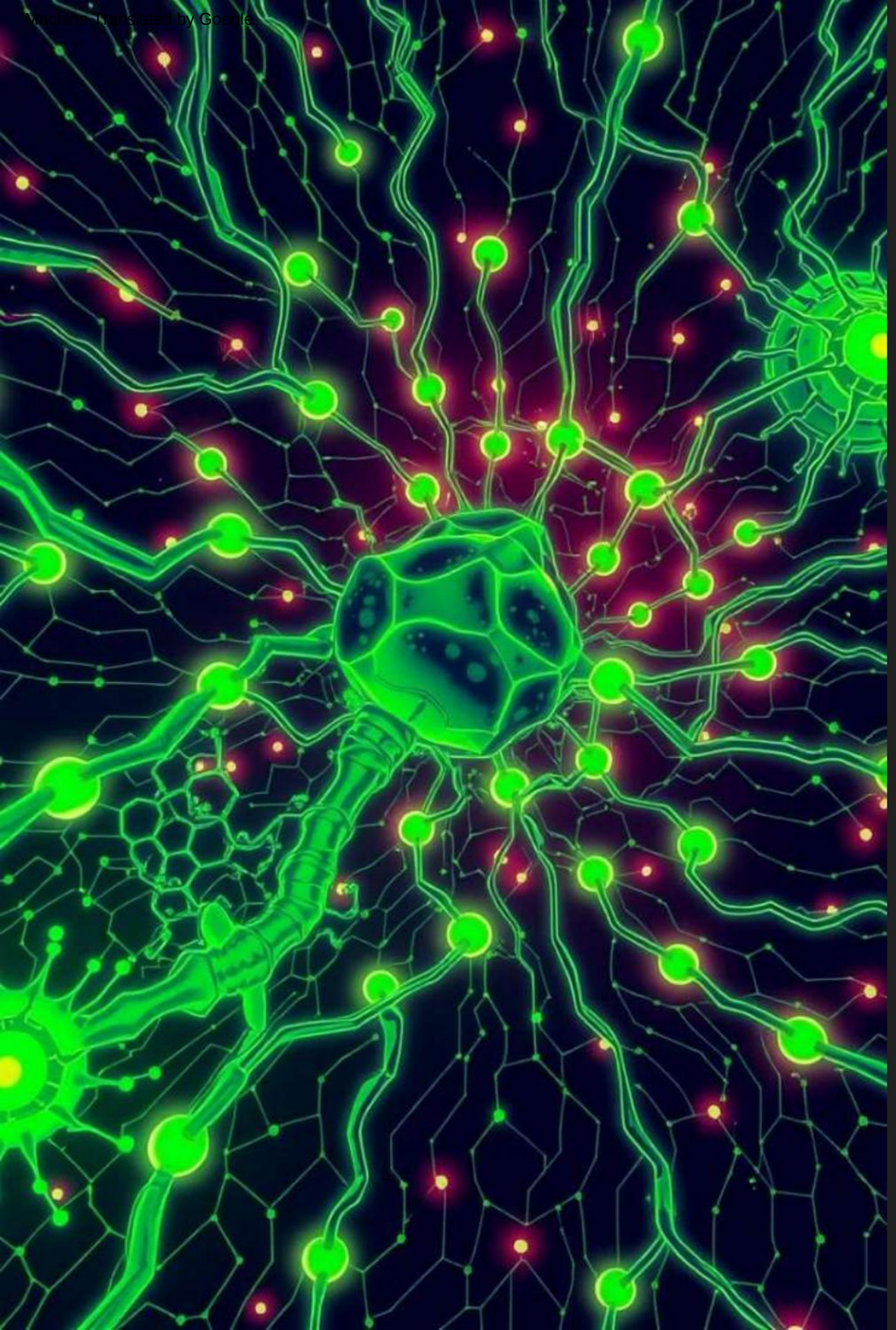
change, asymmetry, uneven color,
and the presence of unusual colors
are among the important diagnostic criteria.

Border

Irregular, jagged, blurred, and fuzzy edges are
other possible signs of skin cancer.
They are.

Diameter

A diameter of more than 6 mm in moles
and likely indicates that they are dangerous
The presence of skin cancer.



Advantages and disadvantages of image processing algorithms

Benefits of image processing

And the speed of detection, reducing human error , identifying complex patterns, reducing the waiting time for detection.

Accuracy

Disadvantages of image processing

High cost of equipment, need for skilled professionals, dependence on image quality, problems related to patient privacy.

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Skin imaging tools

Dermatoscope

Hand-held tool for detailed skin examination, with appropriate magnification and exposure.

Digital camera

To capture high-quality skin images for more accurate processing and diagnosis.

3D scanning

Creating 3D images of the skin for more accurate diagnosis and detection of subtle changes.

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Advantages and disadvantages of image processing in diagnosing skin diseases

Benefits of image processing

And high speed in diagnosis, early identification and reduction of human error, Accuracy improving medical care.

Disadvantages of image processing

High cost of equipment and software, need for skilled professionals, limitations in identifying rare or complex cases.

The future of image processing technology in medical diagnostics

1. Developing artificial intelligence (AI) algorithms for more accurate and efficient diagnosis.
2. Improving image quality using new technology and improving imaging methods.
3. Using image processing in diagnosing skin diseases in remote and underdeveloped areas.

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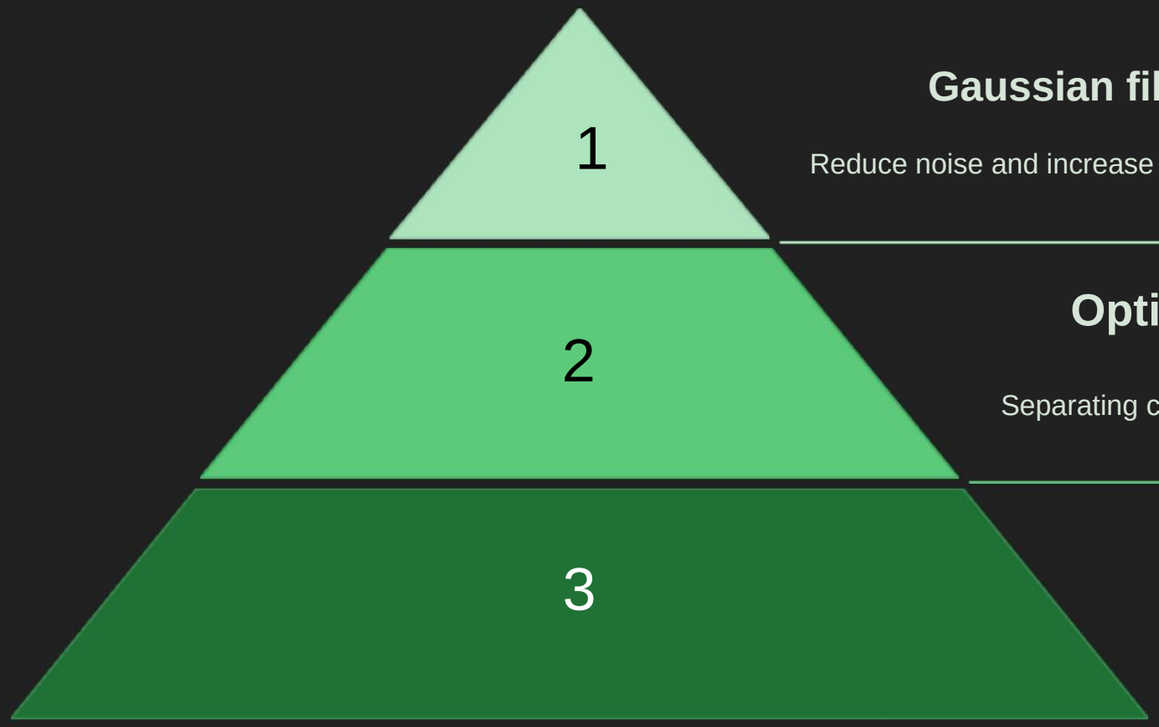
Methods to improve diagnosis



Gaussian filter

Reduce noise and increase image quality, improve recognition accuracy.

Optimal clustering

Separating cancer cells from normal cells and improving detection accuracy.

Image processing

Image analysis to detect skin cancer with higher accuracy.

Impact of image resolution

1

Image quality

It is. And the clarity of images is important in diagnosing skin cancer. Accuracy

2

New technology

New imaging technology helps improve image quality.

3

Early detection

Early detection of skin cancer is possible using high-quality images.

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Skin diseases related to cancer

1

Melanocytic mole

A type of mole that may develop into melanoma.

2

Melanoma

The most dangerous type of skin cancer that spreads quickly.

3

Actinic keratosis

A type of skin cancer caused by exposure to sunlight .