Graphology

Decoding Equations from Images

DSP Lab Project

Presented by

BL.EN.U4EAC21058: Rohit S. Nair

BL.EN.U4EAC2159: Rudraniel Ghosh Roy

BL.EN.U4EAC21066: Shambhavi Singh

BL.EN.U4EAC21068: Shourjyo Bhattacharya

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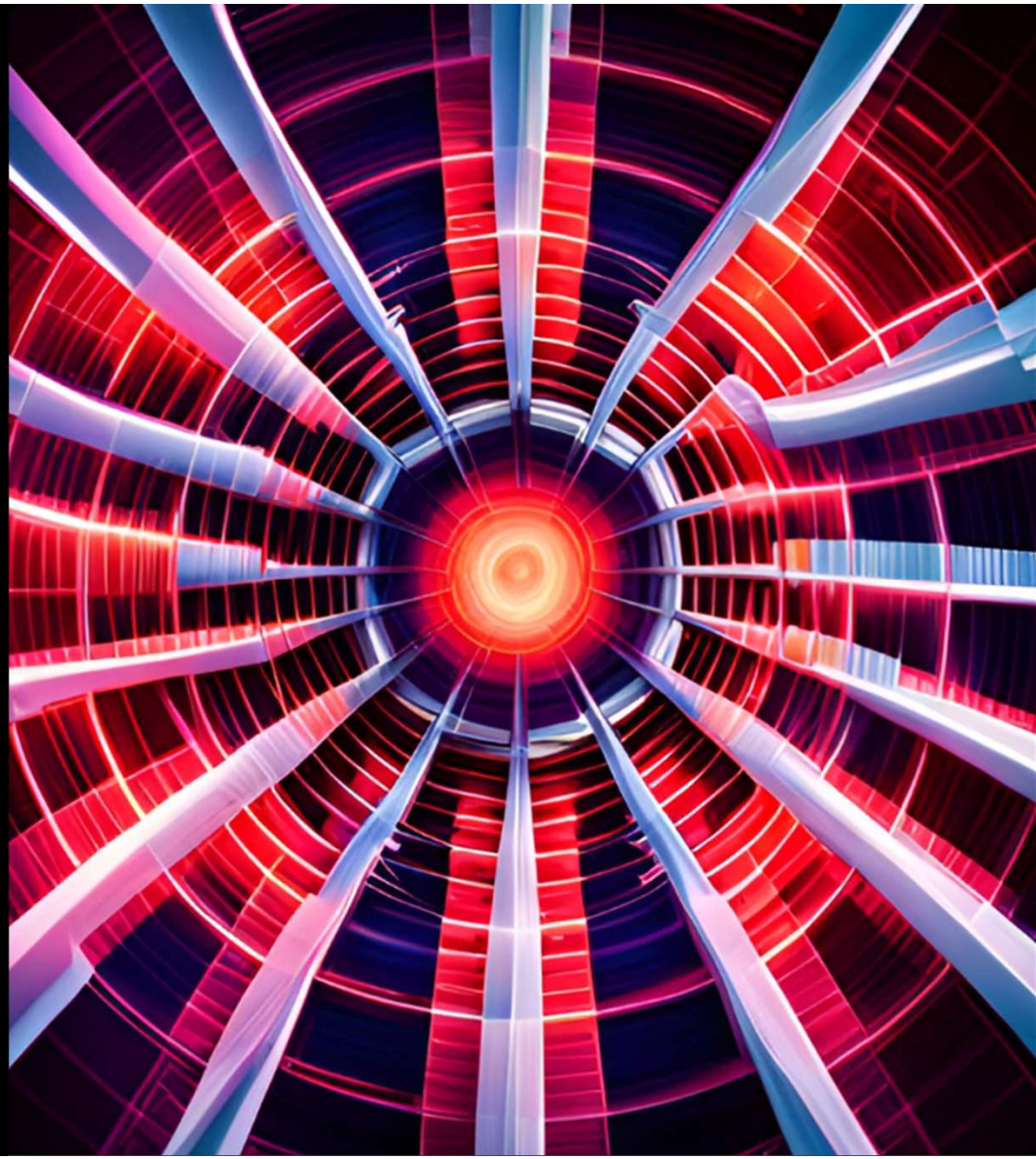
Introduction

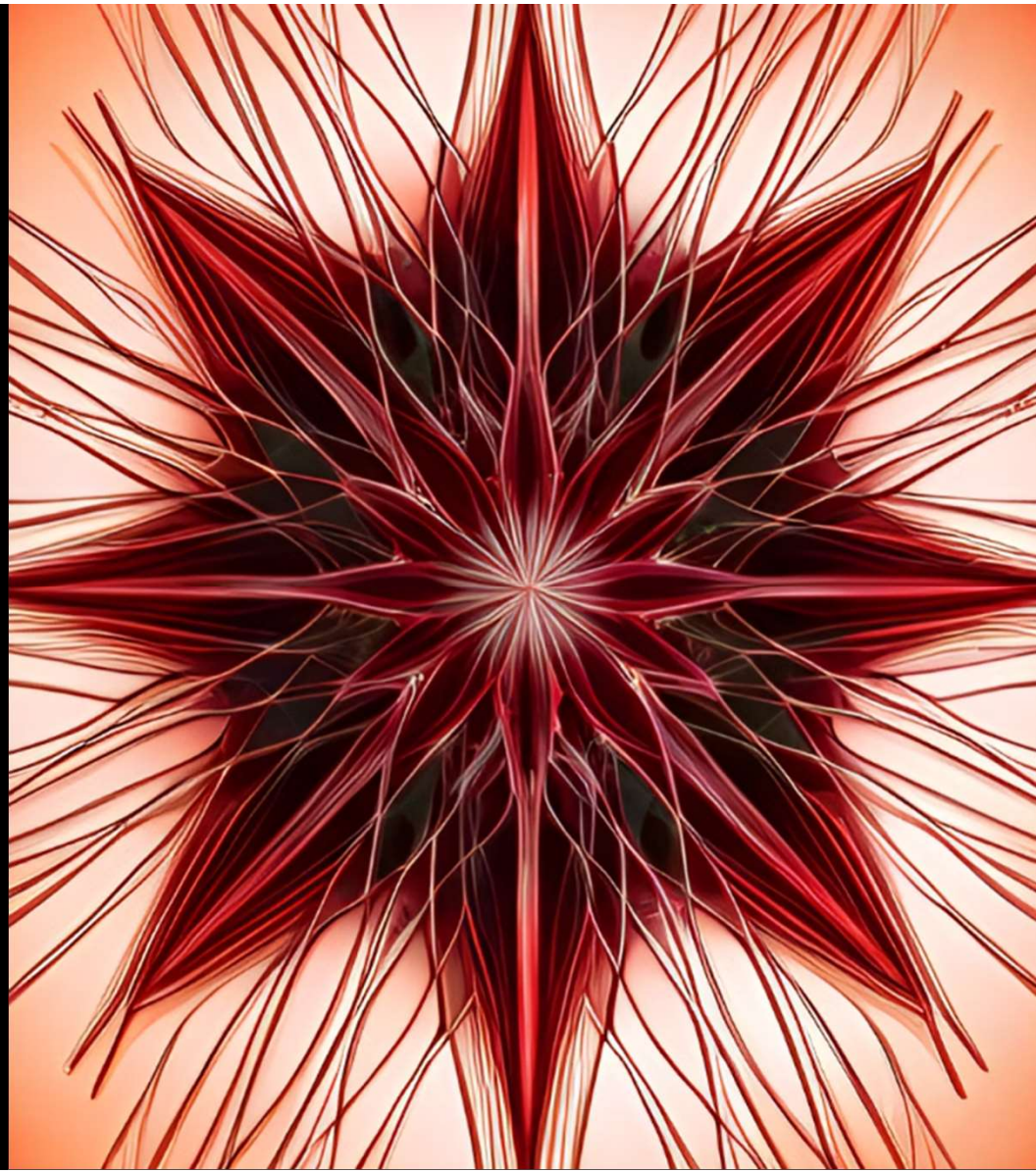
This Matlab program that takes an image of a graph and outputs the equation of the graph.

The program can save time and improve accuracy in analyzing graphs, which is crucial in many fields such as engineering, physics, and economics.



The Problem

Analyzing graphs can be a challenging task, especially when dealing with complex graphs that have multiple curves and lines intersecting at different points. Without the equation of the graph, it can be difficult to accurately determine the behavior of the graph and make informed decisions based on the data.



The Solution

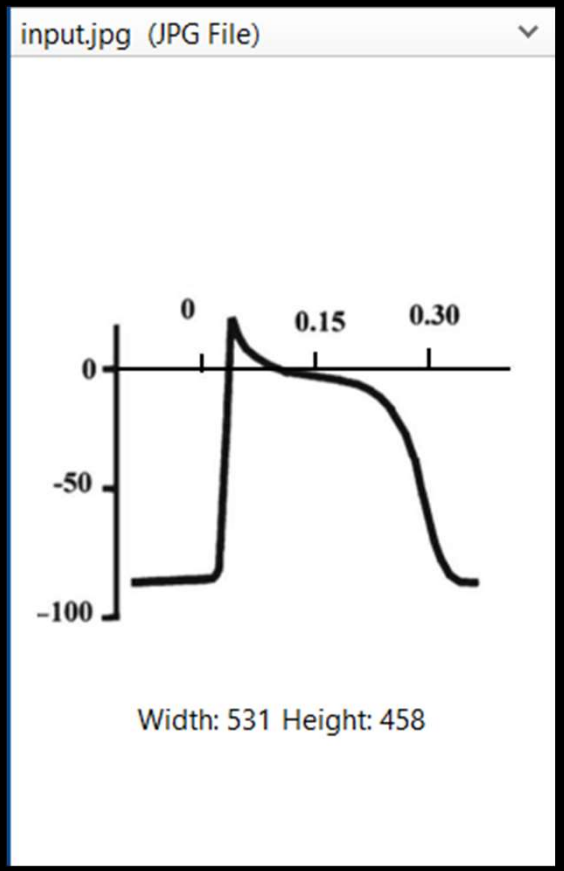
The Matlab program we are discussing today offers a solution to this problem by taking an image of a graph and outputting the equation of the graph.

The process is simple: input the image into the program, and it will use algorithms and Matlab tools to analyze the graph and generate the equation.

MATLAB Program

```
% Read the image
image = imread('input.jpg');

% Convert the image to grayscale
grayImage = im2gray(image);

% Convert the grayscale image to a matrix
matrix = double(grayImage);

% Generate x, y, and z data for surface fitting
[x, y] = meshgrid(1:size(matrix, 2), 1:size(matrix, 1));
xData = x(:);
yData = y(:);
zData = matrix(:);

% Convert all 0's to 0 and any value greater than 1 to 1
matrix(matrix == 0) = 0;
matrix(matrix > 1) = 1;

% Display the modified matrix
disp(matrix);

% Define the fitting function for a surface
fitType = fittype('poly22');

% Perform surface fitting
fitResult = fit([xData, yData], zData, fitType);

% Display the fit result
disp(fitResult);
```

Input Image



Output

```
Command Window

    Linear model Poly22:
    fitResult(x,y) = p00 + p10*x + p01*y + p20*x^2 + p11*x*y + p02*y^2
    Coefficients (with 95% confidence bounds):
      p00 =       262.1  (261.1, 263.1)
      p10 =     -0.0946  (-0.1002, -0.08898)
      p01 =     -0.1892  (-0.1957, -0.1827)
      p20 =   0.0001589  (0.0001495, 0.0001683)
      p11 =   0.0001026  (9.282e-05, 0.0001123)
      p02 =   0.0003851  (0.0003725, 0.0003977)

fx >>
```

The Benefits

The benefits of using this Matlab program are numerous. It can save time and effort in analyzing complex graphs, allowing researchers and analysts to focus on other tasks.

Furthermore, the program can improve accuracy in determining the behavior of the graph, which is crucial in making informed decisions based on the data.

The Future

The potential for future developments in this technology is exciting. With further advancements in machine learning and artificial intelligence, it is possible that this program could become even more sophisticated.

This could lead to even faster and more accurate analysis of complex graphs, opening up new possibilities in fields such as finance, medicine, and climate science.

THANK YOU