

404:FOUND PS1415

MOTION AMPLIFICATION VIDEO

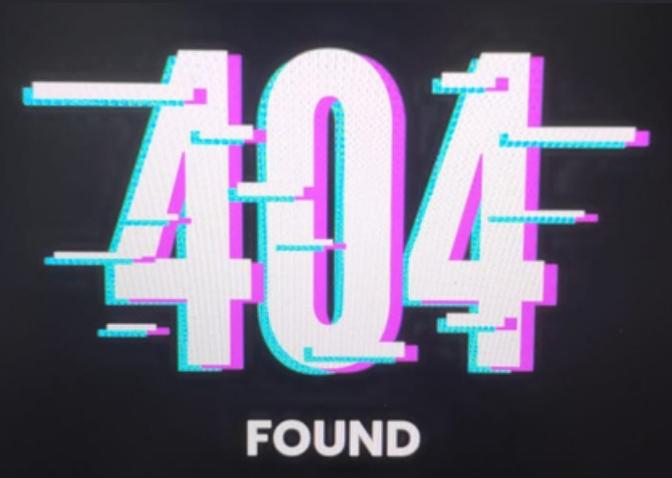
TECHNIQUES FOR VIBRATIONAL ANALYSIS

TEAM MEMBERS :

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TEAM LEADER :

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OBJECTIVE

- TO VISUALISE AND MEASURE VIBRATION OF STRUCTURES AND MACHINERY FOR CONTACTLESS MONITORING OF COMPONENTS IN MACHINEY
- ENHANCE SAFETY AND EFFICIENCY BY ENABLING EARLY DETECTION OF DEFECTS IN INDUSTRIAL OPERATIONS.

404
FOUND ·

Home

Introduction

Amplification

Project

in LinkedIn

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SIH 2023 PS1415

Development of motion
amplification video
techniques for vibration
analysis

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LET'S Connect!



**OUR END
PRODUCT—
AN OPERATIONAL
WEB APP**

TECHNOLOGY STACK

techniques for vibration
analysis

Scroll down to explore

LET'S Connect!

SIH 2023

PS1415

- React JS
- Flask
- Pytorch
- Javascript
- Python
- OpenCV
- TensorDock

SOLUTION DESCRIPTION

WE'VE DEVELOPED A COMPREHENSIVE SYSTEM FOR ANALYZING MACHINERY AND STRUCTURAL VIBRATIONS USING ADVANCED MOTION AMPLIFICATION. OUR SOLUTION EMPLOYS NEURAL NETWORKS AND MAGNIFICATION TECHNIQUES TO PRECISELY IDENTIFY AND AMPLIFY SUBTLE VIBRATIONS.

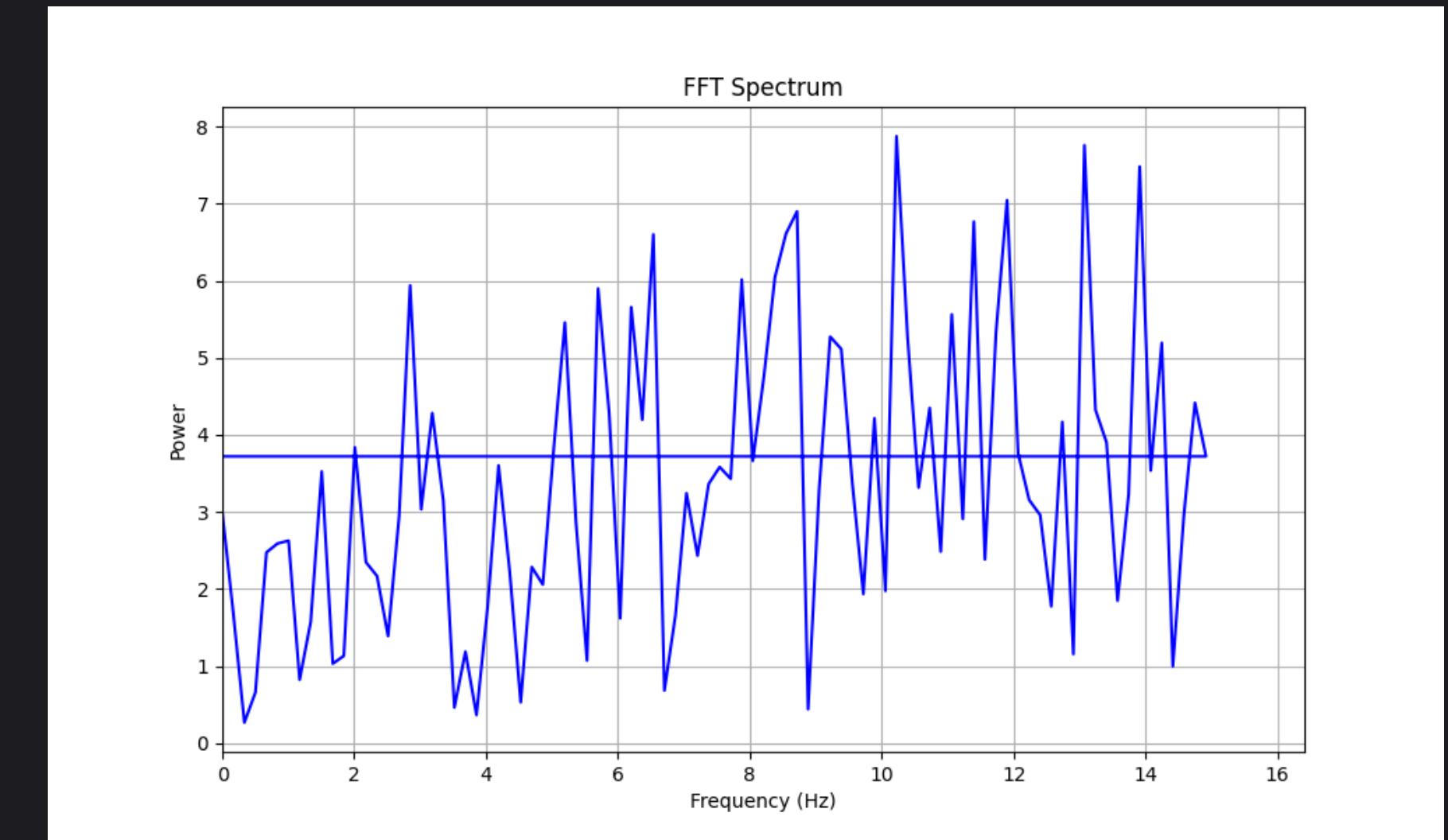
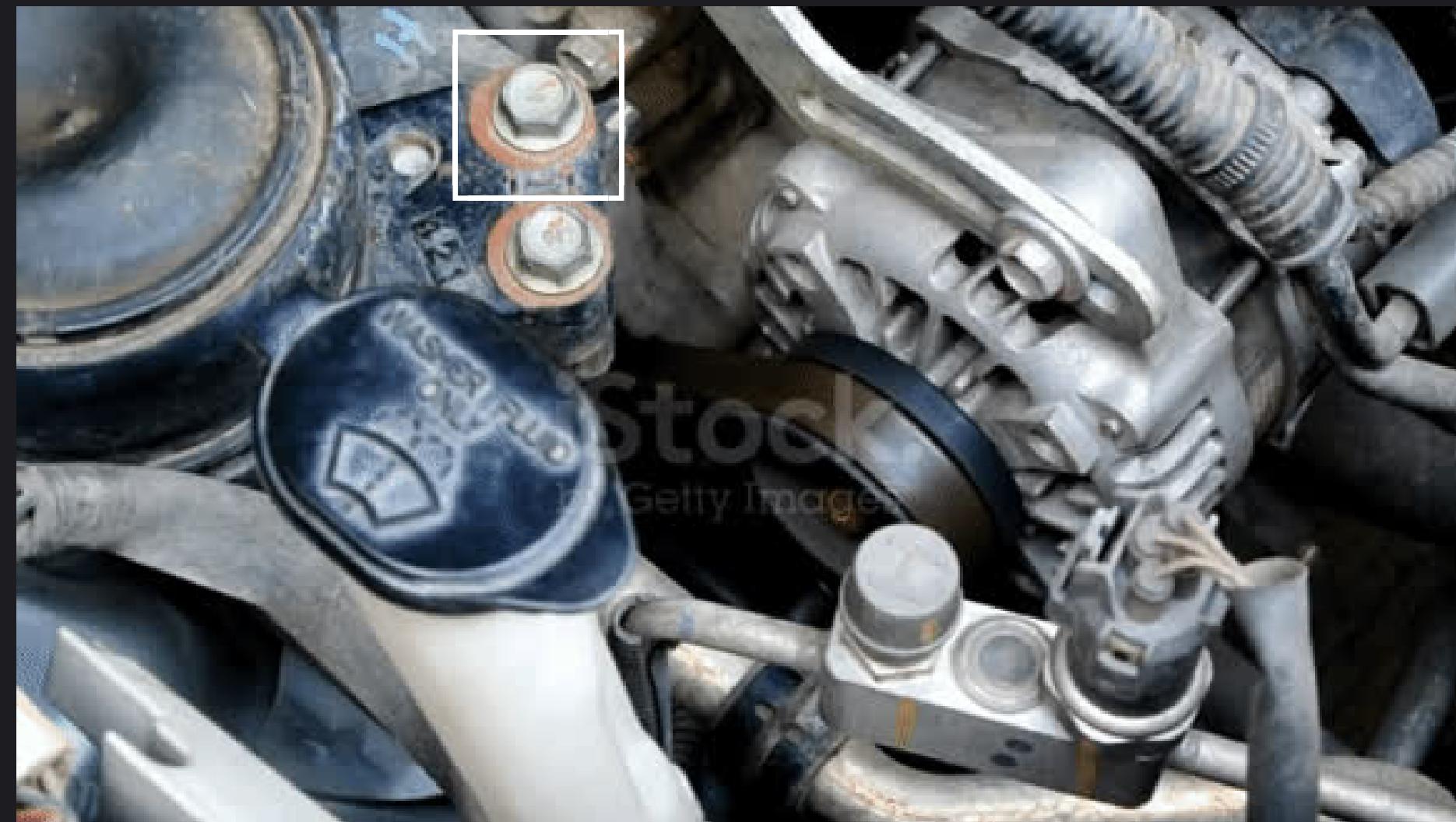
A UNIQUE FEATURE IS THE COMPREHENSIVE AREA SELECTOR FOR TARGETED MAGNIFICATION, LETTING USERS PINPOINT SPECIFIC AREAS FOR ANALYSIS. HEATMAPS VISUALIZE ACTUAL VIBRATIONS, AIDING USERS IN MARKING PRECISE AREAS OF INTEREST. FOR EACH SELECTED REGION, OUR SYSTEM GENERATES DETAILED GRAPHS FOR FAST AND ACCURATE MATHEMATICAL ANALYSIS. WITH CUSTOMIZABLE SETTINGS FOR MAGNIFICATION AND AMPLIFICATION FACTORS, USERS CAN TAILOR THE ANALYSIS TO THEIR NEEDS.

THIS LEVEL OF DETAIL, ALONG WITH TARGETED MAGNIFICATION AND FAST, ACCURATE GRAPH PRODUCTION, SETS OUR SOLUTION APART IN THE FIELD OF VIBRATIONAL ANALYSIS.

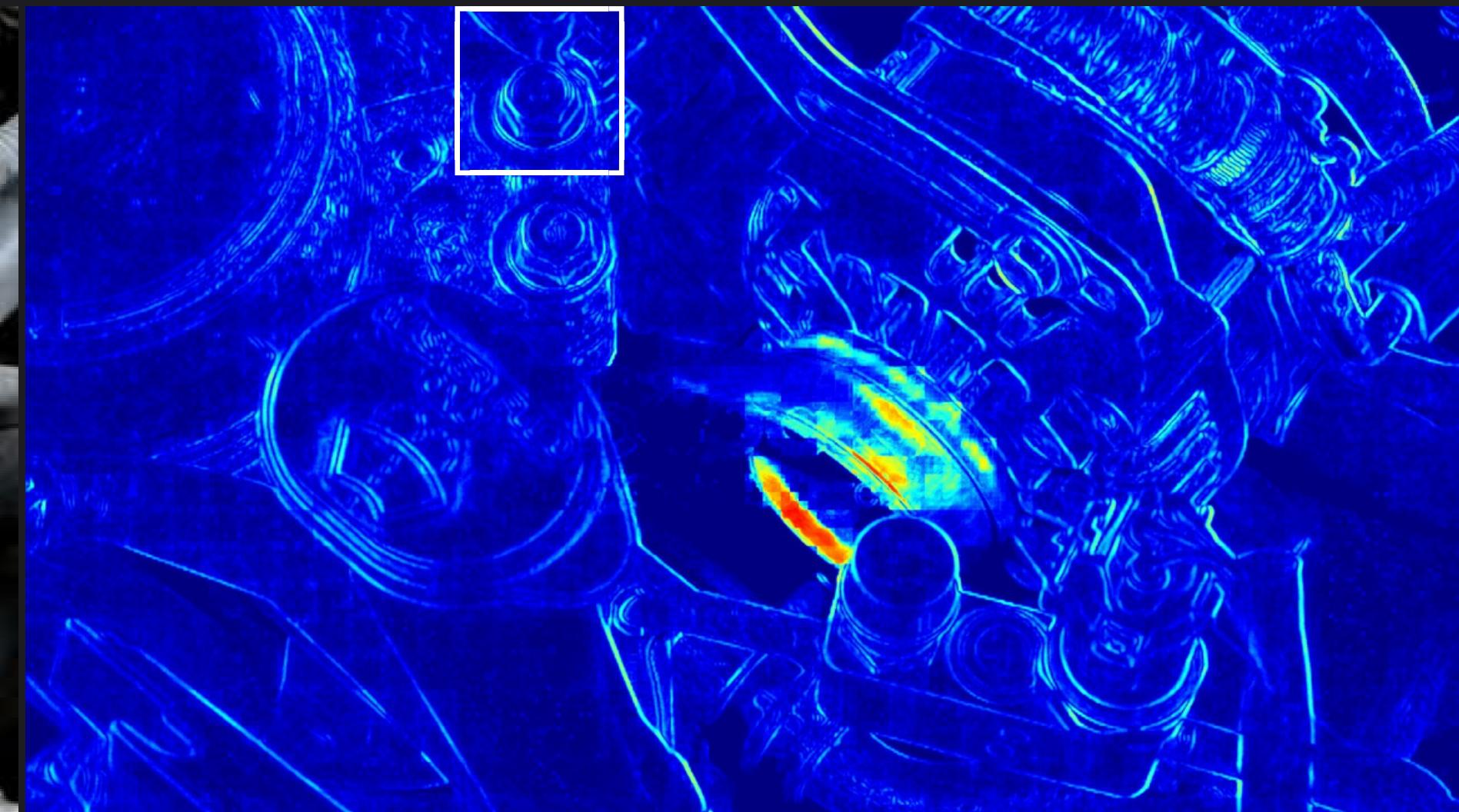
OUR APPROACH

- COMPUTING FREQUECIES OF THE MOVING COMPONENTS
- DETERMINITION OF ABNORMALLY VIBRATING PARTS USING A HEATMAP
- MAGNIFICATION OF REGIONS OF INTEREST(ROI)
- ANALYSIS THROUGH TIME WAVEFORM AND FFT SPECTRUM

FFT:



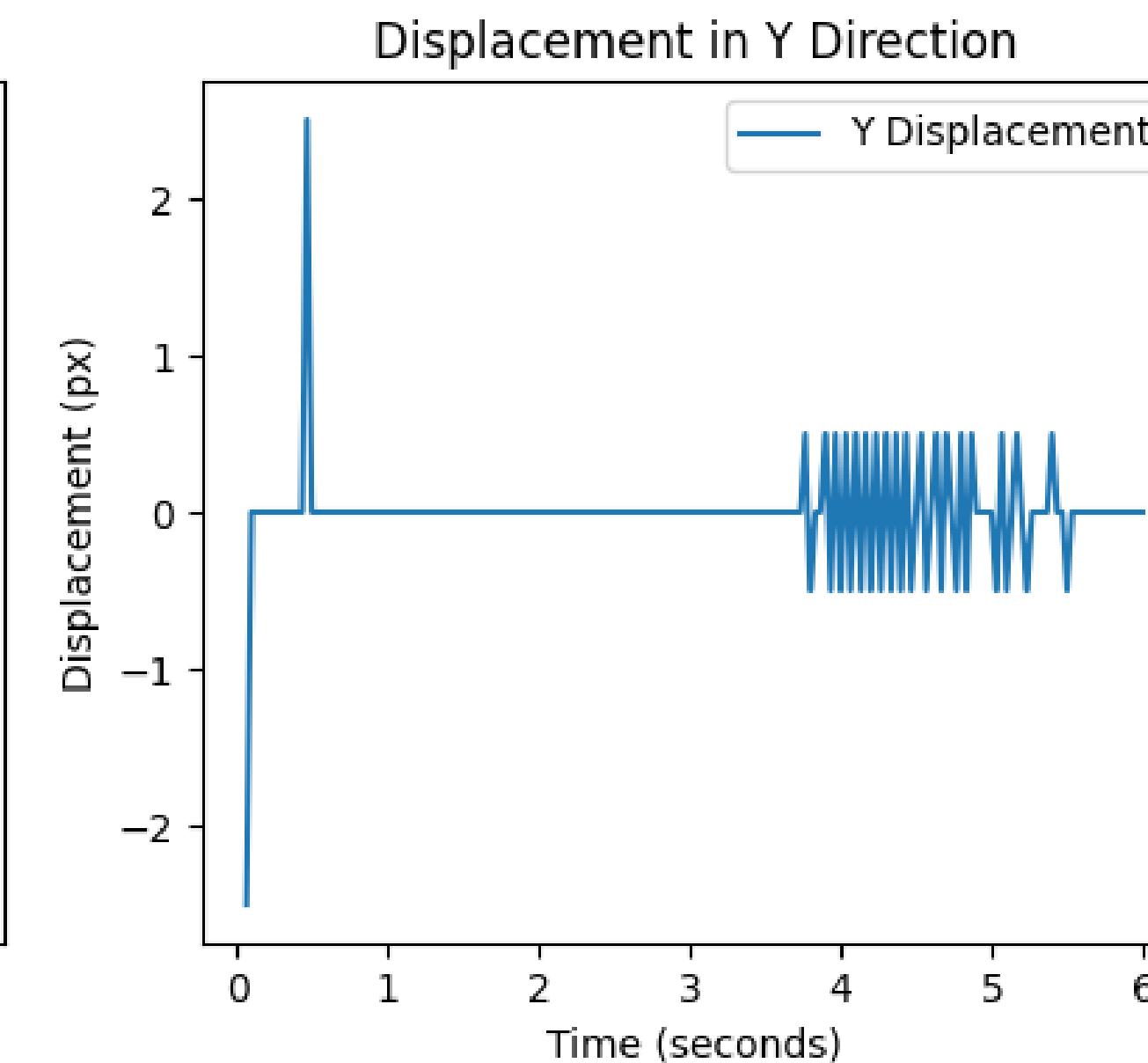
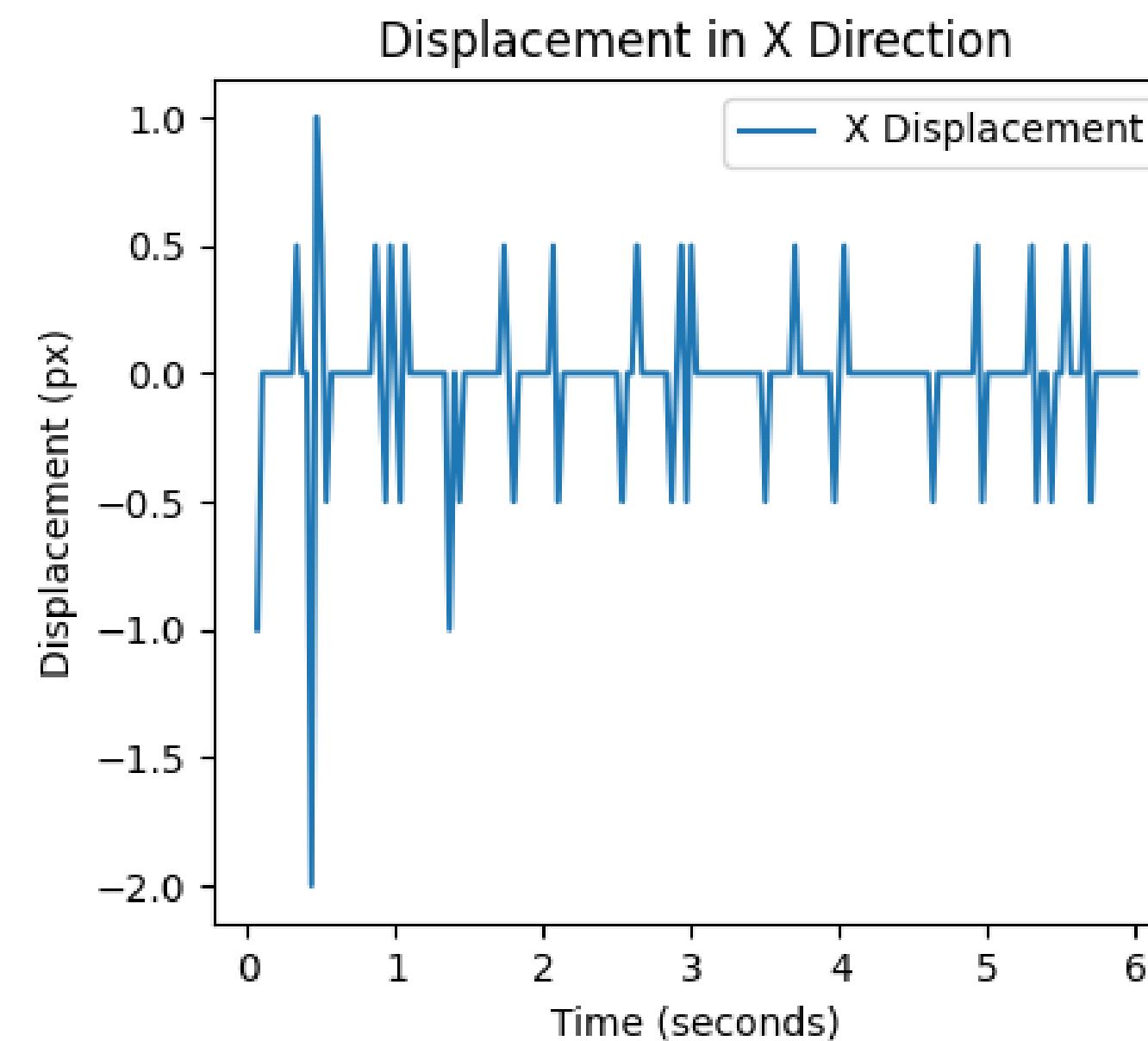
HIGHLIGHTED:



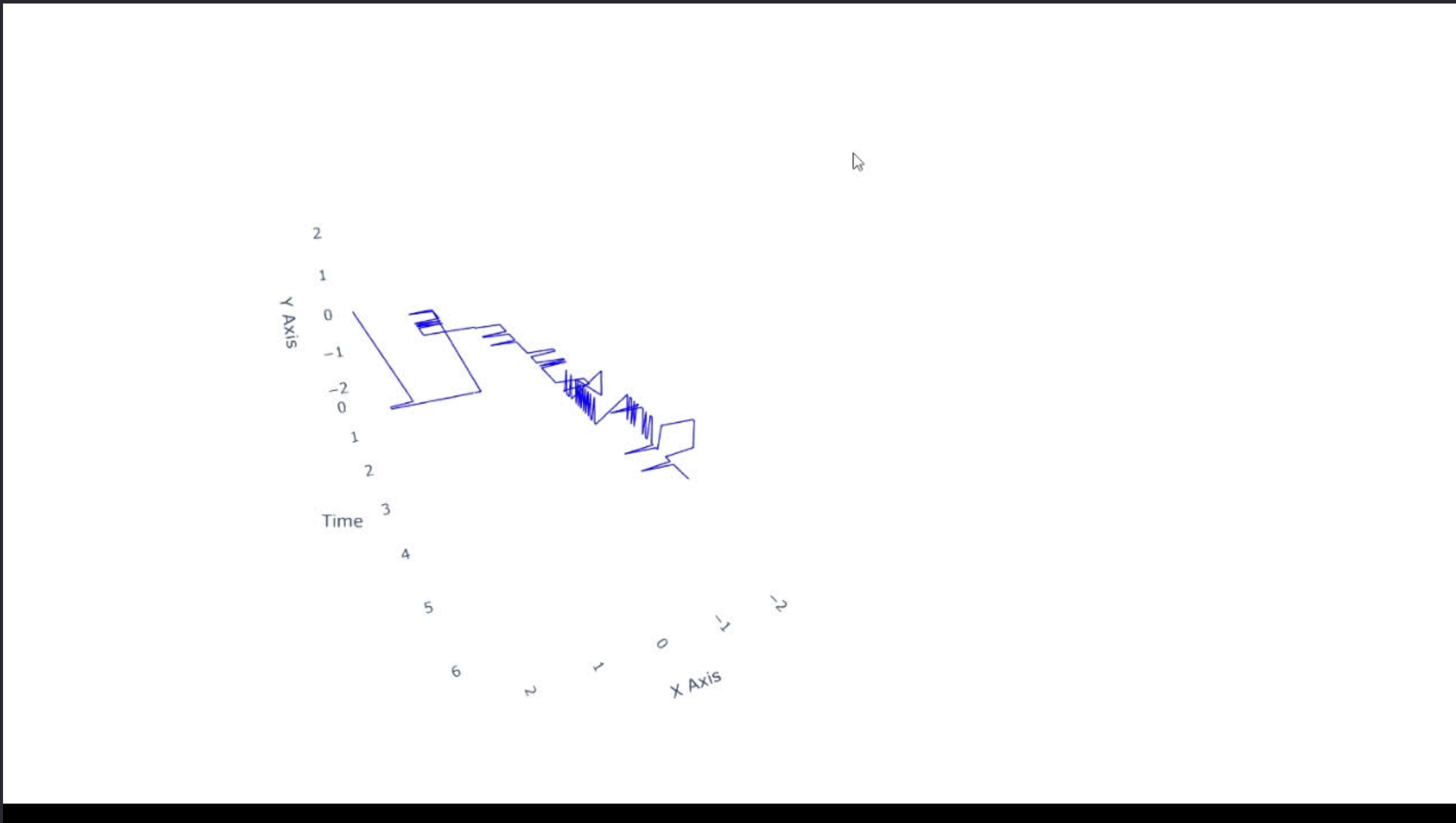
MAGNIFIED:



TIME SERIES:



3D-PLOT



FUTURE DIRECTIONS

- TO TRAIN A LEARNING MODEL TO PREDICT FAULTS AND CLASSIFIES THEM.
- WE INTEND TO DO THIS BY CONSTRUCTING A FEATURE VECTOR BY TRACKING THE FREQEUNCY AND AMPLITUDE OF SELECTED POINTS.
- AND CORRELATE THIS TO FAULTS SUCH AS FRACTURES, DISSLOCATIONS ETC.

NOVELTY

- SELF-SUPERVISED MODEL
- TARGATED MAGNIFICATION
- HEATMAP GENERATION FOR PRECISE
REFERENCE
- FAST AND ACCURATE GRAPH
GENERATION
- SEPERATE SET OF GRAPHS FOR EVERY
SELECTED AREA

CONCLUSION

- OUR SOLUTION IS VERY ACCURATE AND CAN BE USED IN INDUSTRIAL ENVIRONMENTS WITH CUSTOM PARAMETERS WITH LITTLE ADJUSTMENTS.
- THE RESOLUTION AND QUALITY OF THE OUTPUT VIDEO DEPENDS ON THE HARDWARE USED FOR CAPTURING INPUT VIDEO STREAM
- HIGHER FPS HARDWARE WILL GIVE BETTER RESULTS

THANK YOU !

