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AFTL



Automatic Fault Detection in Power Transmission Lines

Azam Karami

Associate Professor

Electrical Engineering Department, Shahid Bahonar University of Kerman, Kerman, Iran

CEO

ViraKavir Company, Kerman, Iran



<https://virakavir.com/en>



Azam Karami

- ❖ Associate Professor, Head of Image Processing and Robotics Lab, Shahid Bahonar University, Iran (2014-Present)
- ❖ Founder, CEO, Vira Kavir Company, Kerman, Iran (2018-Present)
- ❖ Postdoctoral Researcher, Department of Electrical Engineering, Purdue University, USA, 2018-2021
- ❖ Postdoctoral Researcher, Vision Lab, University of Antwerp, Belgium, 2014-2017
- ❖ Ph.D., Electrical Engineering-Telecommunications-Systems, Shiraz University, 2012
- ❖ Patent A.Karami, "Automatic Fault Detection in Power Transmission Lines (AFTL)", G01B 00/11, 2019
- ❖ Published more than 35 journal & 60 conference papers & 20 outstanding industrial projects
- ❖ Received the First Rank in "Artificial Intelligence", BRICS Women Competition, Russia, 2024
- ❖ Received the First Rank in "Robotics & Electronics", 3rd Kanz Scientific Competition, 2023
- ❖ Selected as the best artificial intelligence startup, GITEX 2022, UAE, Dubai
- ❖ Received 1st Rank, Vira Kavir Company among 230 companies in AI and Deep Learning, Iran, 2022
- ❖ Selected as the top researcher, Ministry of Science, Research and Technology (Iran), 2020
- ❖ Selected as the distinguished faculty member and industrial researcher, Shahid Bahonar University of Kerman, 2020 & 2021
- ❖ Received the best project award Iran organization from Management of Electric Power Generation and Transmission (Tavanir), December 2019





Virakavir Team

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Ali Mohammad Hosseinzade
COB

Ph.D Computer Science
20 Years Experience
(Web Developer)

Saleh Sarafraz
Head of Aerospace

MS.c. Aerospace
12 Years Experience
(UAS Design)

Ashkan Adibi
Head of Optic & Laser

Ph.D. Optics and Laser
15 Years Experience
(Design Optical Equipment,
Machine Learning)

Amin Baktash
Drone Pilot

MS.c. Aerospace
6 Years Experience
(UAV Pilot)

Amin Dehghan
Drone Pilot

MS.c. Aerospace
5 Years Experience
(UAV Pilot)

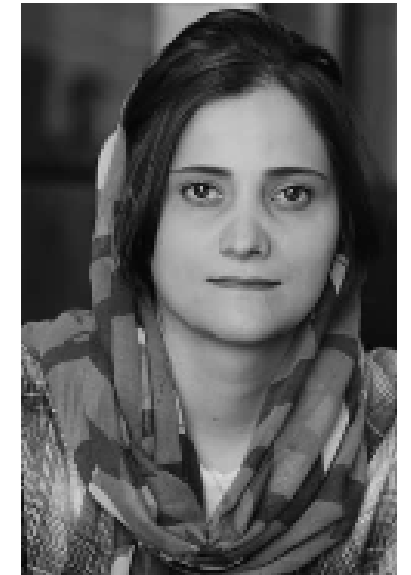
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ViraKavir Team

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Azam Karami
CEO

Associate Professor
PhD. Electrical Engineering
15 Years Experience
(Machine Learning,
Remote Sensing)

Mitra Peiro Hosseini
CTO

MS.c. Photonics
8 Years Experience
(Machine Learning,
Dataset Management)

Sharzad Faladat
**Head of Image Processing
Team**

Ph.D. student Optics and
Laser
10 Years Experience
(Design Optical Equipment,
Machine Learning)

Zahra Attari
Head of Robotics

MS.c. of AI
7 Years Experience
(UAV Firmware
developer,
Machine Learning)

Elnaz Sharifi
Head Of AI

MS.c. AI
8 Years Experience
(Deep Learning,
Big Data Analysis)





Problem

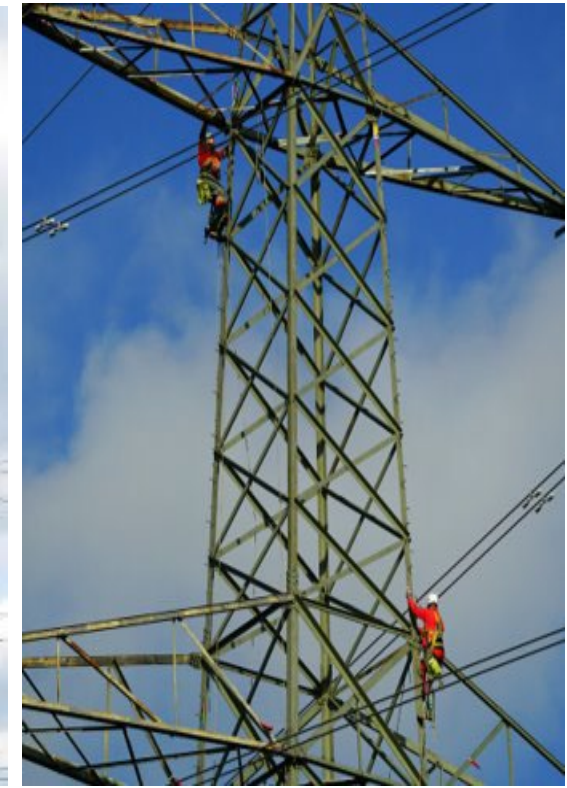
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Foot Patrol & Helicopter-assisted Inspection:

- **Very Slow**
- **Very Expensive**
- **Dangerous**

Reviewing UAV Inspection Images by Experts:

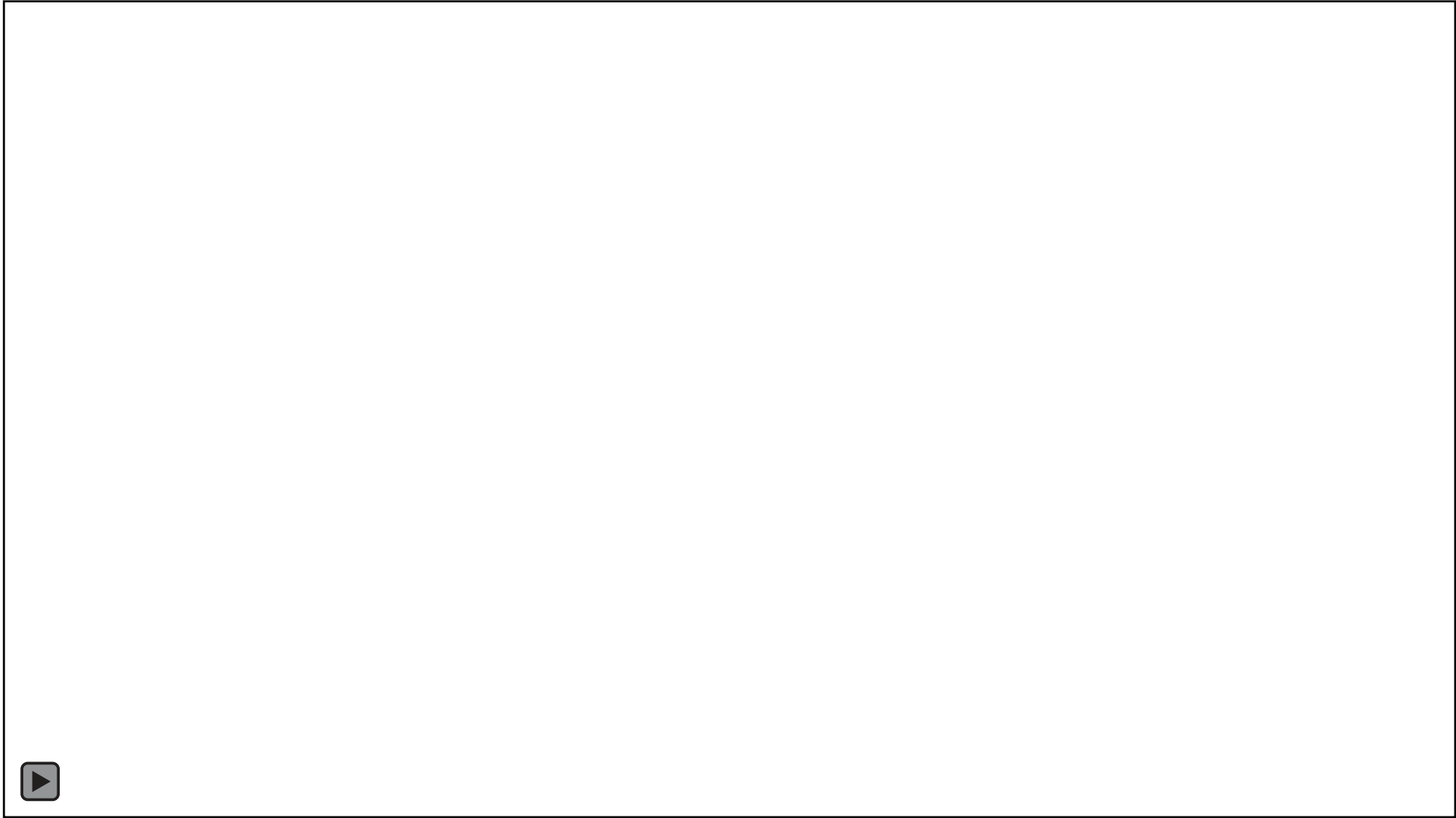
- **Slow**
- **Expensive**





Problem

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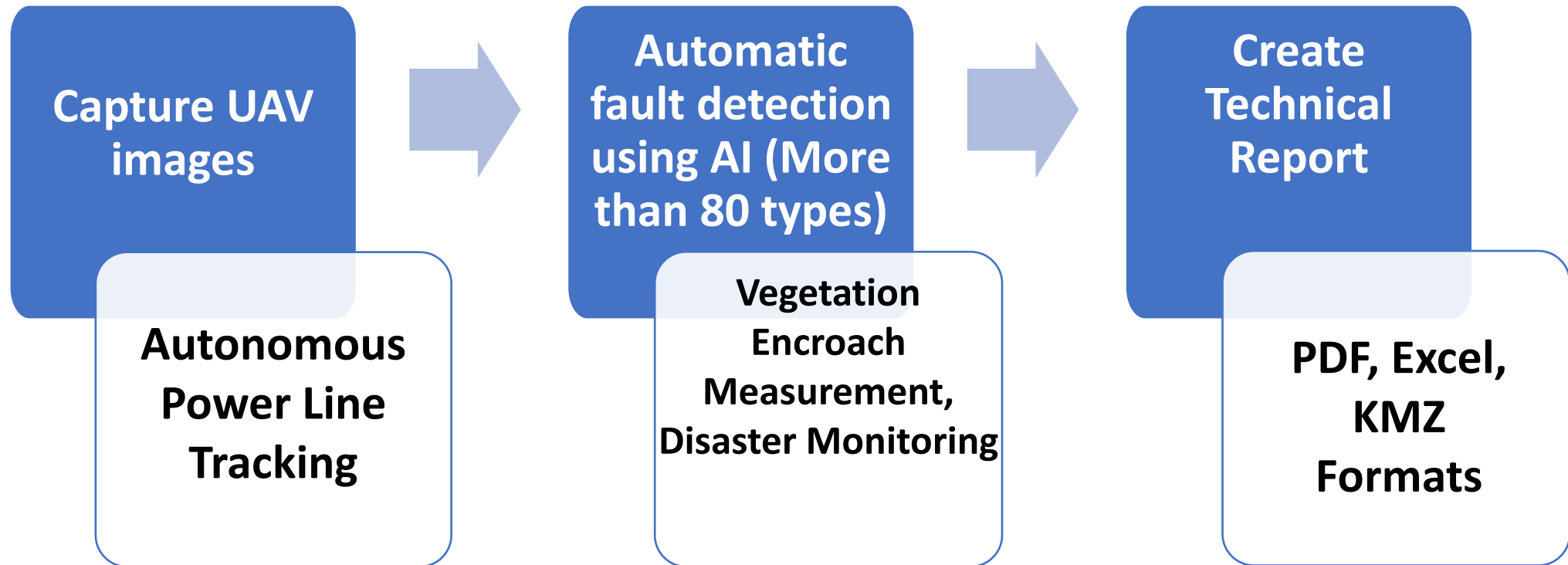


Solution

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A web platform where users can upload UAV images of electric equipment.





Solution

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Tehran Regional Electric

- Dashboard
- Colleagues
- Contractors
- Shooting Guide
- Upload Images
- Images
- Search Images
- Reports

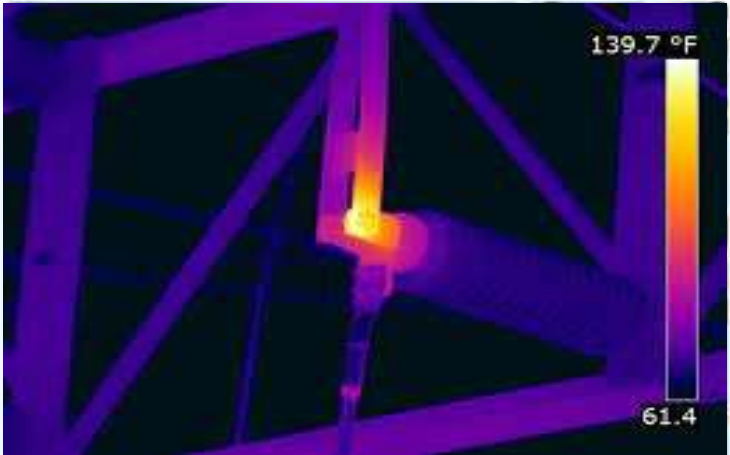
Dashboard / Uploaded Images / Code 386 / Images

Search folder name

1

A

IMAGES WITH ERROR (8)




139.7 °F


61.4


Normal 1 Warning 1 Critical 0

IMAGES WITHOUT ERROR (0)



Normal 0 Warning 3 Critical 0





Sample of Defects

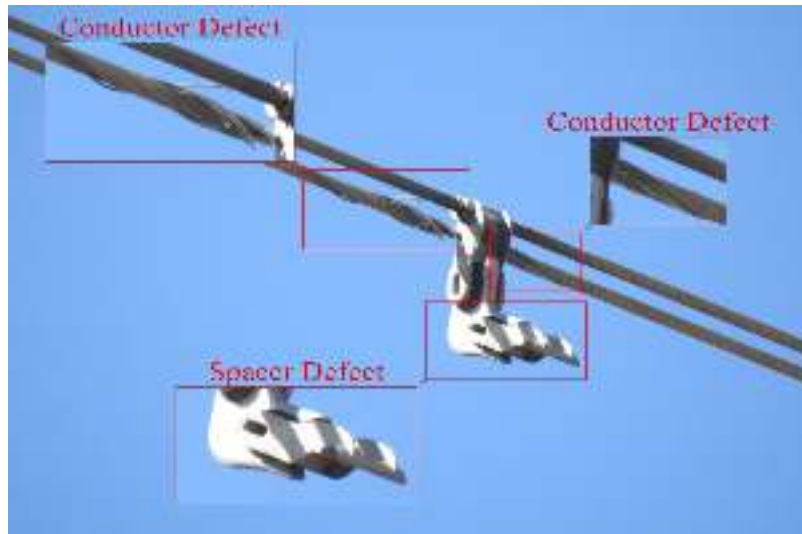
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Sample of Defects

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Sample of Defects

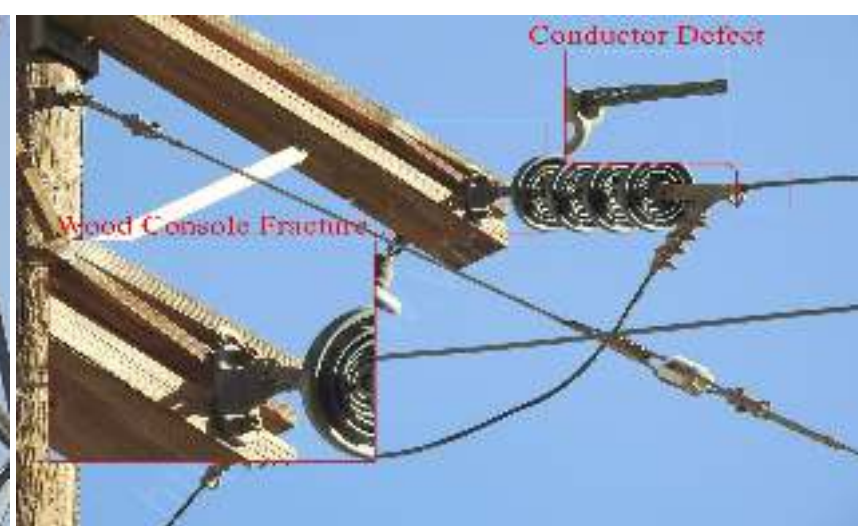
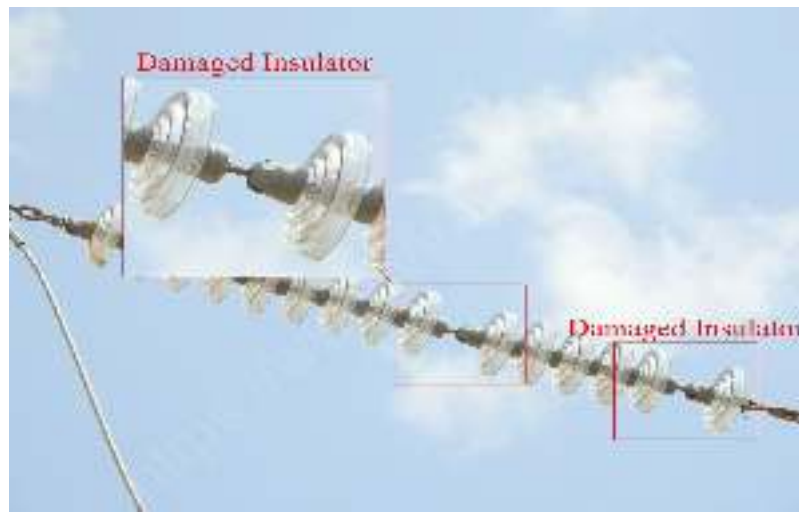
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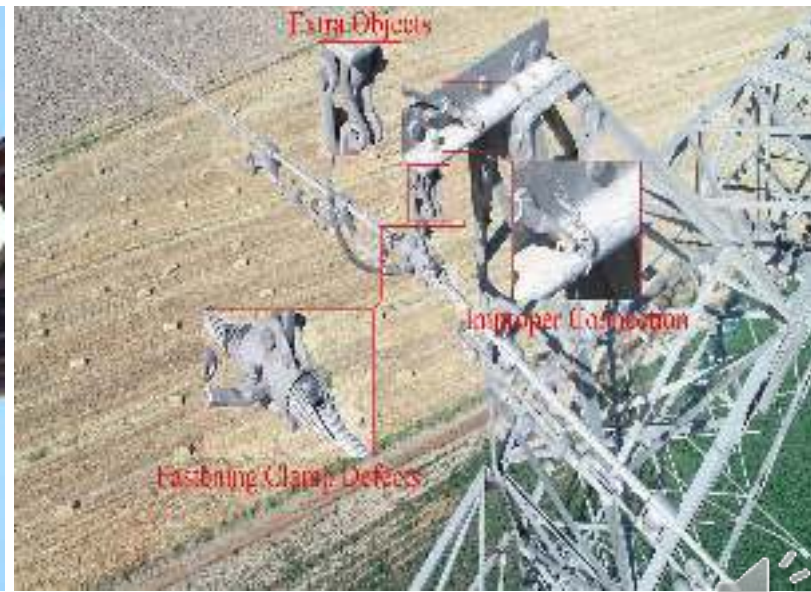
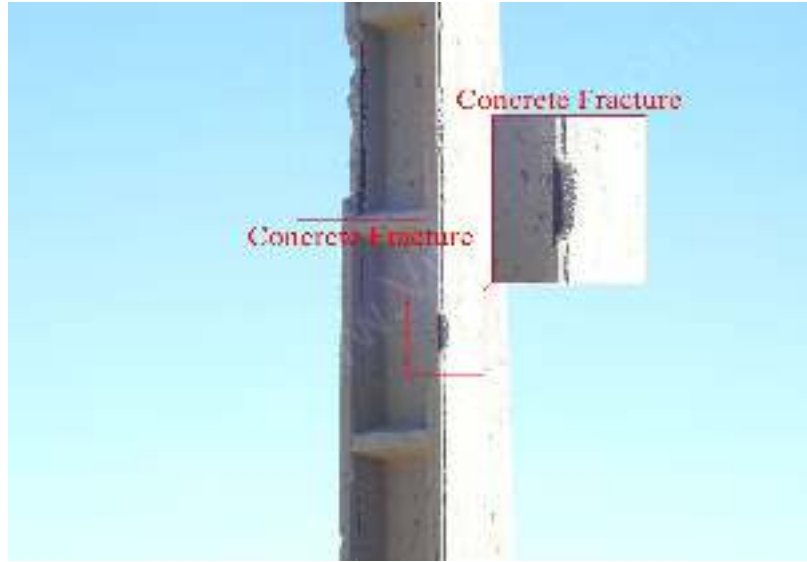
Sample of Defects

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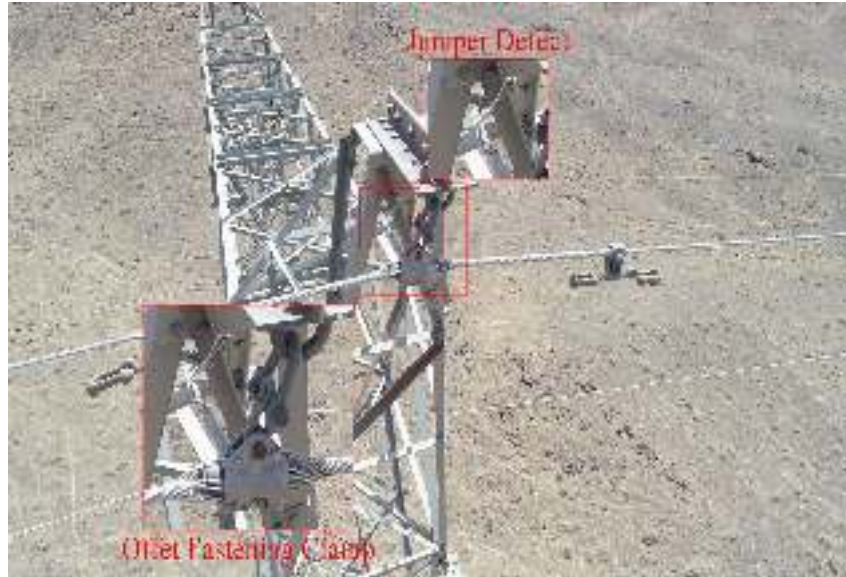
Sample of Defects

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Sample of Defects

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Sample of Defects

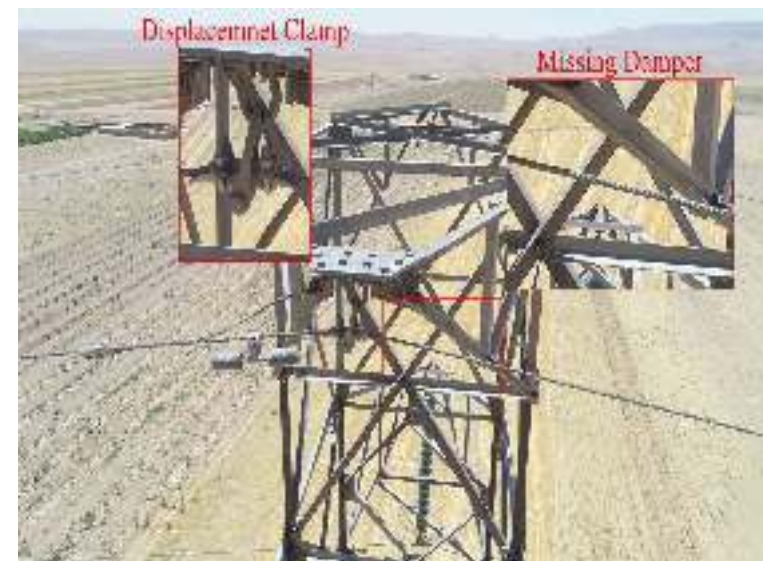
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Sample of Defects

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Sample of Defects

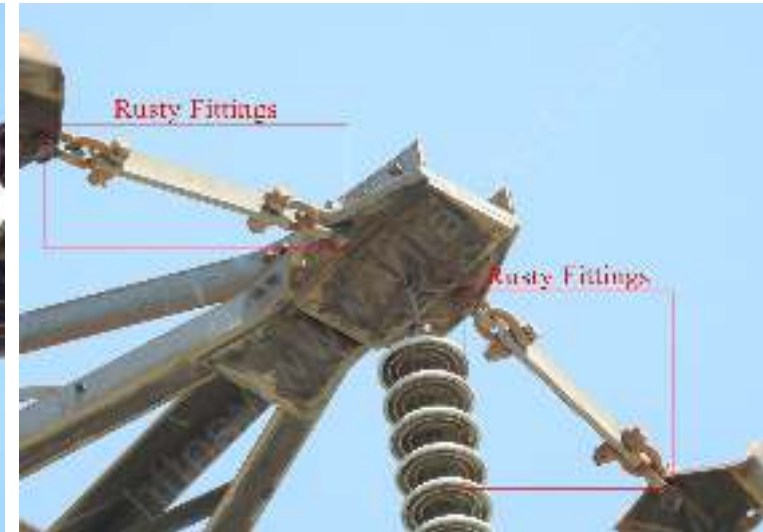
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Sample of Defects

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Sample of Defects

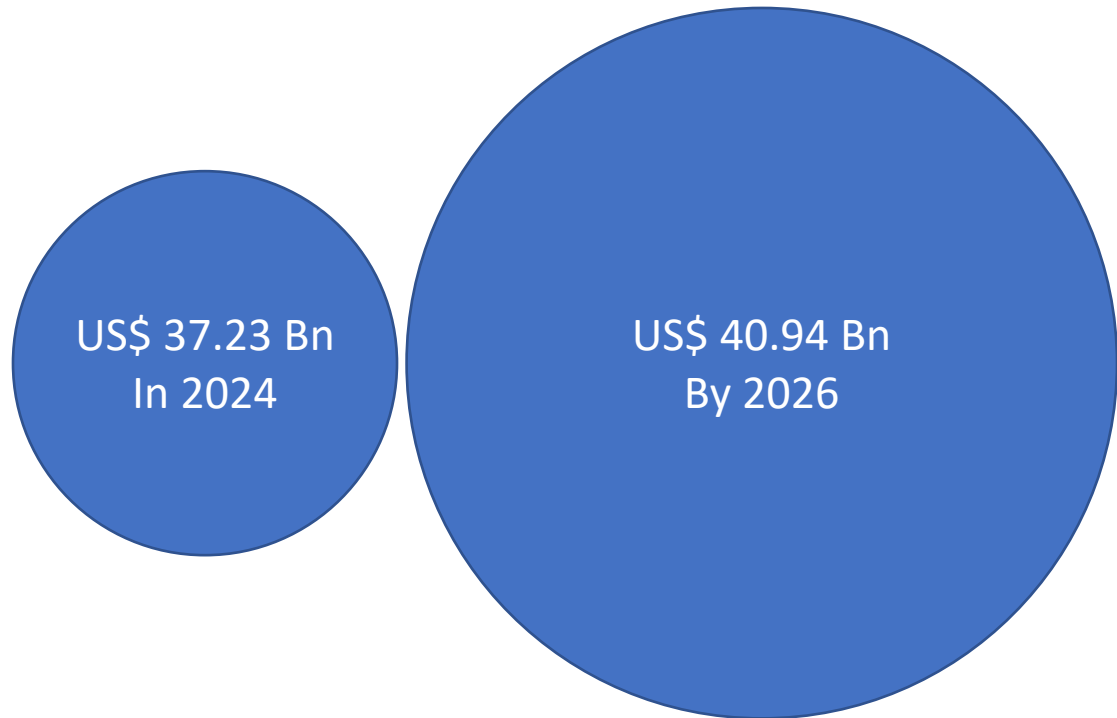
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Market Size

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The Power Transmission Lines and Towers Markets

The Middle East and Africa is a leading power transmission lines and towers market.

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Business Model

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Capturing UAV Images
(Per Tower)



\$ 90

Free Trial Version
(Up to 100 Images)

Limited Plan
(Per Tower, up to 200 Images)

\$10

AI Fault Detection



Unlimited Plan

1 Month License

\$ 10,000

3 Months License

\$ 25,000

1 Year License
(Discount: Up to 15 %)

\$ 98,000

White Labeling
1 Year License
(Discount: Up to 15 %)



\$ 170,000

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Competitive Advantages

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5 Million Images
Dataset

80 Types of
Defects

High
Compatibility
Software

Free Trial

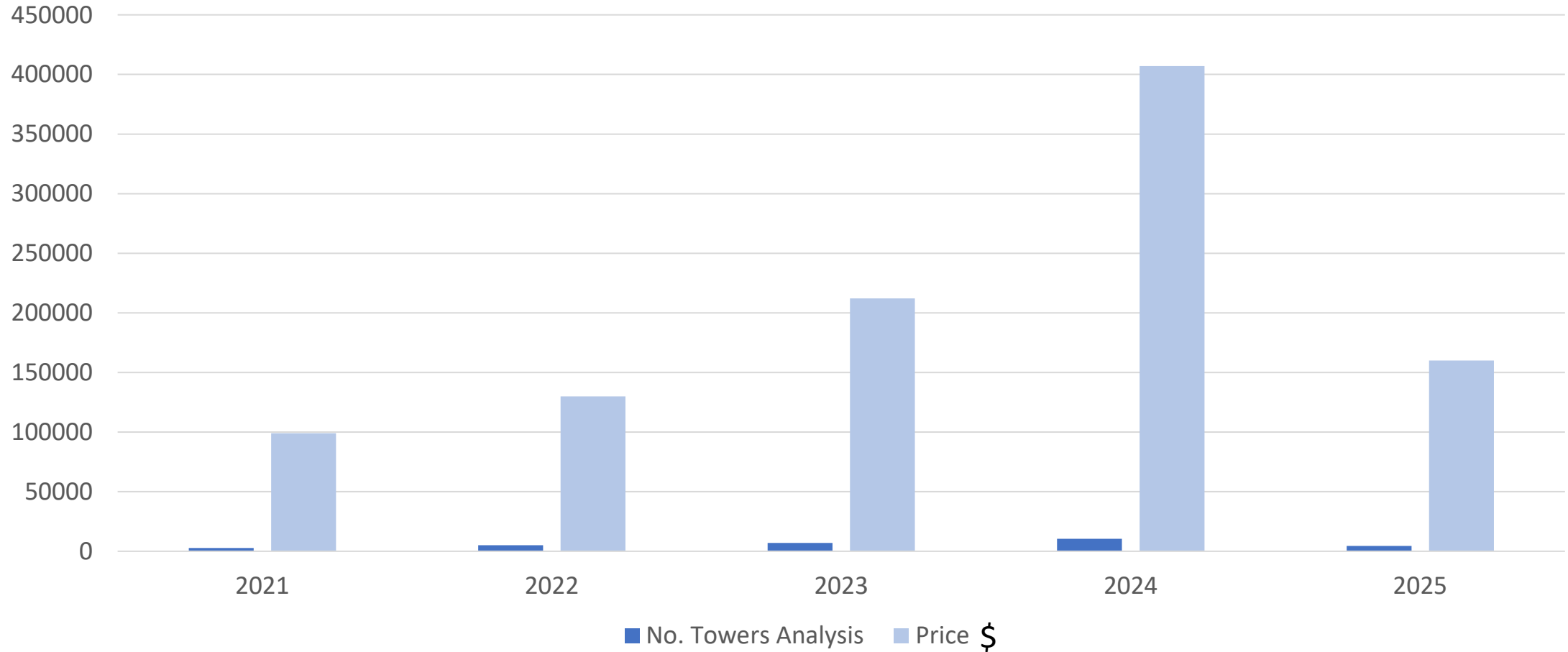
Low Cost





Sales

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Goals

- Automatic Autonomous Capture UAV Images
- Develop to Automatic Fault Detection in Oil & Gas Pipelines, and Civil Engineering
- Develop National & International Projects 35% per Year

Potential Partners

- Electric Companies
- Telecommunication Company
- Oil & Gas Companies

How?

- Collecting An Appropriate Dataset
- Designing Novel and Accurate Fault Detection Algorithms
- Applying Semi and Self Supervised Approaches





Awards & Honors

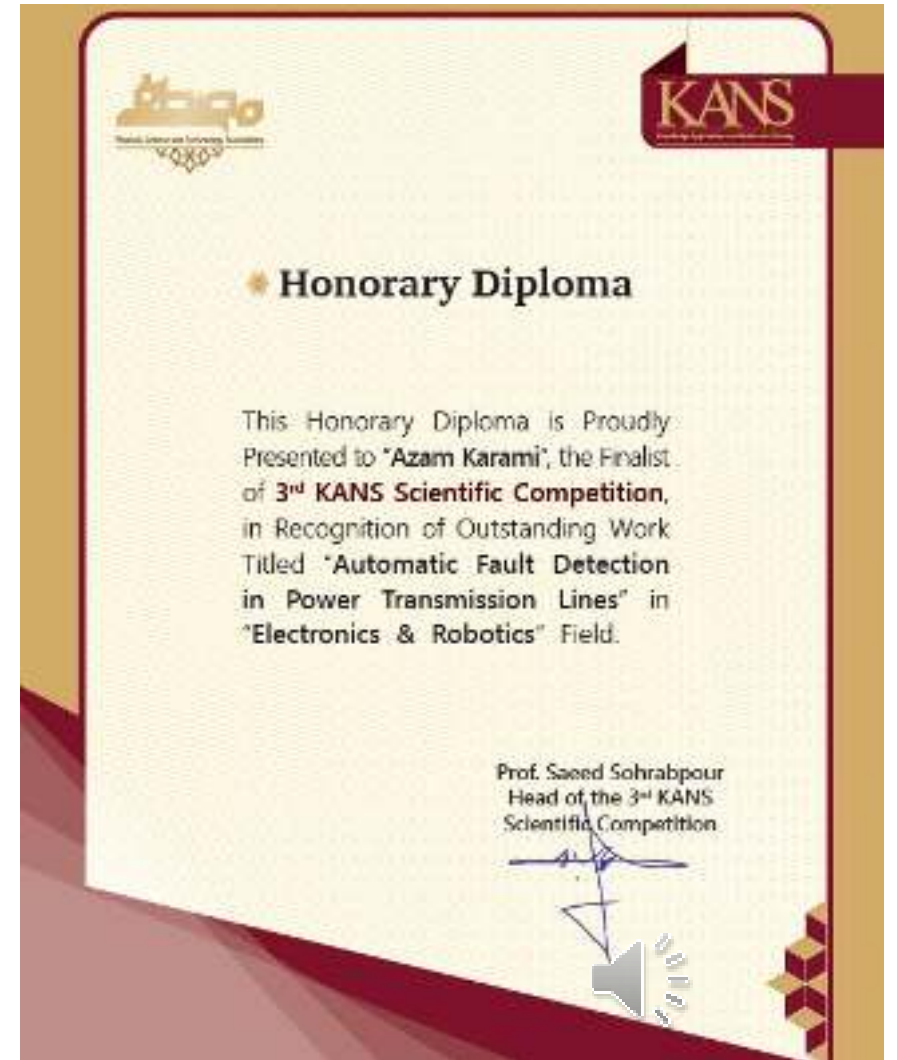
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- ❖ Received the First Rank in “Robotics & Electronics”, 3rd Kanz Scientific Competition, 2023
- ❖ AFTL is Selected as the best artificial intelligence startup, GITEX 2022, Dubai, UAE
- ❖ AFTL is Selected as the best project award Iran organization from Management of Electric Power Generation and Transmission (Tavanir), December 2019 and Ministry of Science, Research and Technology (Iran) March 2020
- ❖ Technology Readiness Levels (TRLs) certificate (8)
- ❖ Published 6 journal & 13 conference papers



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Industrial Project Funding

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Industrial Project Funding

Total project funding received amounts to \$2670K as PI

- ❖ PI: A.Karami, " Automatic Fault Detection in Power Transmission Lines (UAV images)", Aeroscan Company, Moscow, \$300K, Russia,2025
- ❖ PI: A.Karami, " Automatic Fault Detection in Power Transmission Lines (UAV images)", Tehran Regional Electricity Company, \$550K, 2020-2025
- ❖ PI: A.Karami, "Fault Detection in Distribution Lines", National Iranian Copper Industries Company (UAV images),\$280K, 2022
- ❖ PI: A.Karami, "Automatic Fault Detection in Power Transmission Lines (UAV images)", Fars Regional Electricity Company, \$220K, 2021
- ❖ PI: A.Karami, " Fault Detection in Distribution Lines", Golgohar Mining Industrial Company (UAV images), \$320K, 2023
- ❖ Collaboration with Dubai University, \$200K, 2024, UAE
- ❖ Collaboration with Purdue Indiana, USA, \$800K, 2019-2022, UAE





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Thank You

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