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8TH ASIA INTERNATIONAL MULTIDISCIPLINARY CONFERENCE
18-19 JULY 2024
TRUNTUM RESORT, KUTA, BALI, INDONESIA

AI: NAVIGATING TOMORROW'S MULTIDISCIPLINARY FRONTIERS

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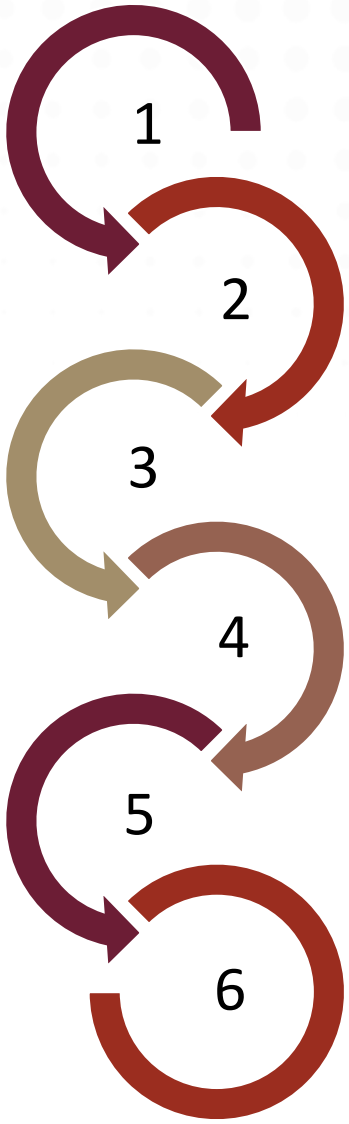
ABSTRACT

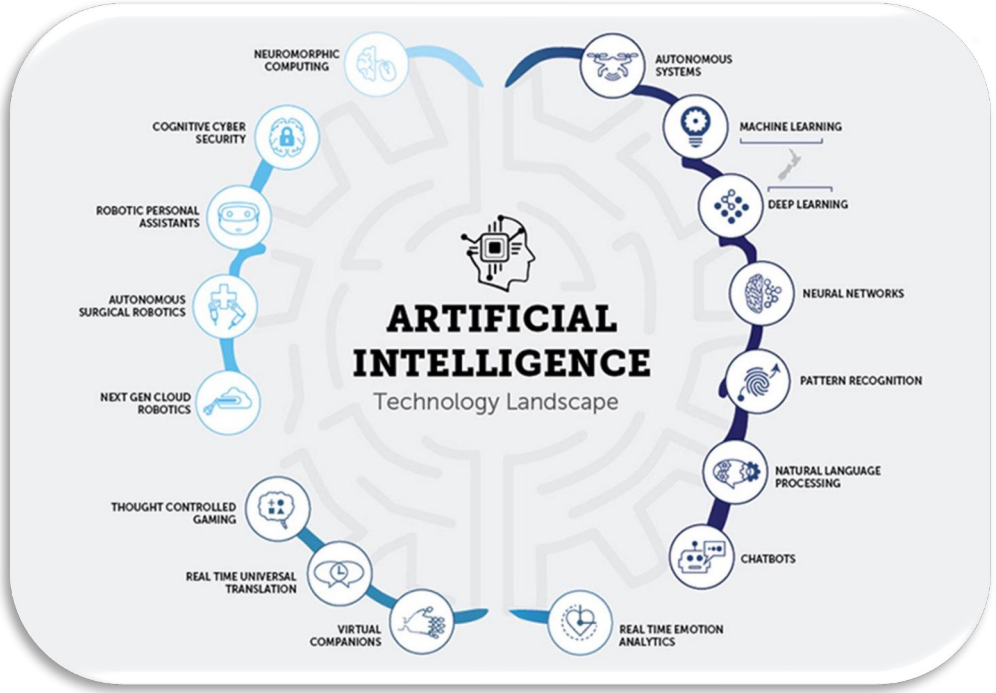
In this talk, the dynamic interplay of Artificial Intelligence (AI) across diverse societal domains, embarking on a multidisciplinary journey to unravel the transformative impact of AI on societies, workforce dynamics, and educational horizons is explored. This exploration includes cutting-edge research on the DNA splicing system and breast cancer diagnosis, offering insights into the convergence of computational biology and AI. Through engaging discourse and insightful analysis, the evolving landscape of AI applications, from healthcare to finance, and from manufacturing to entertainment is navigated. The ethical dimensions of AI deployment are delved into, and strategies for fostering inclusivity and equity in the AI-driven future are examined. Drawing on cutting-edge research and real-world case studies, the potential of AI to catalyze innovation, drive economic growth, and shape the fabric of our collective tomorrow is illuminated. Join us on this journey towards tomorrow, where AI serves as a powerful force for positive change, enriching lives and forging new pathways towards prosperity and progress.

PRESENTATION OUTLINE



1. Introduction
2. Impact of AI to Societal Domains
3. Exploring Various Research on AI
4. Evolving Landscape of AI Applications
5. Ethical Dimensions of AI Deployment
6. Potential of AI to Drive Innovation and Economic Growth

INTRODUCTION



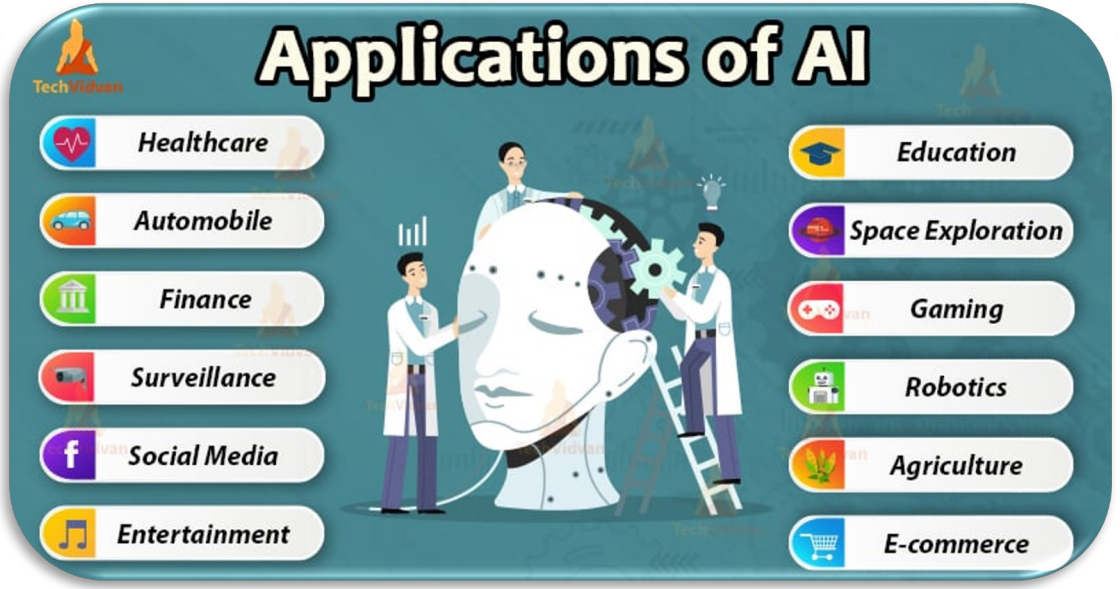
WHAT
IS ARTIFICIAL INTELLIGENCE (AI)?

Enabling machines to think and make decisions without human intervention

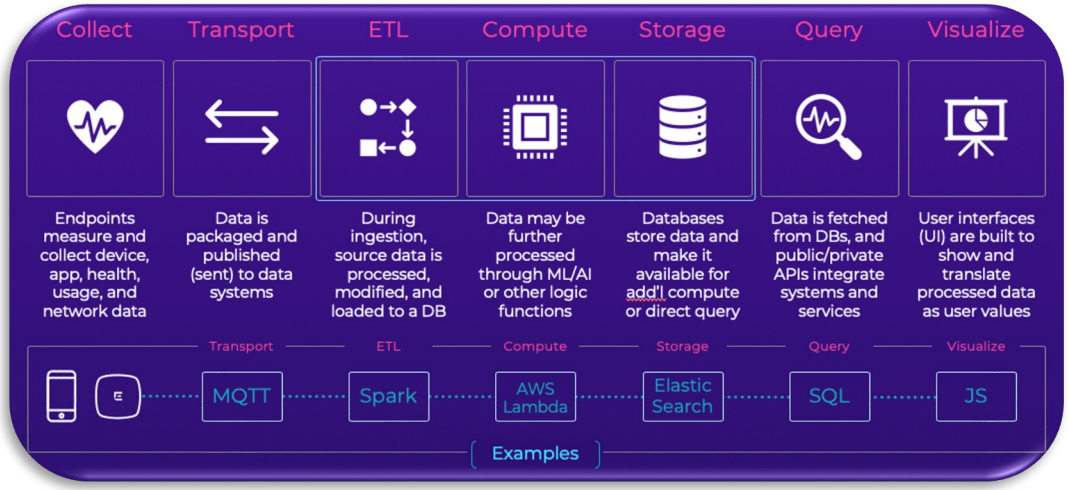
INTRODUCTION

WHERE
AI IS APPLIED?

AI is applied in various fields including healthcare, finance, retail, automotive, and entertainment.



INTRODUCTION



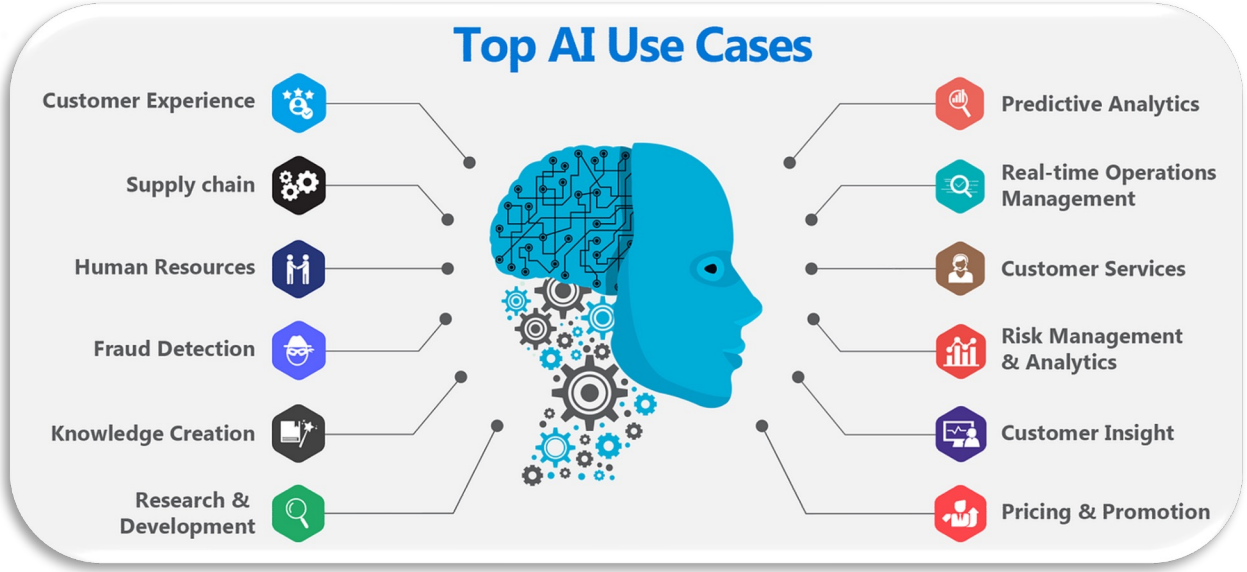
HOW
AI IS APPLIED?

Through machine learning algorithms, natural language processing, computer vision, and robotics.

INTRODUCTION

WHY
AI IS USED?

To improve decision-making, enhance efficiency and accuracy, increase productivity.



IMPACT OF AI TO SOCIETAL DOMAINS

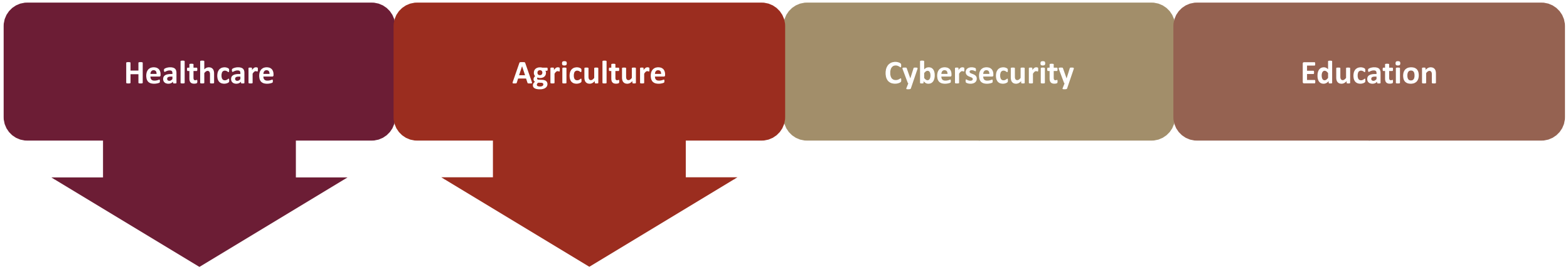
Healthcare	Agriculture	Cybersecurity	Education

IMPACT OF AI TO SOCIETAL DOMAINS

Healthcare | **Agriculture** | **Cybersecurity** | **Education**

Personalized medicine through genomic analysis and AI-driven diagnostics.

IMPACT OF AI TO SOCIETAL DOMAINS



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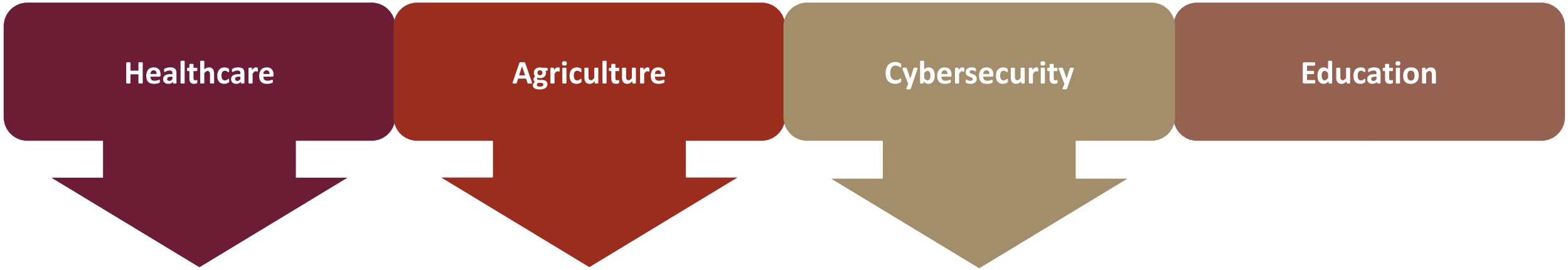
Genetic engineering of crops for resilience and higher yields using AI.

IMPACT OF AI TO SOCIETAL DOMAINS



Personalized medicine through genomic analysis and AI-driven diagnostics.

Genetic engineering of crops for resilience and higher yields using AI.

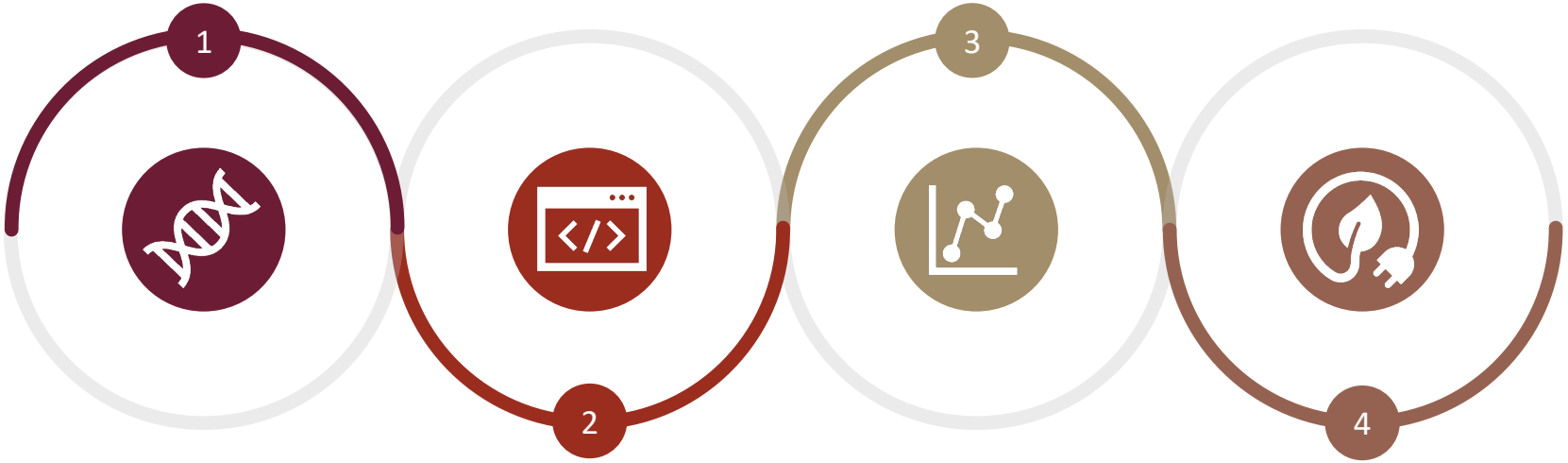
Enhanced bioinformatics for genetic data protection.

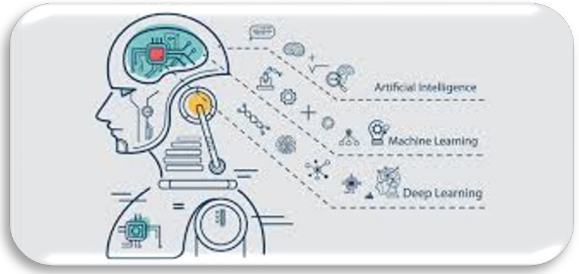
IMPACT OF AI TO SOCIETAL DOMAINS

Healthcare	Agriculture	Cybersecurity	Education
Personalized medicine through genomic analysis and AI-driven diagnostics.	Genetic engineering of crops for resilience and higher yields using AI.	Enhanced bioinformatics for genetic data protection.	Adaptive learning technologies incorporating cognitive science insights.

EXPLORING VARIOUS RESEARCH ON AI

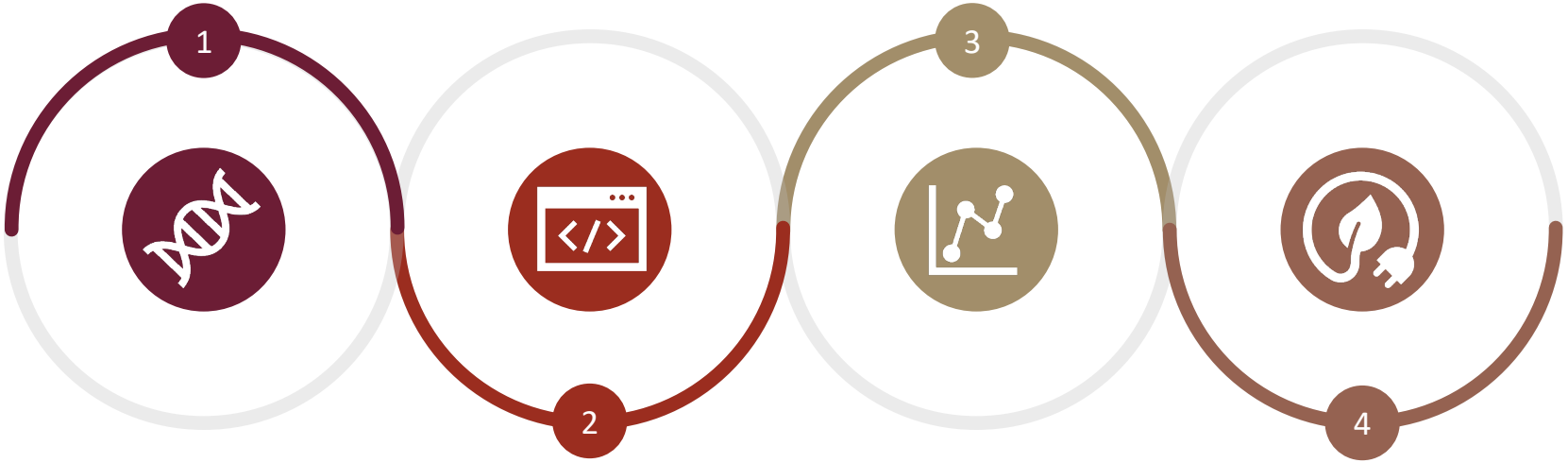
EXPLORING THE DNA SPLICING SYSTEM

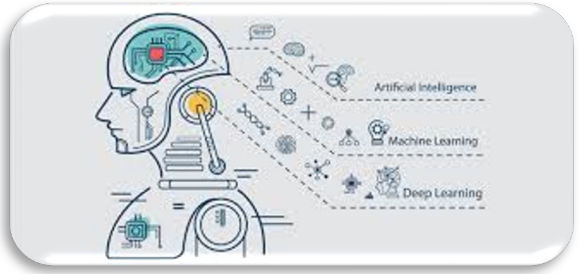




EXPLORING THE DNA SPLICING SYSTEM

AI identifies gene sequences for precise DNA splicing in genetic engineering.





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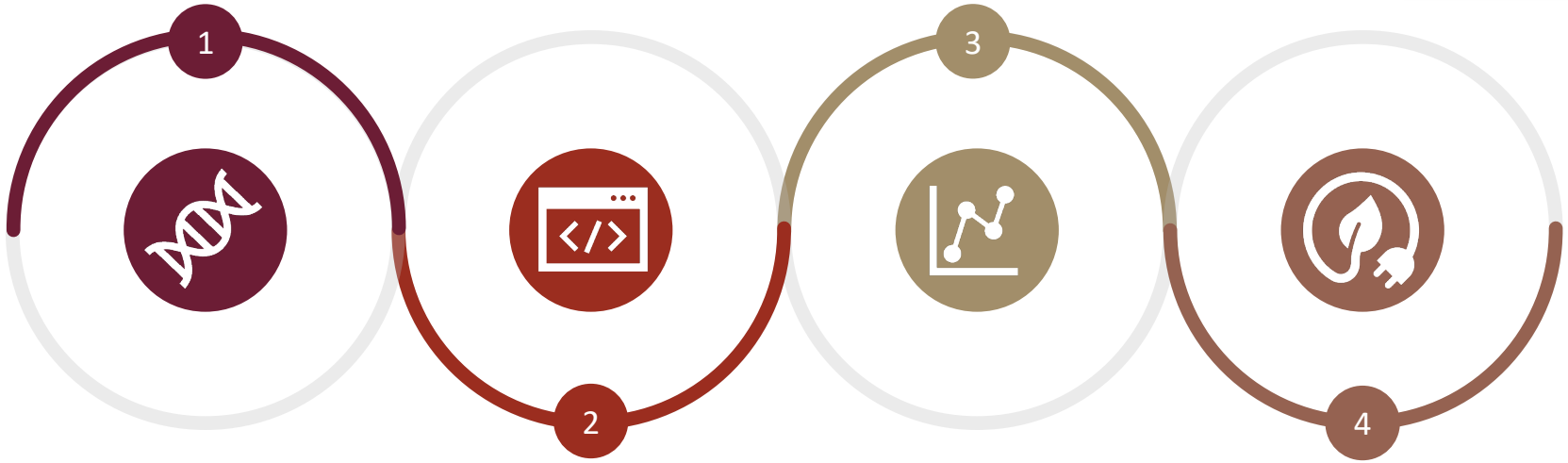
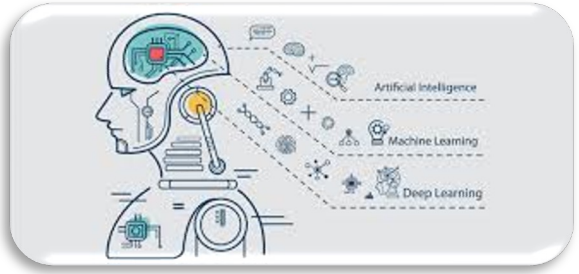




Machine learning predicts outcomes of gene edits, aiding biotechnology advancements.

EXPLORING THE DNA SPLICING SYSTEM

AI identifies gene sequences for precise DNA splicing in genetic engineering.

AI tools facilitate large-scale genomic data analysis, enhancing bioinformatics.

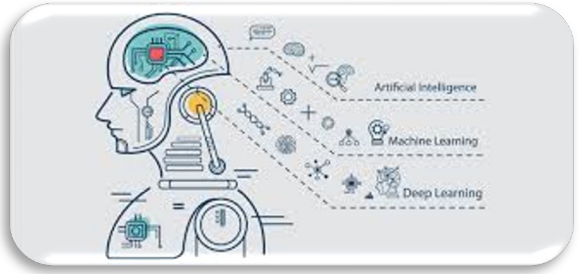
1

2

3

4

Machine learning predicts outcomes of gene edits, aiding biotechnology advancements.



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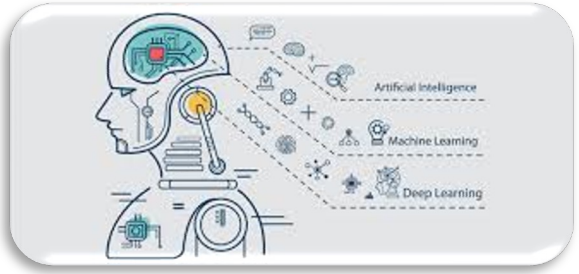
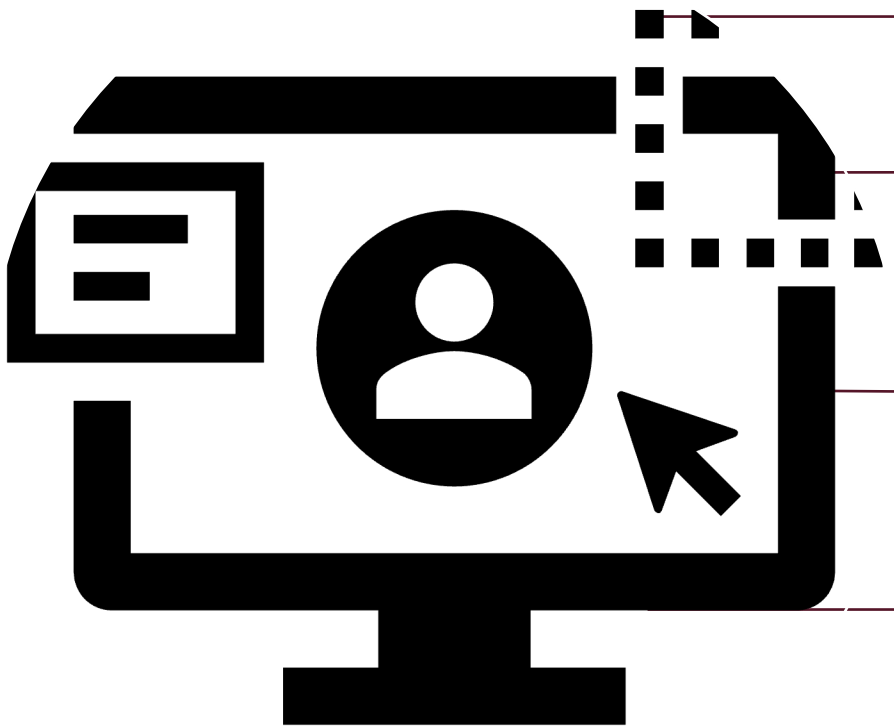


Machine learning predicts outcomes of gene edits, aiding biotechnology advancements.

AI enhances CRISPR technology with accurate gene editing for medical and agricultural use.

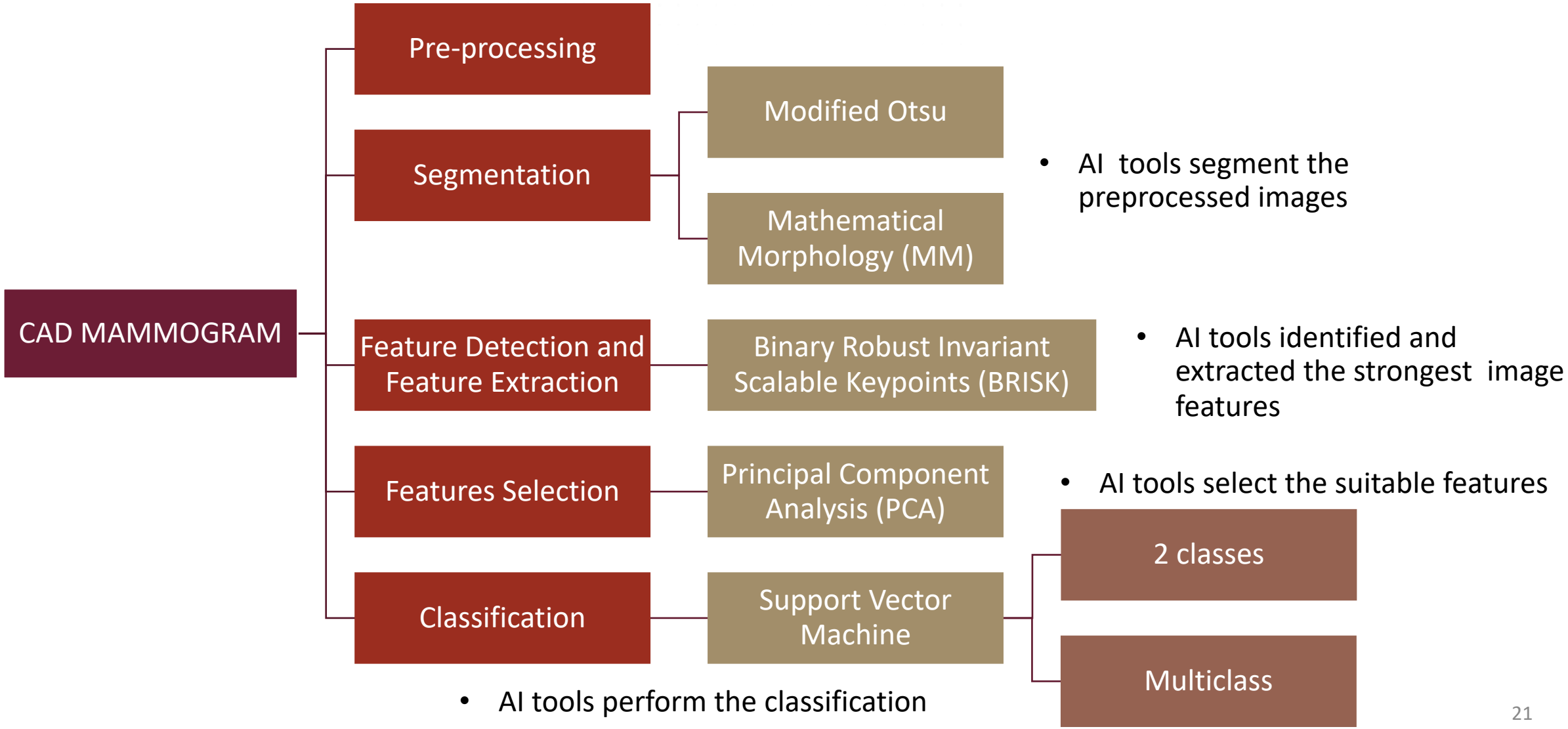
APPLICATION OF AI IN BREAST CANCER DIAGNOSIS

Leverage advanced AI techniques to enhance the accuracy and effectiveness of computer-aided breast cancer diagnosis.



- Pre-processing
- Segmentation
- Features Detection and Features Extraction
- Features Selection
- Classification

APPLICATION OF AI IN BREAST CANCER DIAGNOSIS (CONT.)



- AI tools segment the preprocessed images
- AI tools identified and extracted the strongest image features
- AI tools select the suitable features
- AI tools perform the classification

APPLICATION OF AI IN BREAST CANCER DIAGNOSIS (CONT.)

Algorithm: Hybrid modified Otsu with MM

1: Parallel environment with 4 local hosts on

2: Calculate Histogram and probabilities, $b_i = \frac{m_i}{M}$,

3: let $T_\circ$ be the increment potential threshold

4: **while** $I < b_i$ **do**

5: Calculate $\mu_0(S) = \sum_{i=1}^{S} i \frac{b_i}{B_0(S)}$ && $\mu_1(S) = \sum_{i=S+1}^{N} i \frac{b_i}{B_1(S)}$

6: Calculate $\sigma_\Gamma^2 = \sum_{i=0}^{N-1} (i-\mu)^2 b_i$

7: **if** $\sigma_{SD} > l *$

8: **then** $l *_{min} = \sigma_\Gamma^2(S)$ && **T = I;**

9: **end if**

10: **set** $\mathbf{I} = \mathbf{I} + \mathbf{T}_\circ$,

11: **end while**

// hybrid Otsu with MM

12: **let** SE = disk ∋ r = 10 **&&** Erosion = 1

13: **set** erosion V = image of W **&&** W = points (x,y)

14: **set** Vw, U = Image of W

15: **while** ($\forall w \in W$) **&&** Erosion < 3 **do**

16: **calculate** V_w= translate (V, w)

17: **update** U =Dilation (U, V_w)

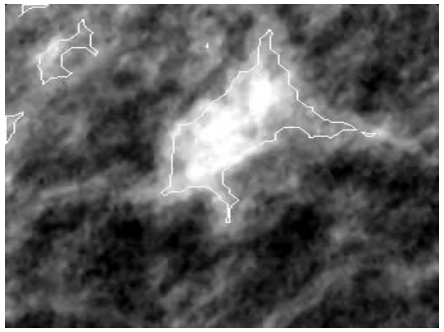
18: **end while**

19: **get** the outline of segmented images

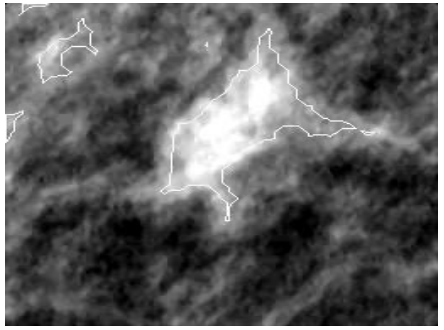
20: Parallel environment with 4 local hosts **off**

Types of Classifications	Kernel function (SVM)	Otsu	Otsu+MM	Modified Otsu+MM
		Accuracy	Accuracy	Accuracy
Two classes classifications	Gaussian	80.0%	82.6%	81.4%
	Linear	64.1%	64.5%	66.4%
	Quadratic	60.3%	60.5%	63.8%
	Cubic	80.6%	84.9%	85.9%
Three classes Classifications	Gaussian	82.6%	83%	85.3%
	Linear	55.0%	56.8%	57.3%
	Quadratic	65.2%	62.7%	65.2%
	Cubic	78.8%	80.5%	88.9%

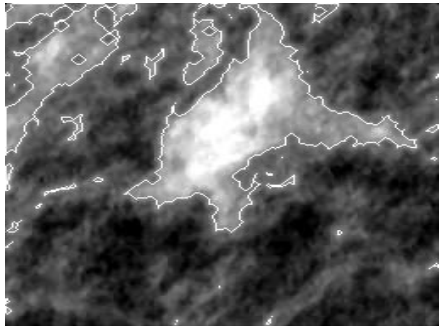
Original Otsu



Original Otsu+MM



Modified Otsu+MM



Related published papers:

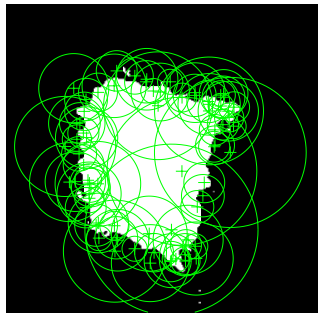
https://doi.org/10.32802/asmscj.2020.sm26(4.19)

https://doi.org/10.32802/asmscj.2020.sm26(4.9)

APPLICATION OF AI IN BREAST CANCER DIAGNOSIS (CONT.)

Classification Category	Classification Types	Average Matching Rates (Training)	Average Matching Rates (Testing)
2 Classes	Benign	65.9%	82.4%
	Malignant	71.4%	80%
3 Classes	Fatty	69.59%	82.4%
	Glandular	85%	88.9%
	Dense	76.2%	88.9%

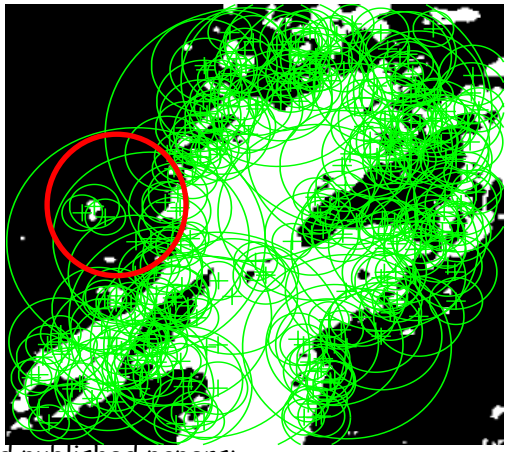
Fatty



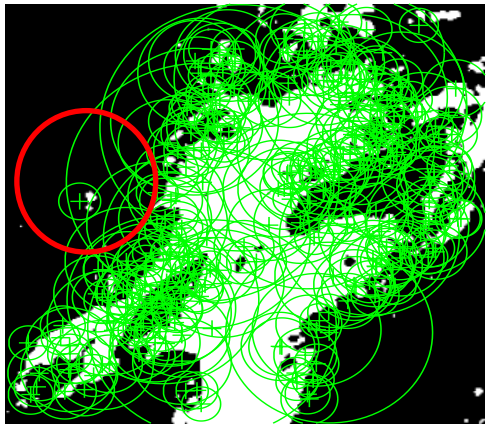
Glandular

Dense

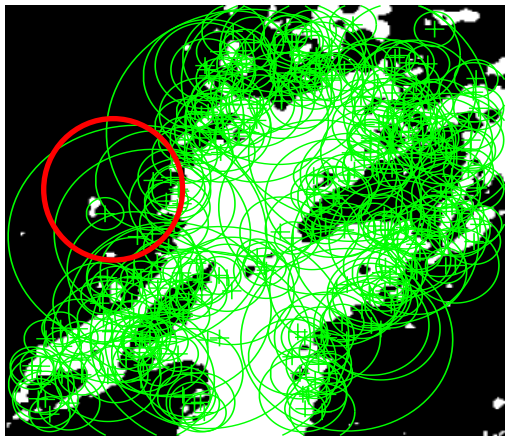
Original Otsu +SURF & BRISK



Original Otsu+MM+SURF & BRISK



Modified Otsu+MM +SURF & BRISK



Related published papers:
https://doi.org/10.4314/jfas.v9i5s.44

EXPLORING AI-DRIVEN DISEASE DIAGNOSIS

AI identifies specific **patterns** to **diagnose diseases** in biomedical engineering.

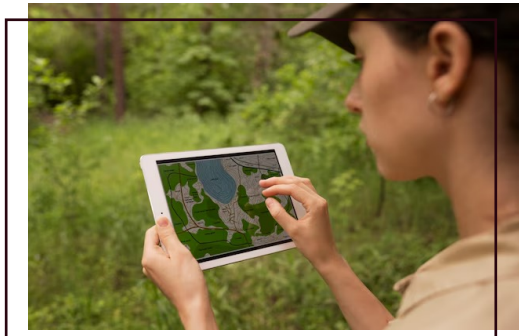
Deep Learning enables big medical data to maintain the global structure of the datasets.

Machine Learning handling **uncertainty** and **incomplete medical** datasets for decision-making.

AI-enhanced medical systems can **identify specific patterns** associated with different diseases, enabling healthcare professionals to diagnose patients more efficiently and effectively

EVOLVING LANDSCAPE OF AI APPLICATIONS

Environmental



- IoT devices for **real-time** health and environmental monitoring.
- Climate modeling, incorporating ecological and genetic data.

Biology & Chemistry

- AI-driven **genomic sequencing** and analysis techniques.
- Processing large-scale genetic and **proteomic data**.
- Drug discovery, leveraging chemistry and biology.

ETHICAL DIMENSIONS OF AI DEPLOYMENT

Ensuring **transparency** and **accountability**

Addressing **biases** and ensuring **fairness**

Safeguarding **privacy** and **data protection**

Developing **interdisciplinary regulations**

Balancing AI benefits

POTENTIAL OF AI TO DRIVE INNOVATION AND ECONOMIC GROWTH

Accelerates **R&D** across biotechnology, healthcare, and environmental science.

Creates **new business models** and market opportunities in multidisciplinary scientific fields.

Enhances **productivity and operational efficiency** in research labs and industrial applications.

Stimulates **investments in AI-driven** startups and ventures in frontier sciences.

Drives **global competitiveness** and economic diversification through AI-enabled innovation

THANK YOU

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In the Name of God for Mankind