Applications of Evolutionary / nature-inspired algorithms in Computer vision

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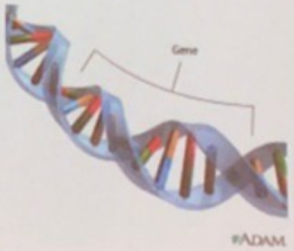
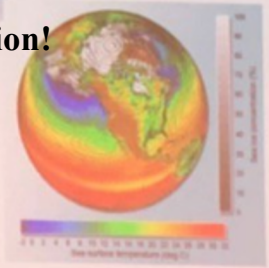
High-Dimensional Data

- Multimedia
  - High-resolution images; High-resolution videos
  - Data from multiple sensors
- Bioinformatics
  - Expressions of genes
  - Neurons
- Social networks
  - Tweets/likes/friendships
  - Other interactions
- Weather and climate
  - Multiple measurements (e.g., temperature)
  - Time series data
- Finance
  - Stock markets
  - Time series data



Emerging problems:
High dimensionality problem
AKA:
Curse of Dimensionality (CoD) : too much information!



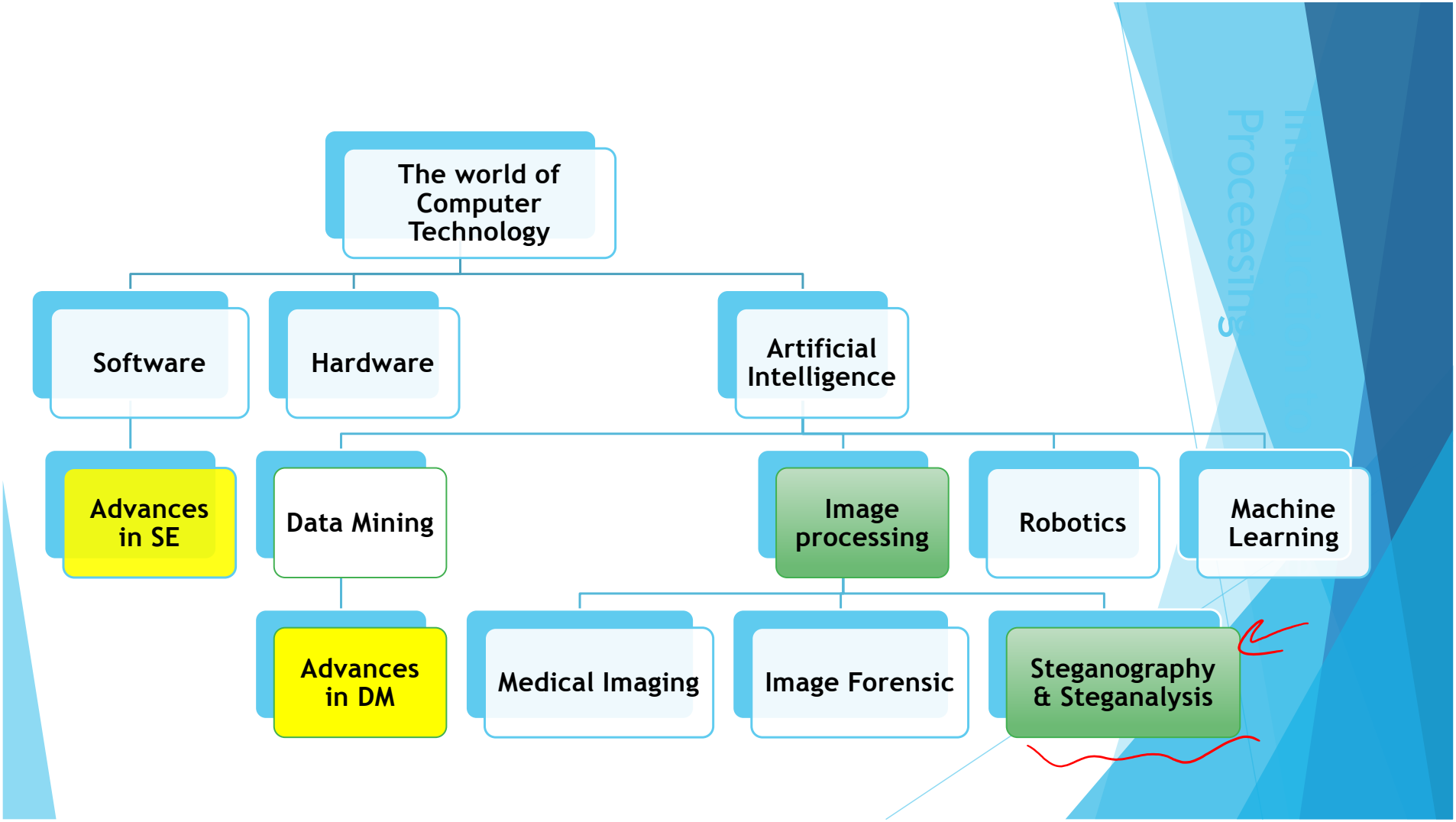
Steganography Started getting smarter …

September 11 2001

Steganalysis Started getting important

Outlines:

- **Review Where you are**
- **Image Processing : Image classification**
- **Steganography VS Steganalysis**
- **Evolutionary schema**
- **Summary**


The world of Computer Technology
Software
Hardware
Artificial Intelligence
Advances in SE
Data Mining
Image processing
Robotics
Machine Learning
Advances in DM
Medical Imaging
Image Forensic
Steganography & Steganalysis

Very Quick Shot

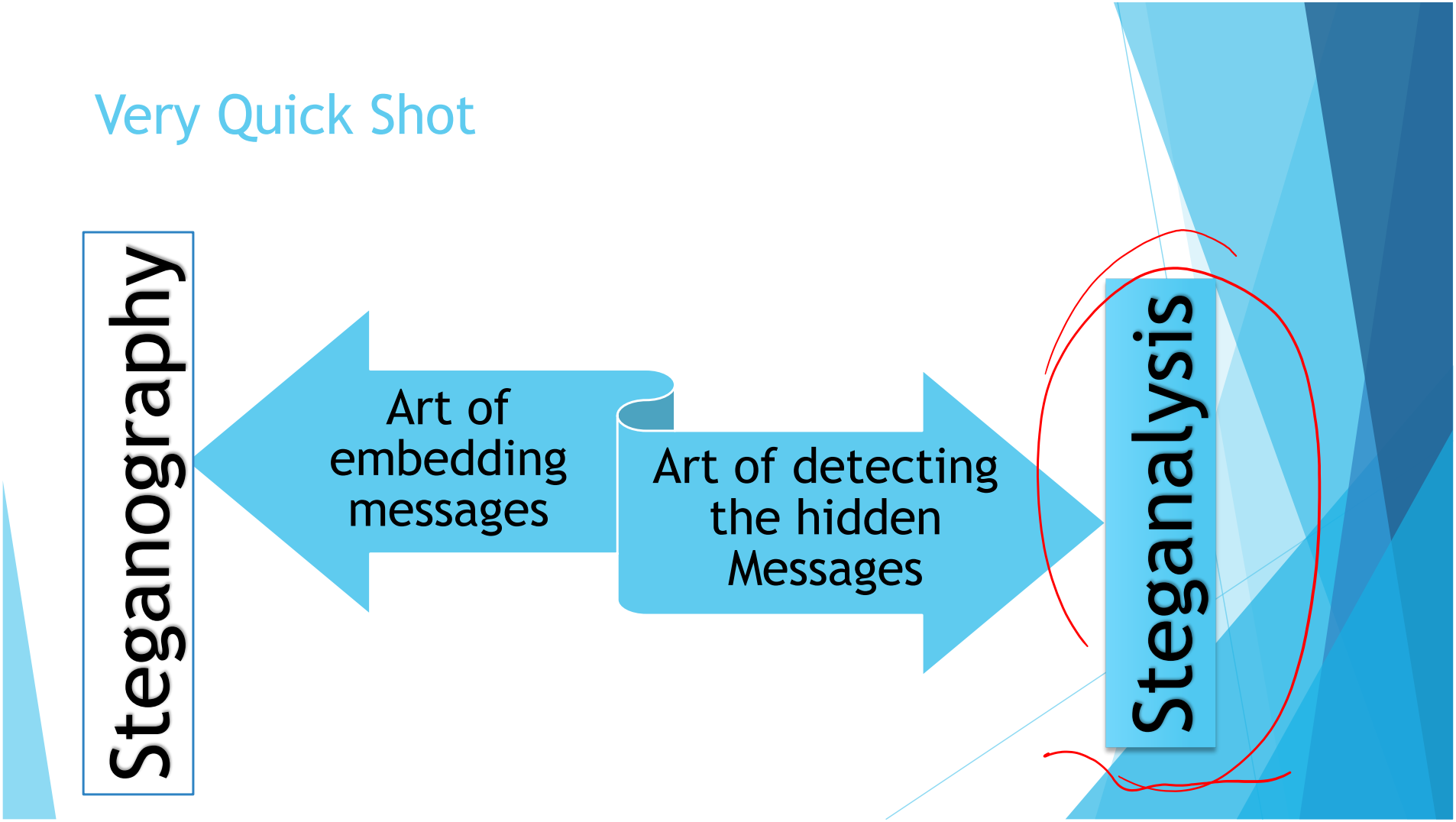


Image Processing : Image classification

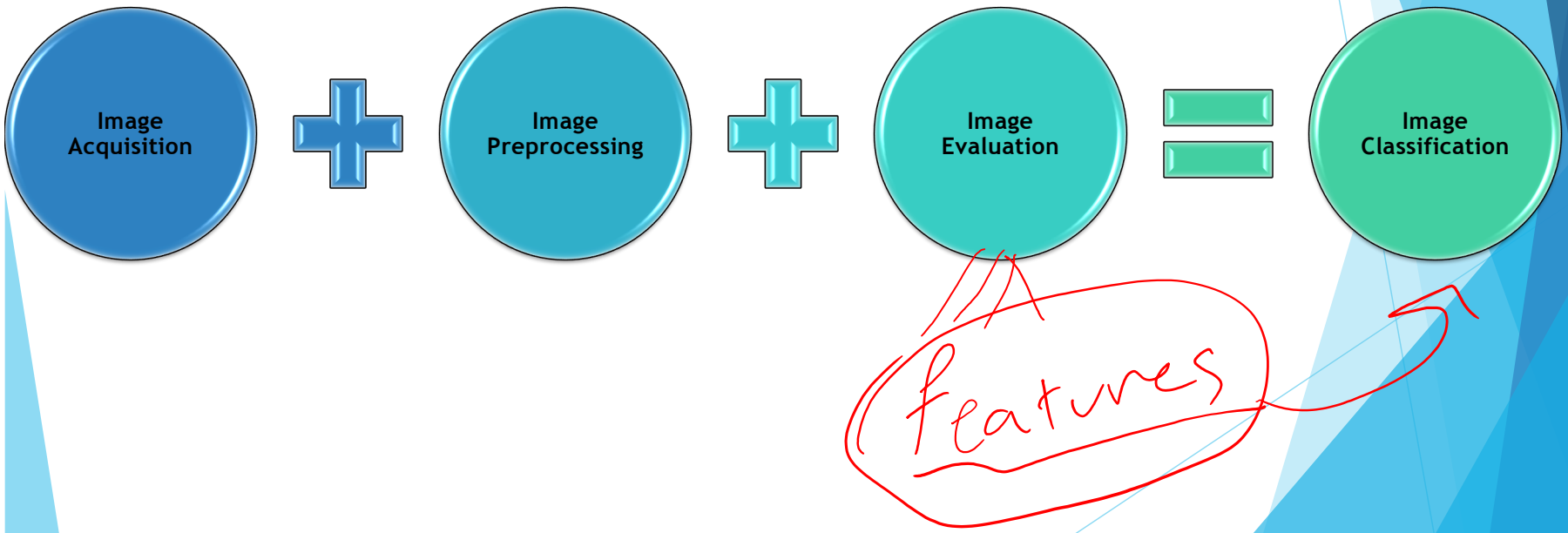
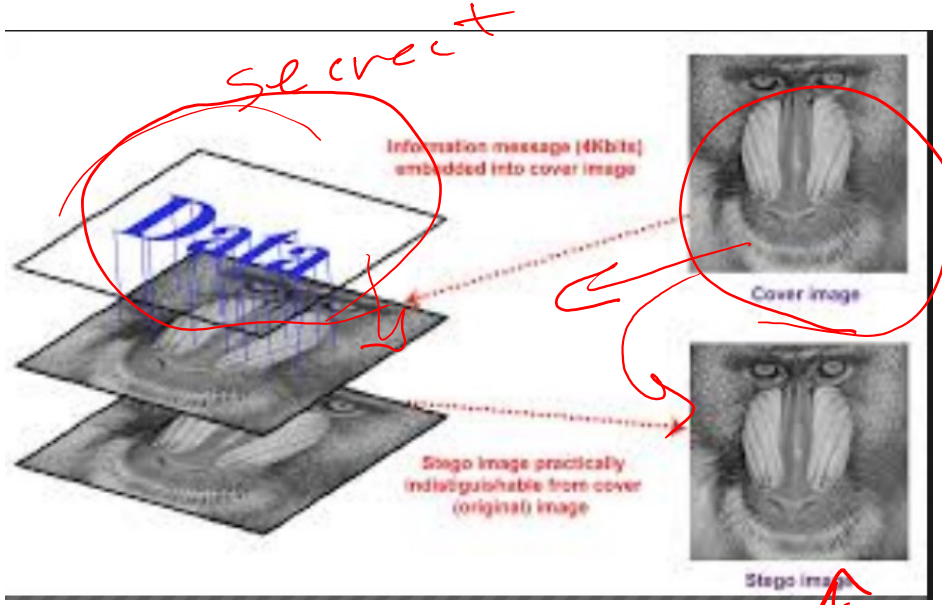


Image Processing
Steganography VS Steganalysis



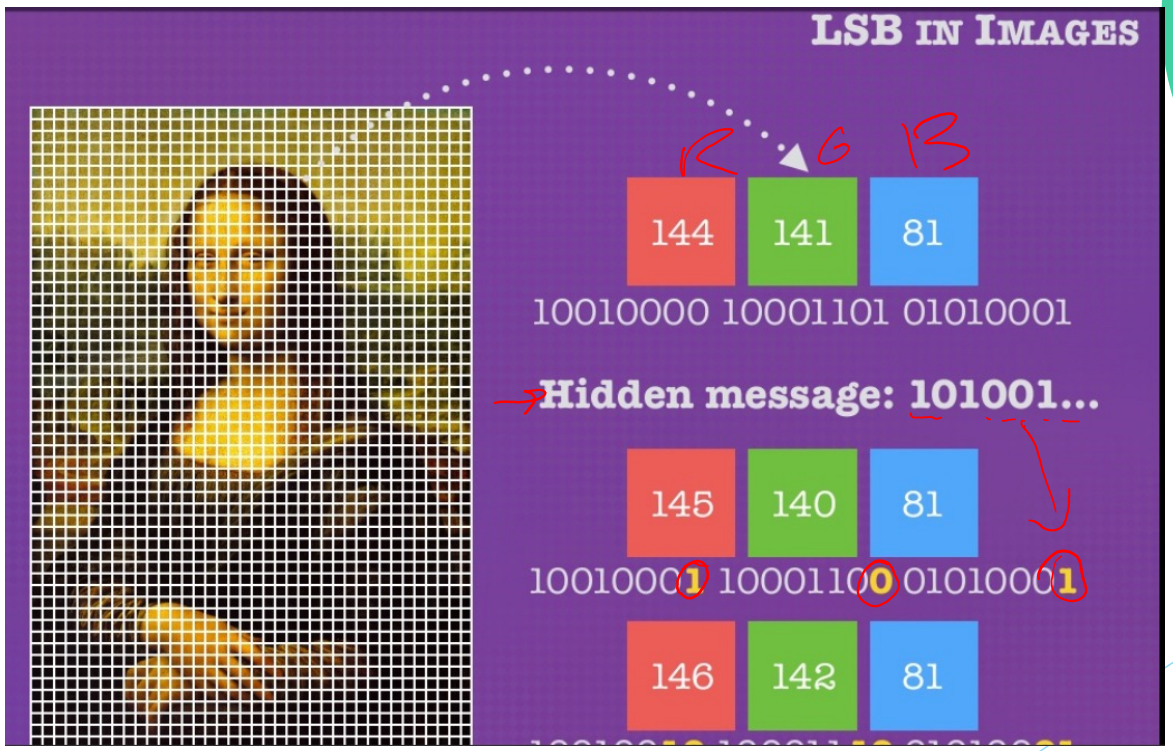
Steganography In others

Original Image

Watermarked Image

Stego VS Cover

Image Processing
Steganography VS Steganalysis



Triple Channel Image

- RGB
- HSV

One Channel Image

- Binary
- Gray

(0-255)

General Steganog

My friend Bob,

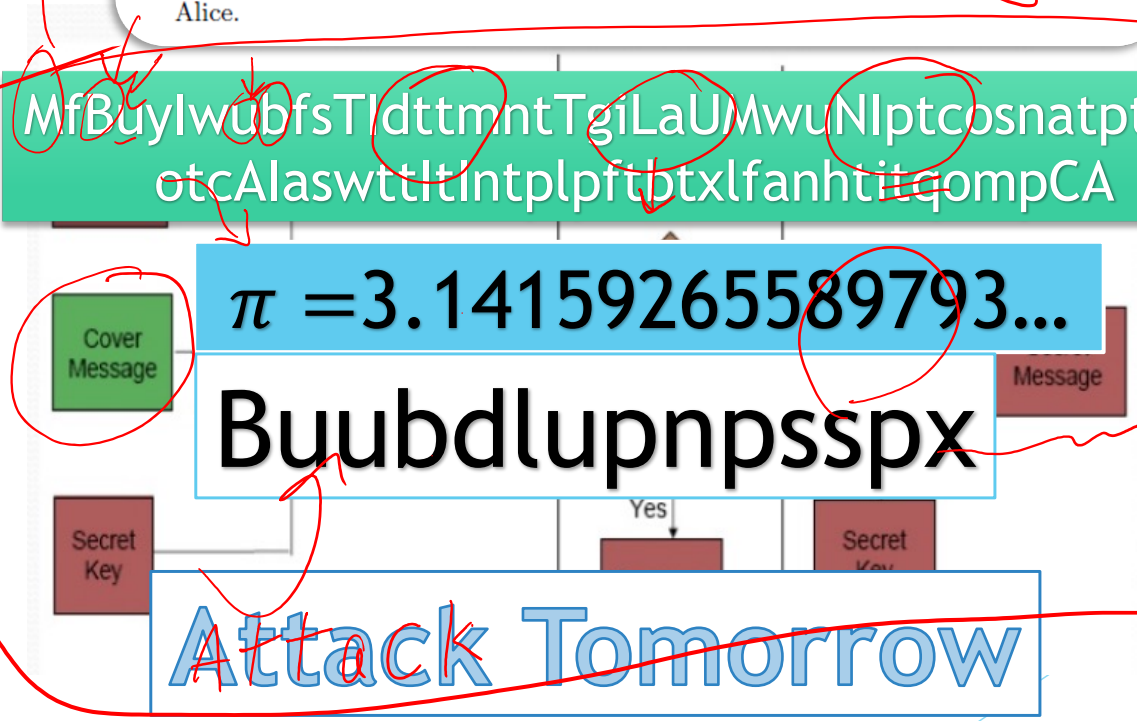
until yesterday I was using binoculars for stargazing. Today, I decided to try my new telescope. The galaxies in Leo and Ursa Major were unbelievable! Next, I plan to check out some nebulas and then prepare to take a few snapshots of the new comet. Although I am satisfied with the telescope, I think I need to purchase light pollution filters to. block the xenon lights from a nearby highway to improve the quality of my pictures.

Cheers,

Alice.

MfBuyIwubfsTIdttmntTgiLaUMwuNIptcosnatpttafs otcAlaswttItIntplpftbtxlfanhtitqompCA

Clear?



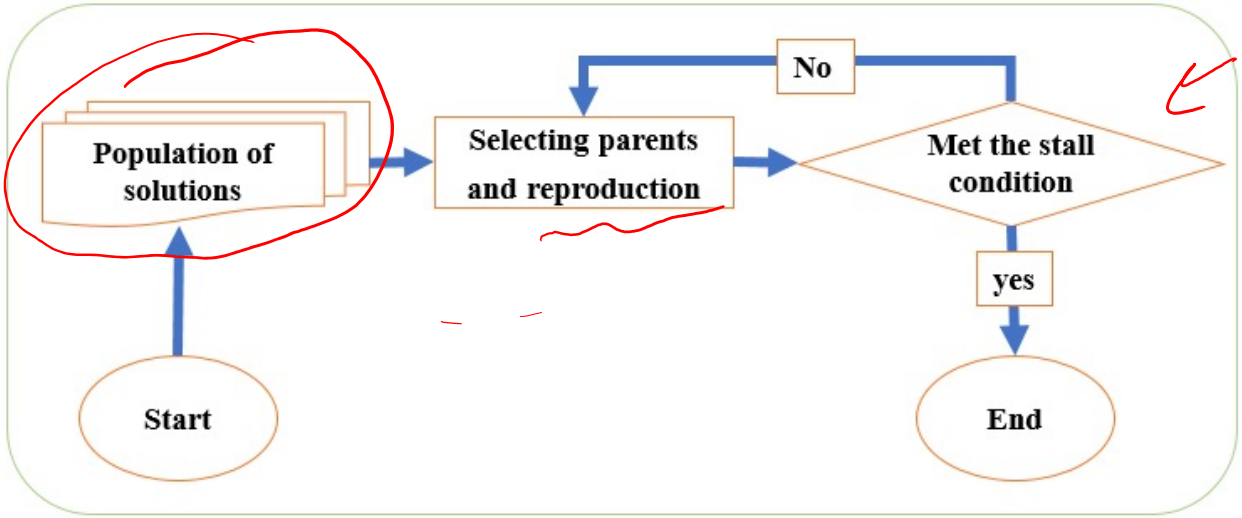
π =3.14159265589793…

Buubdlupnpsspx

Attack Tomorrow

Why EA / NIA?

General procedure of Evolutionary/Nature-inspired algorithm



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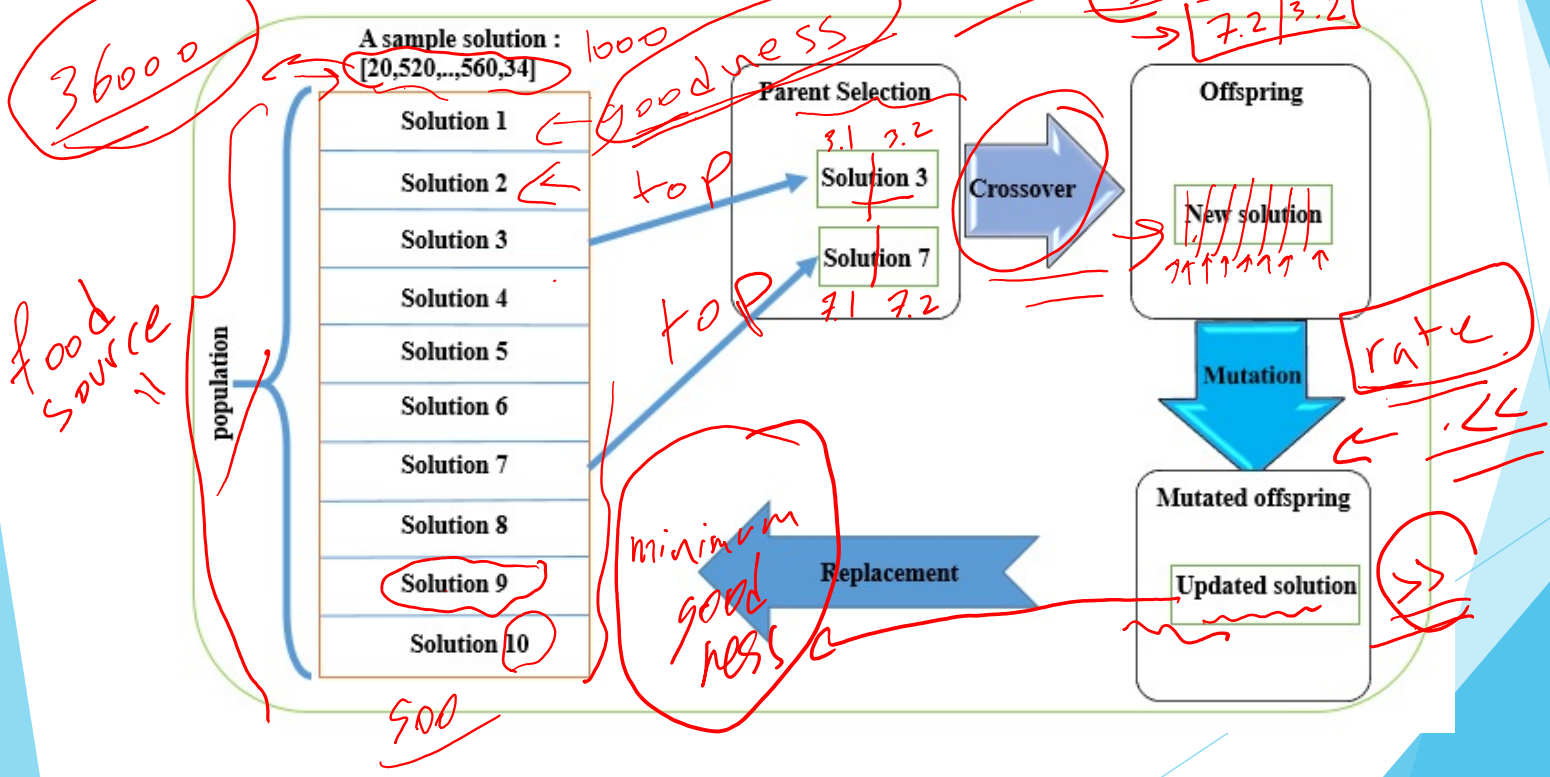

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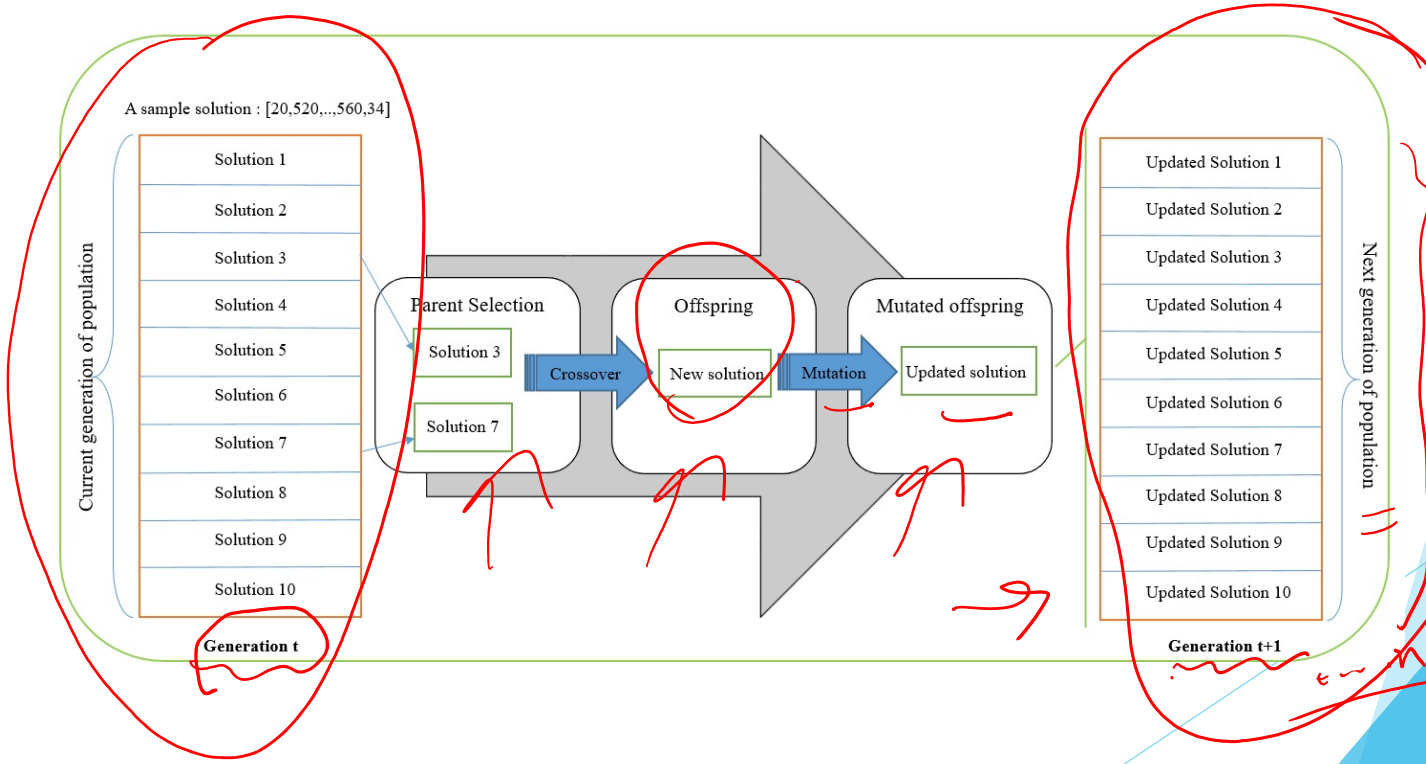
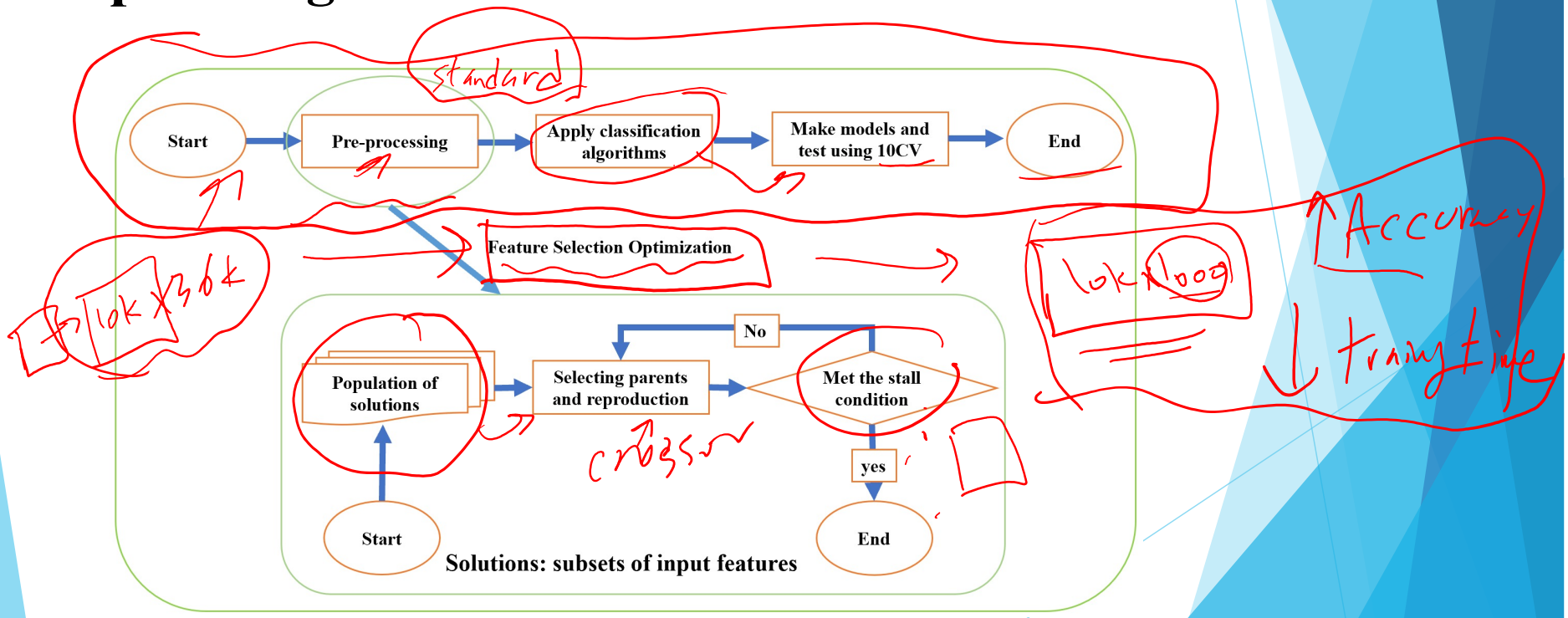
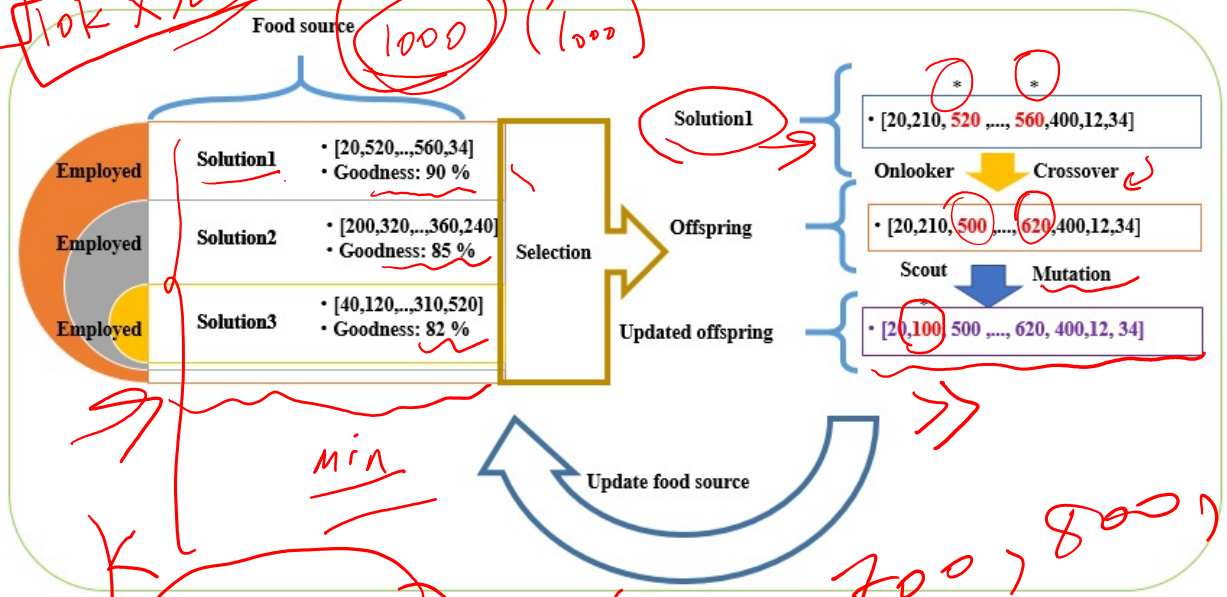


General procedure of Evolutionary/Nature-inspired algorithm



IFAB : Image steganalysis using feature selection-based ABC



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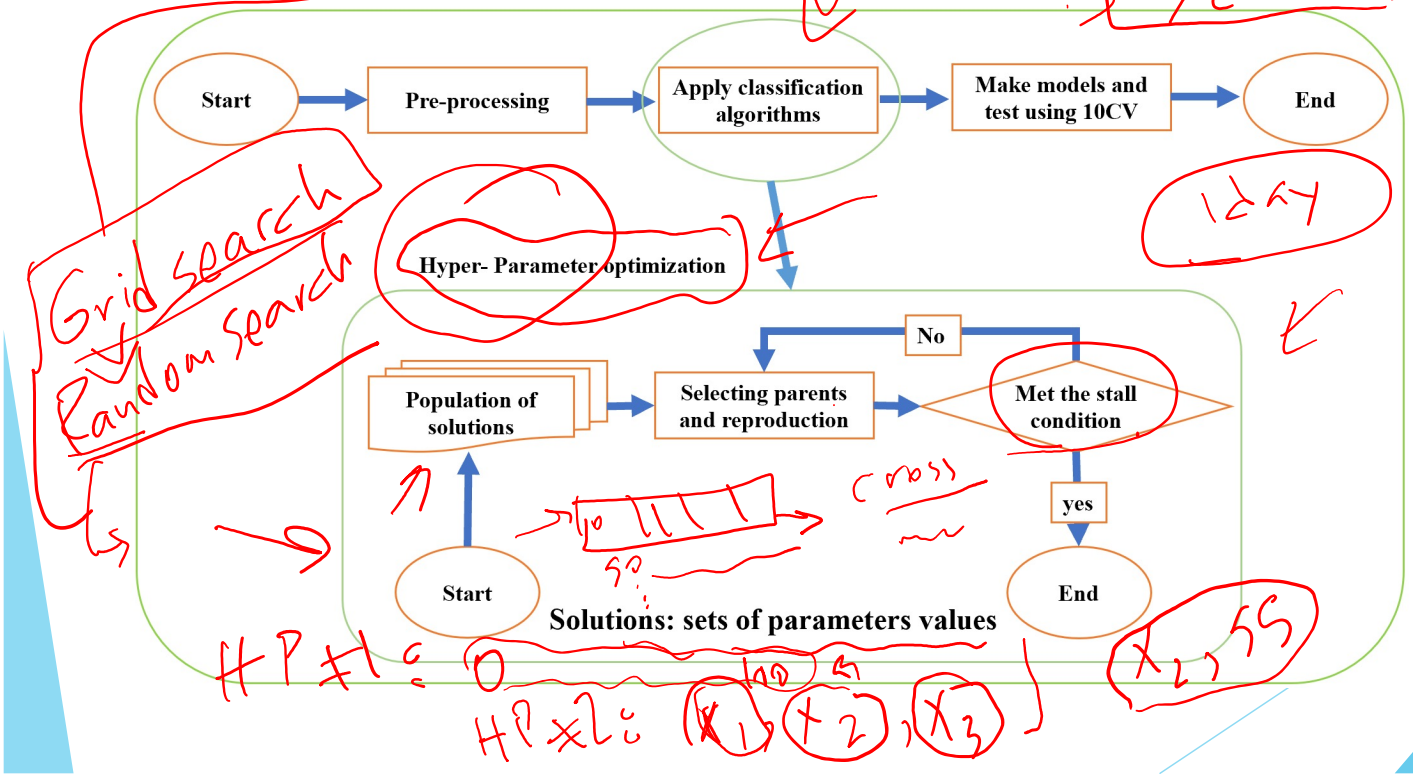
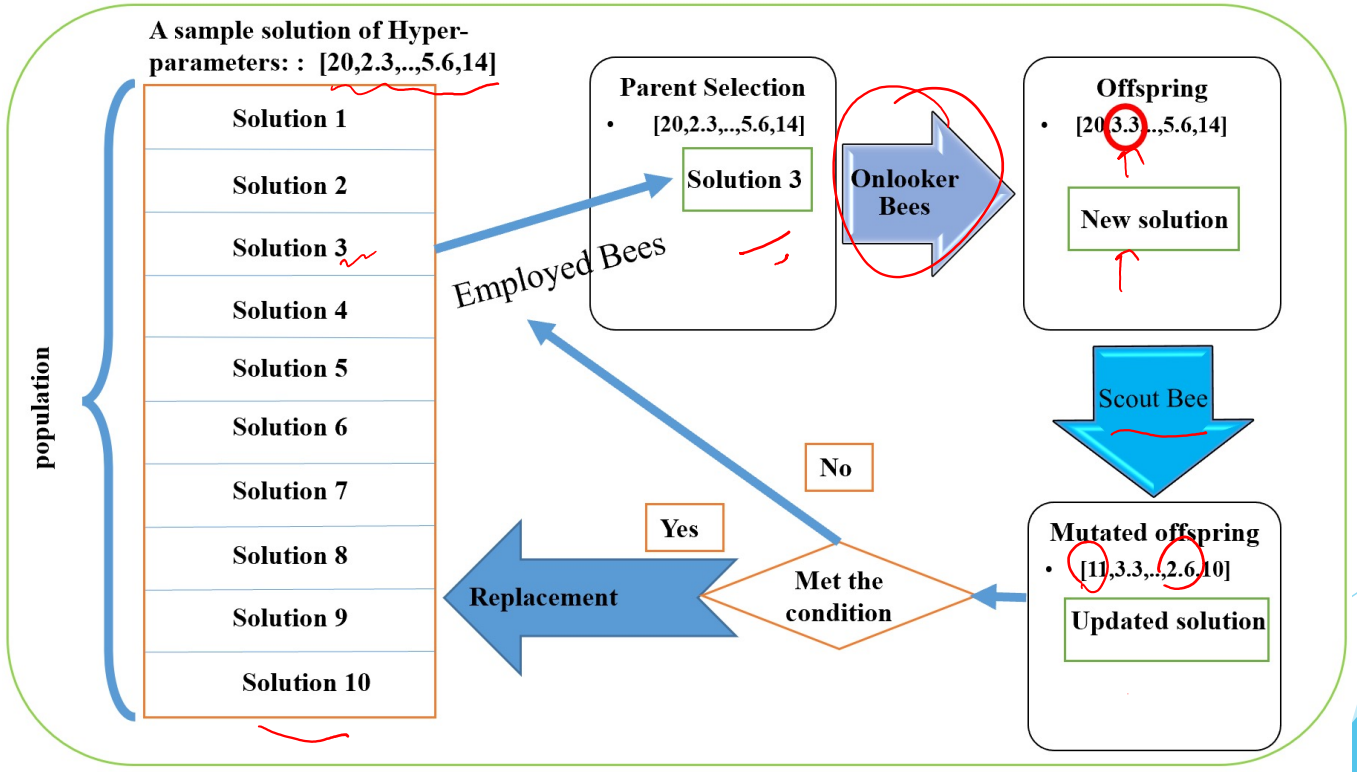
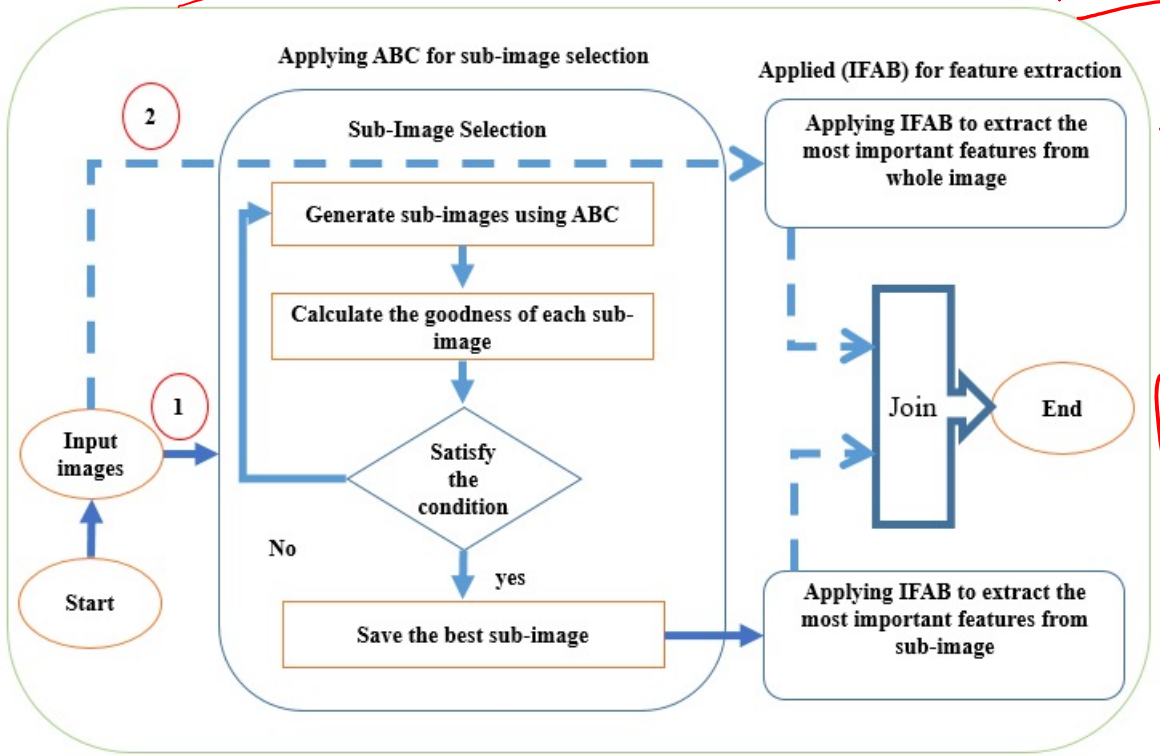


General procedure of Evolutionary/Nature-inspired algorithm



RISAB: Region-based Image Steganalsis using ABC



RISAB-example

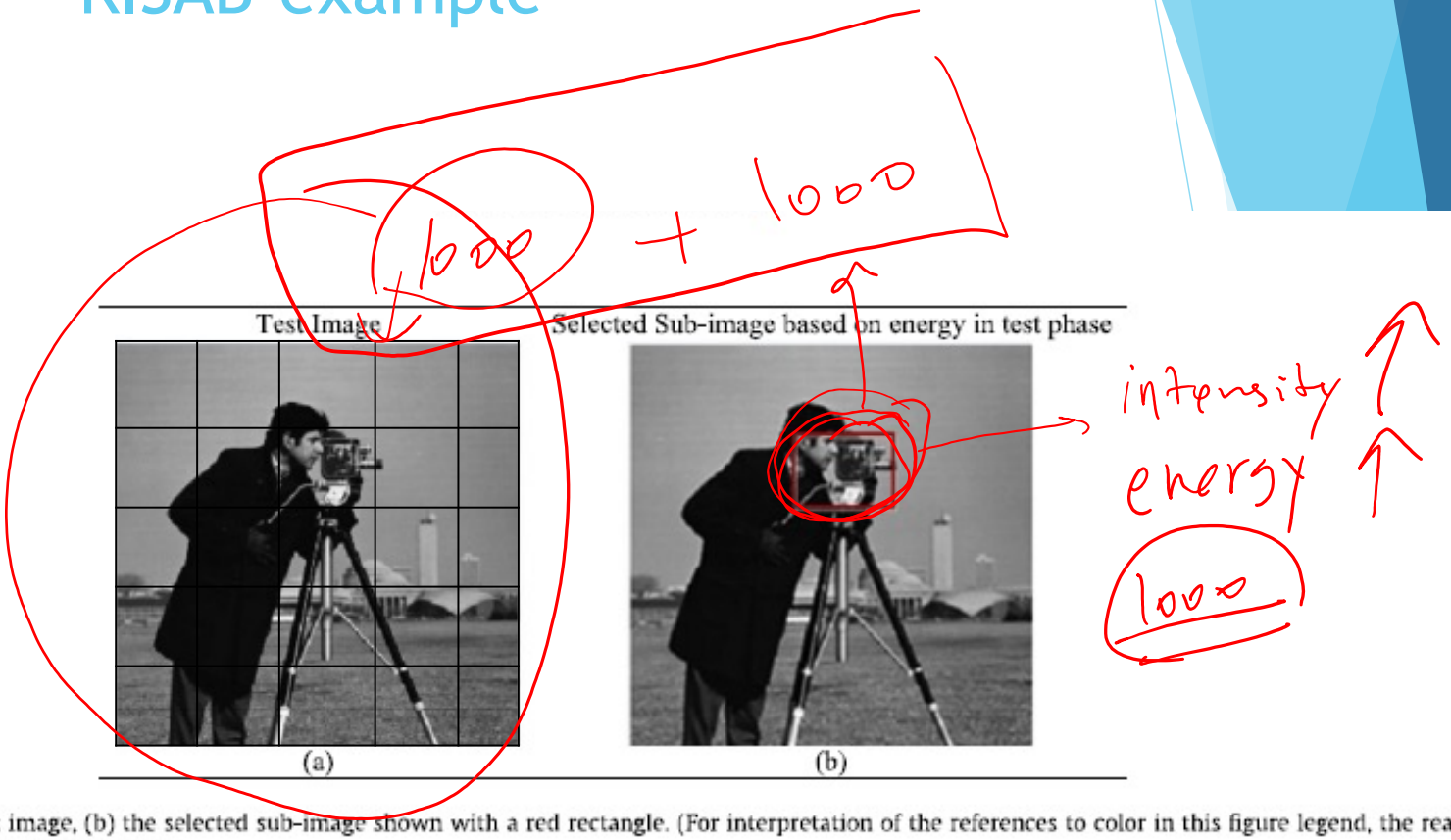


Fig. 8. A sample of (a) test image, (b) the selected sub-image shown with a red rectangle. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Thank you

References:

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- https://doi.org/10.1016/j.jvcir.2016.12.003
- https://www.redcom.com/introduction-to-cryptography/
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- Steganography in Digital Media,Principles, Algorithms, and Applications By Dr Jessica Fridrich