

(*)

Fake Image

(digitally Altered image)

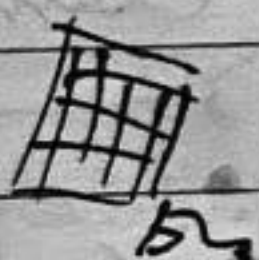
ML & Neural N/w

Even complex neural N/w not possible to predict if image is fake or not without identifying a common factor across all fake images.

Giving raw pixels to neural N/w, we gave Error level analysed image. (ELA)

(ELA) → Check inconsistency in a Image's Compression level.

When image is saved or modified, different part of it may have different levels of Compression.



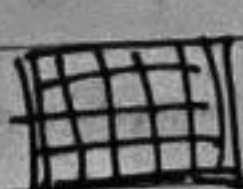
how ELA work -

- * Save Image at lower Quality (90%)
- * Compare newly save image with ~~save image~~ original
- * Identify the variation in error levels across different regions of the Image
- * Highlight the inconsistent area where modification might have been made.

Image's
Meta Data

Not reliable

Like if Image edit by Adobe Photoshop then it mention it version of Adobe Photoshop used.



100 Pixel

Compress
resize



10000 Pixel

3 color channel
Red Green Blue

→ 30,000 (10000x3)

1000

30000
RGB

→ Multilayer Perceptron (MLP) N/w

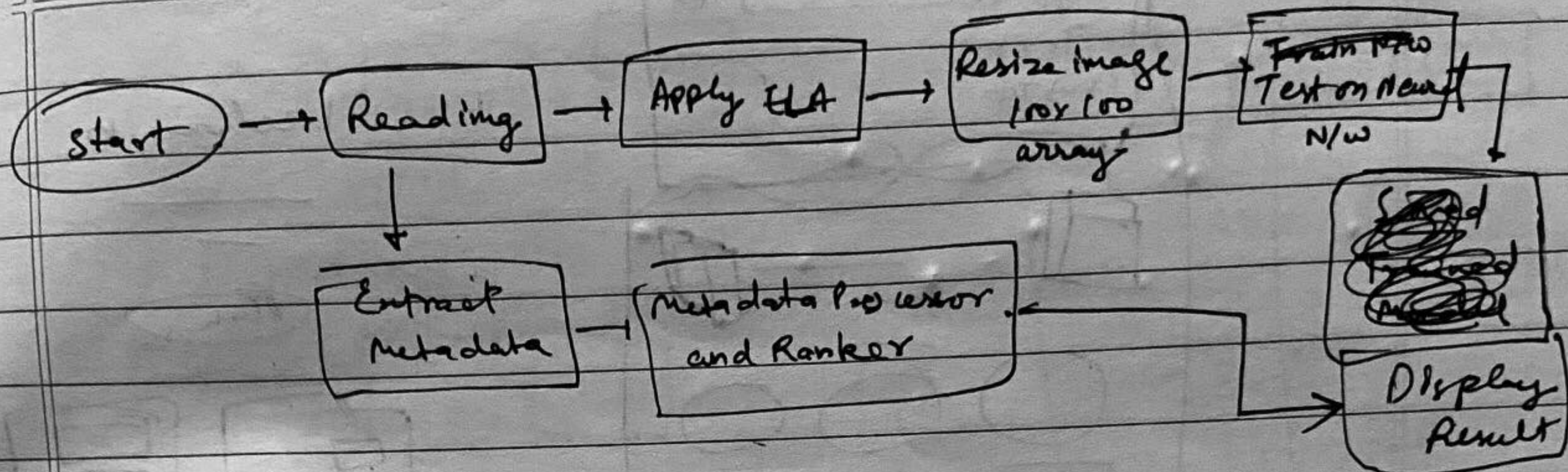
Metadata Analysis

→ Combined analysis Probability Score.

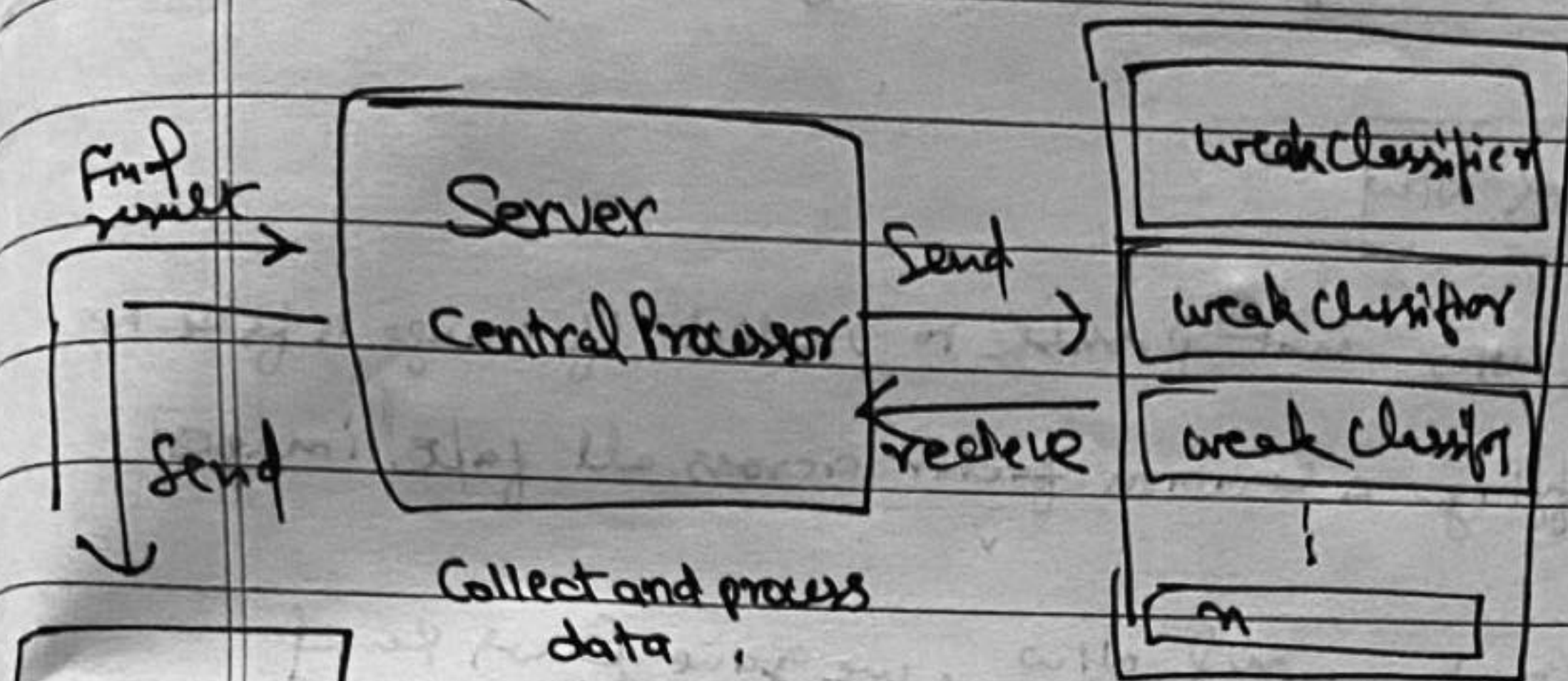
- ① Neuoph Studio - neural N/w framework (loading images)
② Metadata extractor - extract metadata from images
③ Java fx - Javafx is used to implement modern user interface

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[Synthetic video detection]



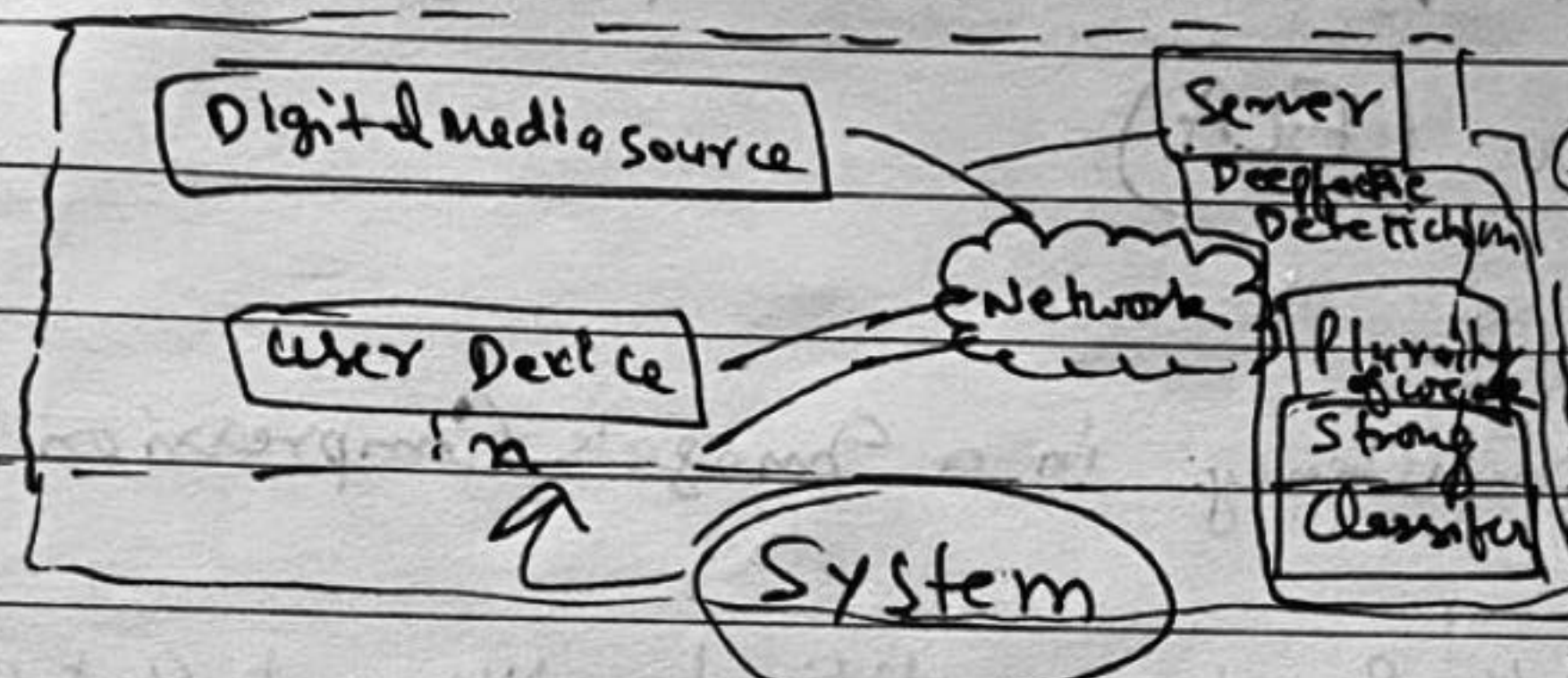
① Weak Classifiers :- train on real & synthetic videos.

② unpaired natural movements, frame inconsistencies, audio mismatch

③ detect irregularities

④ Each weak classifier generate respective prediction result

⑤ Sent to Server.



Strong - receive prediction from all weak classifiers.

① Analyze these predictions to look for patterns

② Make Result.

Monitor a digital media source

Process to identify video

Identify video

Extract video

Analyze the video with a plurality of weak classifiers

Analyze the result of weak classifier with a strong classifier

Create a training set

Remove blurred frames

Identify physical features

Select the physical features

Down-Sample the physical feature

Train weak classifier

Weak Classifier

Possible Methodology -

- Single level detection (Sensor noise, double JPEG Compression)
- Physical level detection (Lighting condition, shadows, reflection etc)
- Semantic level detection (Consistency of metadata)
- Physiological signal detection - (breathing & blinking)

Strong Classifier :- a Network / Classifier that is trained to be well correlated with true classification meaning the network is trained to learn to directly classify.

Weak Classifier : neural network train to detect & analyse certain certain characteristic.

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by individual may only loosely predict true classification

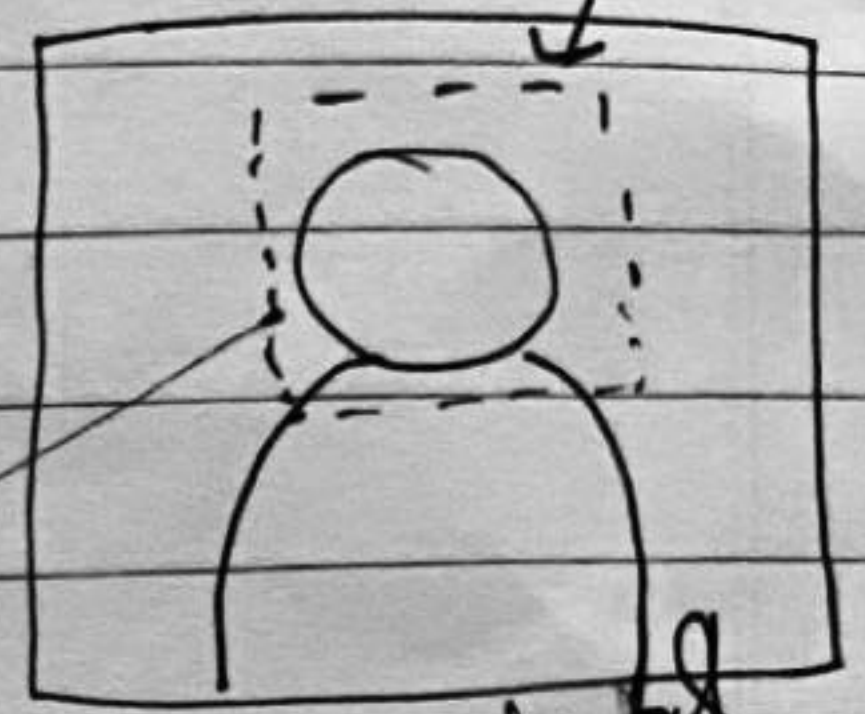
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Main detection

[Irregularities in]

- ① weak classifier - mouth detection
- ② weak classifier - movement of head
- ③ weak classifier - audio gain of video file

Numerical confidence level

? just if video is off animal on an animated video.



Real Image
Human Face

Fake
Human Face

Weakling
Supervised
Learning
Model

Model

Model

Strong Classifier

Weak Classifier

Output