ECE501_2025_12_Group_2

Project name: **Image Tampering Detection (Forgery Localization)**

Team Details:

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Work done till week 1:

1. **Selection and Knowledge of the topic:**

- Investigated the relevance of image tampering detection to applications in the real world, e.g. to fake news detection, digital forensics, and copyright.

- Learned the general concept: how to point out duplicated or manipulated regions in an image with the help of digital image processing.

2. **Review of Literature / Preliminary Study:**

- Learned the common methods of tampering, including copy-move, splicing and retouching of images.

- Explored methods that existed such as:
    - Block-based matching (e.g. breaking the image down into blocks and matching them based on either correlation or DCT features).

    - Matching by feature (e.g. with SIFT, SURF or ORB features to locate duplicated areas).

- Searched about the research paper and GitHub project for a similar kind of topic to implement something.

3. **Tool and Library Selection:**

- Choose Python as the language of choice.
- Libraries we are going to use:
    - OpenCV,
    - NumPy to perform arithmetical operations on numbers and Matlpotlib

Plan for Next Week (Week 2):

1. **Set Up Environment:**

- Install all the libraries and tools that are necessary (OpenCV, NumPy, Matplotlib, etc.).
- In a basic mode, set up some sort of a code and datasets and output project directory.

2. **Dataset Collection:**

- Find tampered image samples in publicly available datasets, e.g. CASIA v2, CoMoFoD or IMD2020.
- Choose a few which can be experimented.

3. **Image Preprocessing:**

- Convert images to grayscale.
- Scale and rescale input images.
- Simple filters To get a familiarity of behavior of noise and edges.

4. **Start Prototype Design:**

- Test and develop block based comparison algorithm (in copy-move forgery detection).
- Determination of the differences between the suspect and normal areas, on a case of images.

5. **Challenges/Observations:**

- Web experience in feature based and block based.
- Choosing data and measure of evaluation (precision, recall, F1) that will be the most appropriate in consideration of the goals of the project.

6. **Future(s) expected (within the next weeks):**

- A simple working prototype, which shows possible areas of tampering in a test image.
- Block based and feature based methods are clearly compared in terms of their accuracy and performance.