

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

Team Details:

Name	AU ID
Prasham Mehta	AU2340135
Dhairya Rupani	AU2340195
Vidhan Nahar	AU2340199
Drumil Bhati	AU2340211

Work done till week 2:

- We understood and got an idea about what the project is, how to implement the project and also explored the project.
- We tried to comprehend the problem statement definition in order to research about our topic.
- We also focused on finding suitable papers in order to aid our research throughout the project lifecycle.
- We also uploaded the selected research papers on our GitHub repository.
- The project methodologies were also finalised, by researching on the available projects online.
- Selected methodologies:
 - **Adaptive Segmentation:** The image is divided into solid image-based components known as superpixels.
 - **Feature Extraction:** Select good and valid points in every section with SIFT and SURF.
 - **Feature Matching:** Check the point of all the sections to determine matches.
 - **Region Localization:** Join up to the similar parts to highlight the entire forged area.

- **Refine and Output:** Clean up the output and indicate the parts that were edited.
- We gathered information on the subject, included a search on Google Scholar on the research papers, and took a look through all the useful research papers.
- Take two most relevant papers and then learn the methods that those research papers offered.
- Listed out the key pointers to the mid semester presentation.
- There are two key methods that we were interested in:
 - Block Based Matching:
 - Sub-division of picture into blocks of picture.
 - We calculate the statistical features of every block and find similar blocks.
 - Feature-based matching:
 - The interest points(key points) are instead of blocks: we take them provided that the image is scaled or rotated.
 - These key points and description of the local pattern can be detected with the help of SIFT or SURF algorithms.
- Dataset selection:
 - **Dataset Overview:**
 - Columbia Image Splicing Detection Evaluation Dataset is a benchmark dataset, which is used to test image forgeries through splicing.
 - Has 183 genuine and 180 spliced images and ground truth masks them.
 - Photos will be in JPEG format, and the resolution will be between 757 x 568 and 1152 x 768.
 - Each of the tampered images is formed with an amalgamation of areas of two or more original images.
 - **Why This Dataset?**
 - Particularly pays attention to the splicing tampering, one of the most widespread types of digital forgery.

- Offers ground truth masks, which allows performing localization evaluation as well as detection.
- Used extensively in academic studies, and therefore benchmark comparability.
- Has realistic and subtle manipulations, similar to the one in the real world.

Plan for Next Week (Week 3):

- Set up the environment:
 - In basic mode configure some sort of a code and datasets and outputs project directory.
 - Install and test a number of libraries that will be useful to our project and attempt to write code that will bring us to our final destination.
- Start Prototype Design:
 - Test and develop block based comparison algorithm that has relation to move forgery detection.
 - In a case of images, determination of the difference between the suspect and normal areas.
 - A working prototype, which demonstrates the potential tempering areas in a test image.
 - Combine SIFT and SURF in order to have strong features.
 - Establish Feature Matching and Region Localization modules.
 - Produce Heatmap Output of tampered areas.