Tuesday Jan 21st -

Everyone but Zoe was here (she was sick)
We discussed collecting and summarizing articles to be used in the literature review. We decided to focus out research efforts on the end goal of robustly classifying wildfires using traditional computer vision techniques.

Tuesday Jan 28th - Everyone was here

We discussed the articles that we summarized, and started narrowing our focus on what we want to analyze in particular. We decided that we want to focus our efforts on satellite images, and look more into thermal and regular images. We're also deciding which color model we want to use, and may end up analyzing a few in order to compare and contrast them.

Tuesday Feb 4th - Everyone was here

We discussed datasets, and chose one to use. We've decided that our paper will attempt to detect smoke and fire via photos taken from watchtowers and smoke. We will attempt to implement separate fire and smoke detection systems.

Tuesday Feb 11th - Everyone but Zoe was here, she had an appointment

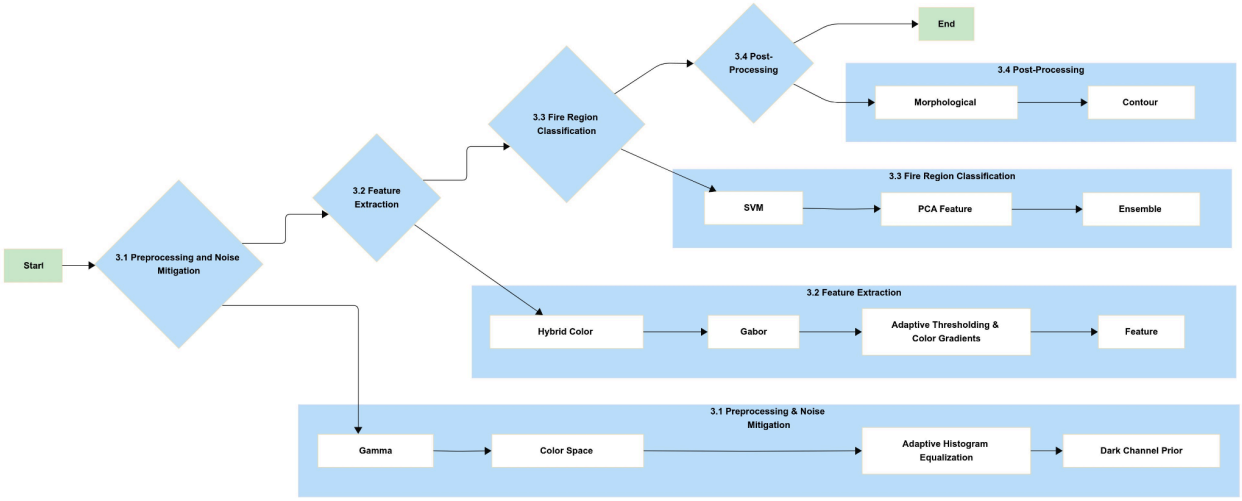
We discussed reading further papers to get a more broad grasp on the topic, by focussing on some other areas that may be useful: Illumination Variations, Reflections from Bright Surfaces, Background Objects with Fire-Like Colors, Fire vs Smoke Confusion, and Atmospheric Noise (Fog, Smoke, Haze). These will help us better achieve our goal of a wildfire detector that uses smoke and flame detection.

Thursday Feb 20th - Everyone was here (online)

We got all of our summaries together to figure out what we're putting in the final Literature Review. We also decided on a proposed pipeline for our fire-detecting algorithm, including preprocessing, feature extraction, classification, and postprocessing.

Sunday Feb 23rd - Everyone but Zoe was here, she was sick. We figured out stuff with her.

We worked on finalizing the project proposal - and made a diagram of what we plan to do for our implementation.



Tuesday Feb 25th - Everyone but Seth was here, he had another group meeting.

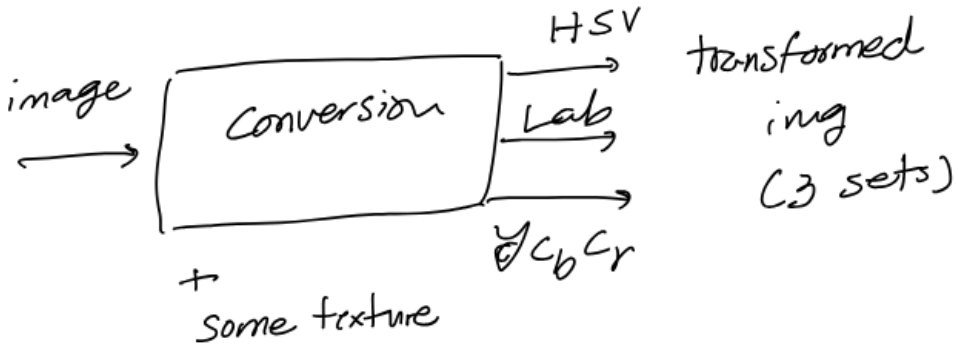
Discussed division of work for implementation of the project.

- Beck - Preprocessing
- Zoe - Colour space feature extraction.
- Jacob - Post-processing - morphological and contour
- Ladan - SVM and PCA
- Seth - texture features,gabor,..

Tuesday Mar 11th - Everyone was here, Zoe connected via Discord

We're thinking of rearranging our algorithm to focus more on regions as a whole, and as such scrapping morphological processing (since we won't necessarily have "regions" to iterate over for non-maximal suppression)

Tuesday Mar 18th - Everyone was here, except Zoe



Have different streams for HSV, YCbCr, and CIE L*A*B* -> CLAHE for dehazing -> Dark Channel Prior for dehazing - > 3 Images output where color rules and texture rules will be applied, get false positive and false negative ratios for each combination of rules and preprocessing algorithms

Steps: (Setup different files for HSV< YCbCr, and CIE L*A*B*)

1. Preprocessing (dehazing, etc)
2. Apply mask to get flame px from training images
3.
    a. Get texture features from flame region
    b. Create/test rules for the given region based on the current color space - return what percentage of fire px matched?
4.

Beck: module 1,2
Jacob: module 3 + mask morphological stuff (non-max suppression, regions larger than some size)
Seth: module 4
Ladan: module 5

Implementation Steps:

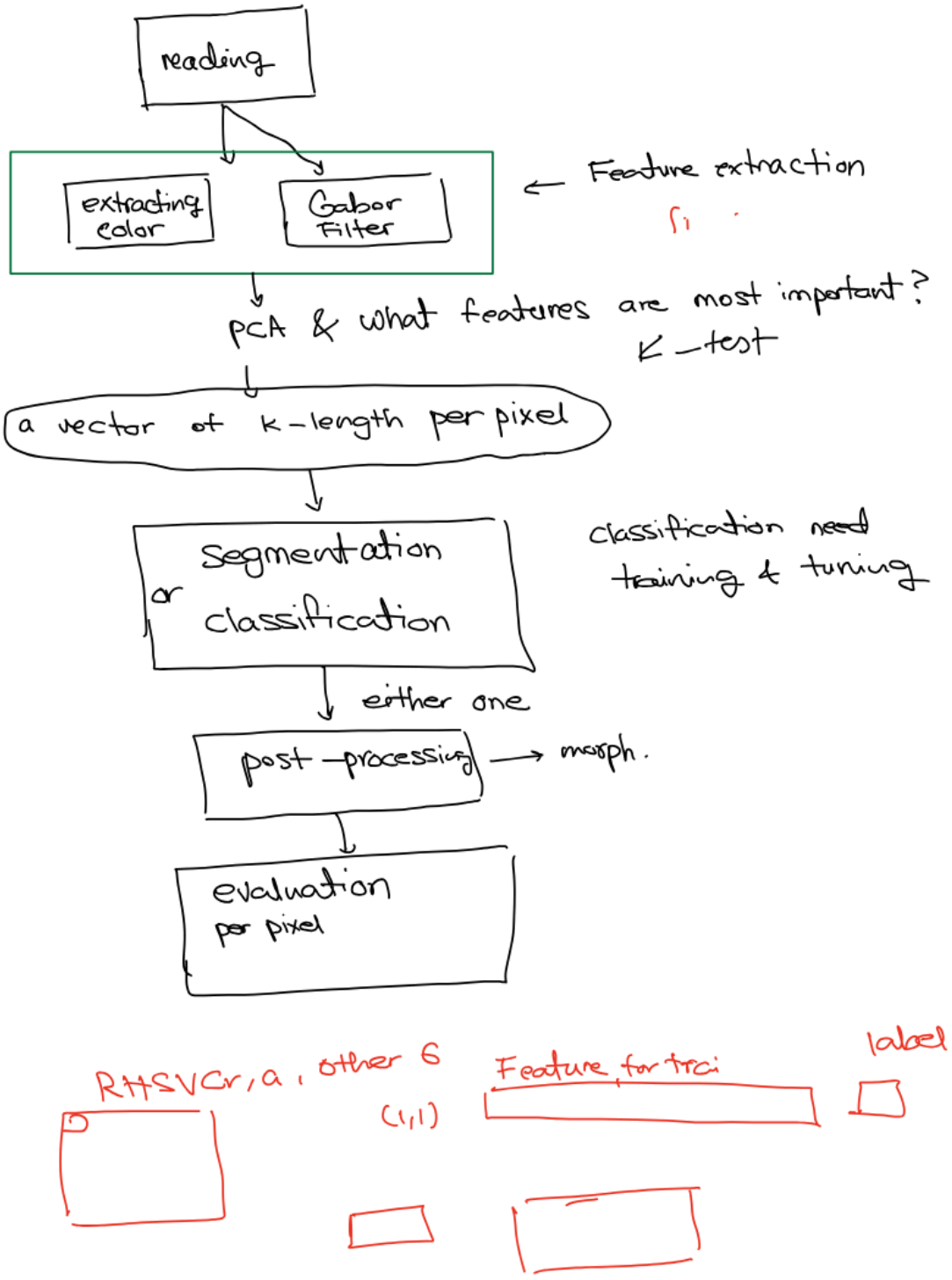
1. **Load Dataset (module 1)**
    - Load images and their corresponding ground truth fire masks.
2. **Preprocessing (module 2)**
    - Resize or normalize if necessary
    - Dehazing and dark channels prior method to the whole image
    - Apple the mask to get the fire region, pass it to the next module
3. **Convert Images to Different Color Spaces and apply Gabor filter**
    - Convert RGB images to HSV, Lab, and YCbCr color spaces.**(module 3)**
    - Apply Gabor filter for texture extraction. **(module 4)** this will need to find the best hyperparameters for gabor filter.(window size, sigma, orientation, etc) we need to report those parameters as well.
4. **Extract Fire-Related Features (module 3,4)**
    - Apply predefined rules from the previous study for color-based segmentation.
    - Use Gabor filter responses to enhance texture-based fire region detection.
5. **Apply Thresholding or Segmentation Rules (module 3,4)**
    - Segment fire regions based on the extracted features. This step can be combined with 4, For example, if we apply the rules, we're segmenting based on some thresholds.
6. **Generate Binary Fire Masks(module 3,4)**
    - Convert segmented regions into binary masks.
    - Combine Color & Texture Masks (and/or)
7.
    - Compare the generated fire masks with ground truth masks using metrics like IoU (Intersection over Union), etc.
8. **Compare Methods & Determine Best Approach (module 5)**
    - Compare results for different color models and texture features.
    - Identify the best-performing combination for fire segmentation.

Sunday March 23rd

We discussed the colour spaces segmentation rules, which we used as a basis to start our research on the importance of the colour spaces. We also examined and refined the implementation of the Gabor filters, to analyze the textures of the fires. We also decided that it would be useful to have some morphological operations after all in our post-processing, since something like closing or dilation would help remove holes in our masks to improve segmentation.

Tuesday March 25th

Deciding responsibilities until next meeting



Beck: Classifier/SVM
Ladan: PCA
Jacob: Segmentation - GMM?
Seth:Attempt at CNN
Zoe: results-evaluation?

Sunday March 30th

Final meeting before submission.
Seth attempted to create a UNet based CNN to compare the results of our model to. Ultimately he was unsuccessful as most results were not useful.
Results of the model were present, and discussions about writing the paper were had.
Jacob was sick, so certain morphological operations were yet to be implemented. These are to be completed for the final report.