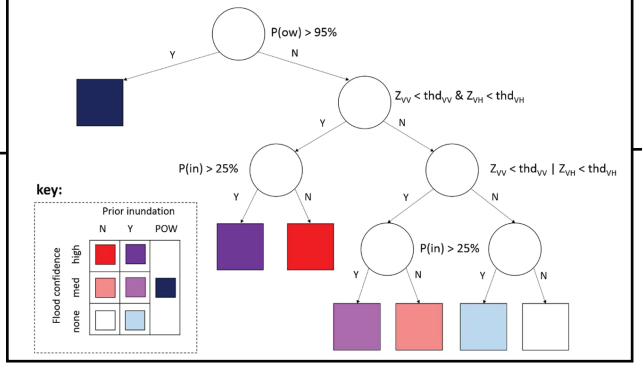
Method 1: Semiautomated ML Flood Mapping

Inputs:
1. StartDate & EndDate (Pre)
2. StartDate & EndDate (Post)
3. AOI (Study Area Shapefile/poly)

Datasets:
1. Sentinel-1 (since 2016)
2. DEM (updated version)
3. Water Occurace layer

Statistical Thresholds



- improve statistical threshold method by redefining equation (for underestimation)
- incldue the threshold of features such as DEM & Slope

Flood Layer (under-estimated)

Sampling
1. Generating ~2000 samples based on flood layer

ML Modelling

- Hypertuned custom ML model specifically designed for flood mapping task
- add multiple features (DEM, Slope, & vv/vh based on S1)

Validation
1. Accuracy Assessment
2. Comparison with GFM
3. Comparison with Zscore

Damage Assessment
1. Flood per LULC
2. Flood per population

Innovations/Research Gaps
1. St. Thresh. depending only on Sentinel-1 backscatter instead other features such as DEM/slope can be added
2. Uncertainity in overestimation or underestimation when using only St. Thresh. method. ML allows differentiating b/w flood & non flood
3. Existing ML based flood maping methods require extensive samples, which are not available most of the times
4. Cloud hosted app, with ability to differentiate rapid accurate flood upto division level (atleast)
5. Our method will be based on historical timeseries data, allowing more accurate results in identifying flood water

To Do:
1. use soil moisture, and ether soil features (soil water retention potential)
2. Everyone uses otsu's or st. thr. method for automation which are not reliable and recent study highlight their limitations.