Fire Mapping: Thermal Insights and Smart Indexing

Presented by Rahul Prabhu

Normalized Burn Ratio (NBR)

- Uses SWIR and NIR bands to identify burnt areas
- Range: -1 to 1
- Values approaching on indicate healthy vegetation, values approaching -1 indicate burned land
- Idea that burnt areas have smaller reflectance in SWIR and larger in NIR bands

$$\frac{SWIR - NIR}{SWIR + NIR}$$

Normalized Burn Ratio (NBRT1)

- Uses thermal band (10.4 to 12.5 µm)
- Range: -1 to 1 (Just like NBR)
- Better separability between burnt and unburnt land
- Originally designed for Landsat TM/ETM+

$$\frac{NIR - SWIR(\frac{Thermal}{1000})}{NIR + SWIR(\frac{Thermal}{1000})}$$

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Burned Area Index

- Uses Red and NIR bands
- Looks at the reflectance of Charcoal in post-fire images
- Uses spectral convergence points, calculated by analyzing large quantities of NOAA-AVHRR images
- Must be calibrated for reflectance

$$\frac{1}{((0.1 - Red)^2 + (0.06 - NIR)^2)}$$

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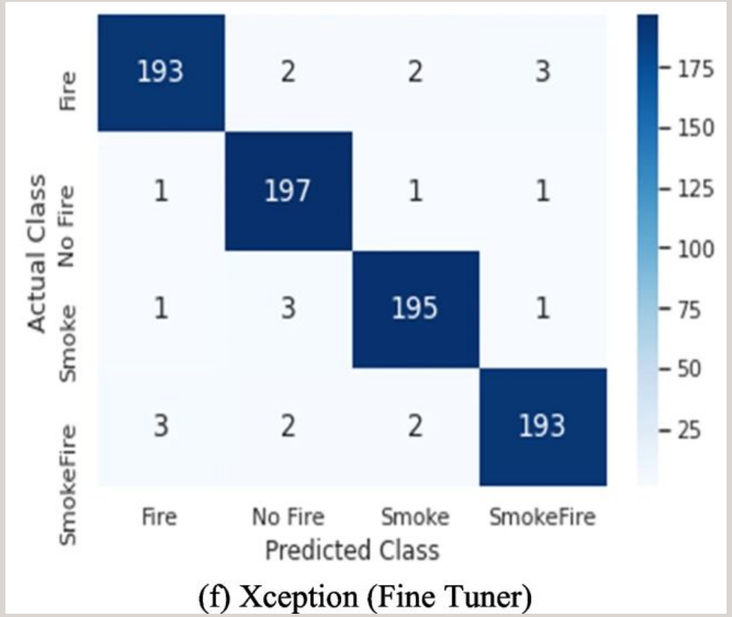
Deep Learning

- Depthwise Separable Convolutions (Xception)
- Learning without forgetting
- Transfer Learning



(f) Xception (Fine Tuner)

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Future Scope

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