

# Applications of image processing in geology

Name- Roni Mittal  
Student id- 1033472

What is a geology?

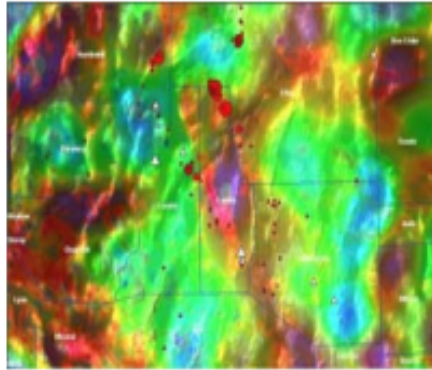
# Topics to be covered

- Mineral Exploration
- Vegetation Measurement and monitoring
- Determining rock mass strength
- Geological hazards (example landslides, earthquakes etc.)

## Applications

- Mineral Exploration
  - Mineral targeting
  - Mapping
  - Analysis

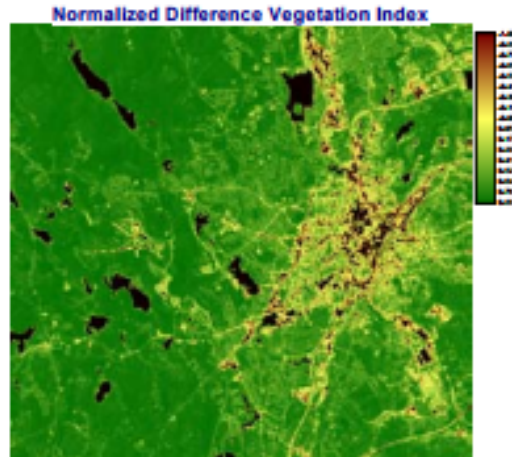
## Mineral exploration cont..



## Vegetation Measurement and monitoring

- Satellite imaging is employed.
- Various indexes are employed in order to monitor vegetation that includes vegetation index, enhanced vegetation index etc.
- Hyper Spectral study is employed to do the analysis in order to understand water content, plant pigment content, canopy architecture & density, vegetation stress and diseased vegetation.

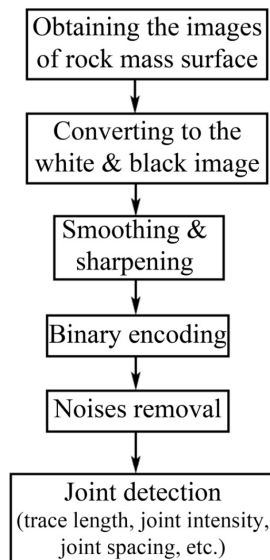
## Vegetation Measurement and monitoring cont..



## Determining rock mass strength

- This is measured with the help of GSI (Geological Strength Index).
- GSI – Rock mass classification system related to rock mass strength and deformation parameters.
- Input images are the photographic images.
- Extracts the information related to rock fracture, roughness, rock-bridge percentage and block volume.

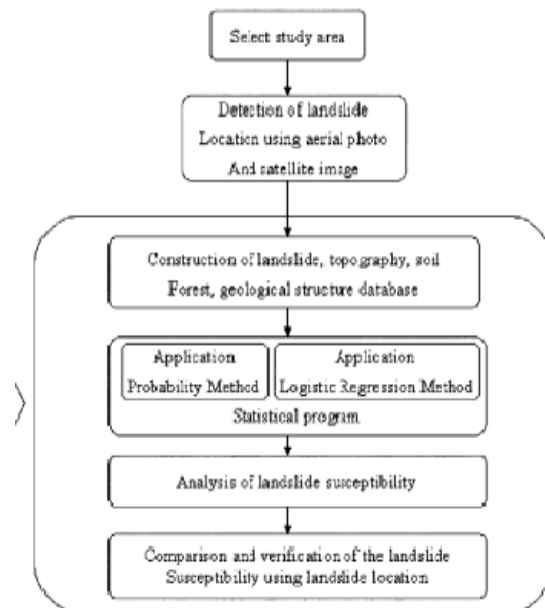
## Steps followed in Determining rock mass strength.



## Geological hazards

- Helpful in predicting and monitoring the landslides.
- Example:- concluded the reason of frequent landslides in korea.

## Landslides cont..



## Earthquakes Damage Detection

- Detects both aerial and linear damages
- Techniques applied to detect aerial damage are edge extraction, texture analysis and edge enhancement.
- Techniques applied to detect linear damage are edge extraction and shadow extraction.

# References

- <https://www.pwri.go.jp/eng/ujnr/joint/36/paper/72kusaka.pdf>
- <http://www.utsa.edu/lrsg/Teaching/EES6513/Projects/Mineral%20Exploration%20using%20GIS%20Final.pdf>
- <https://link.springer.com/article/10.1007/s002540100310>
- <http://www.itc.nl/ilwis/applications/application14.asp>
- [https://www.researchgate.net/publication/275209723\\_Vegetation\\_measurement\\_using\\_image\\_processing\\_methods](https://www.researchgate.net/publication/275209723_Vegetation_measurement_using_image_processing_methods)
- <http://www.ijcaonline.org/icvci/number17/icvci1692.pdf>
- <https://www.sciencedirect.com/science/article/pii/S1674775516301226>

Thank you !