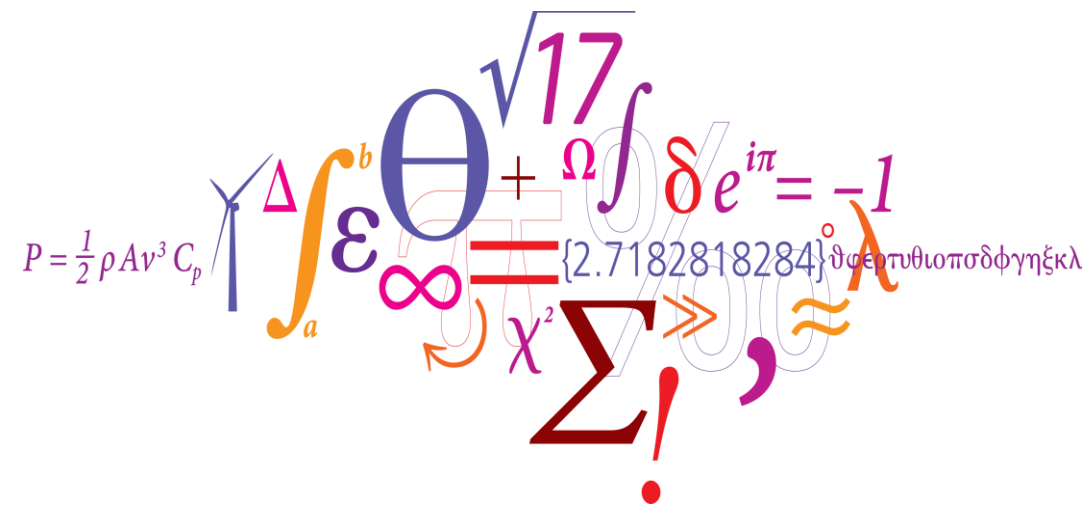


Quantifying the fidelity of numerical simulations of wind resources

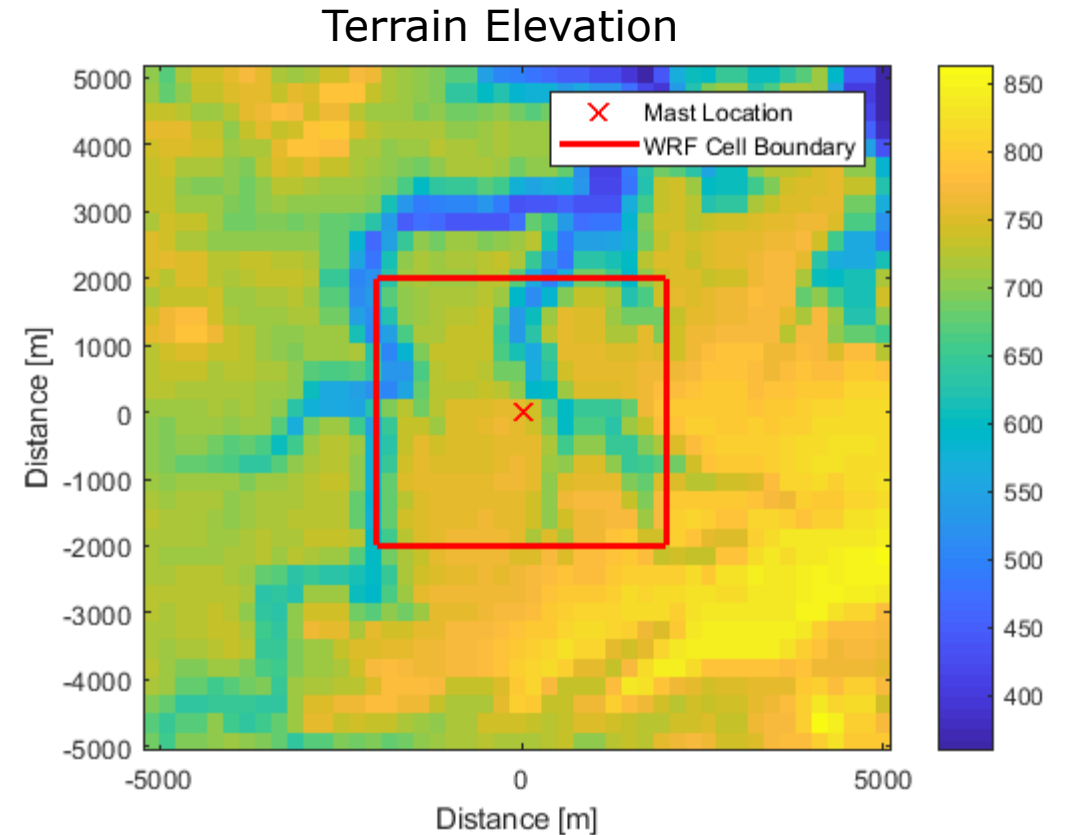
Erlingur Ívar Jóhannsson
 Master Thesis Project

Supervisors: Jake Badger and Sara C. Pryor



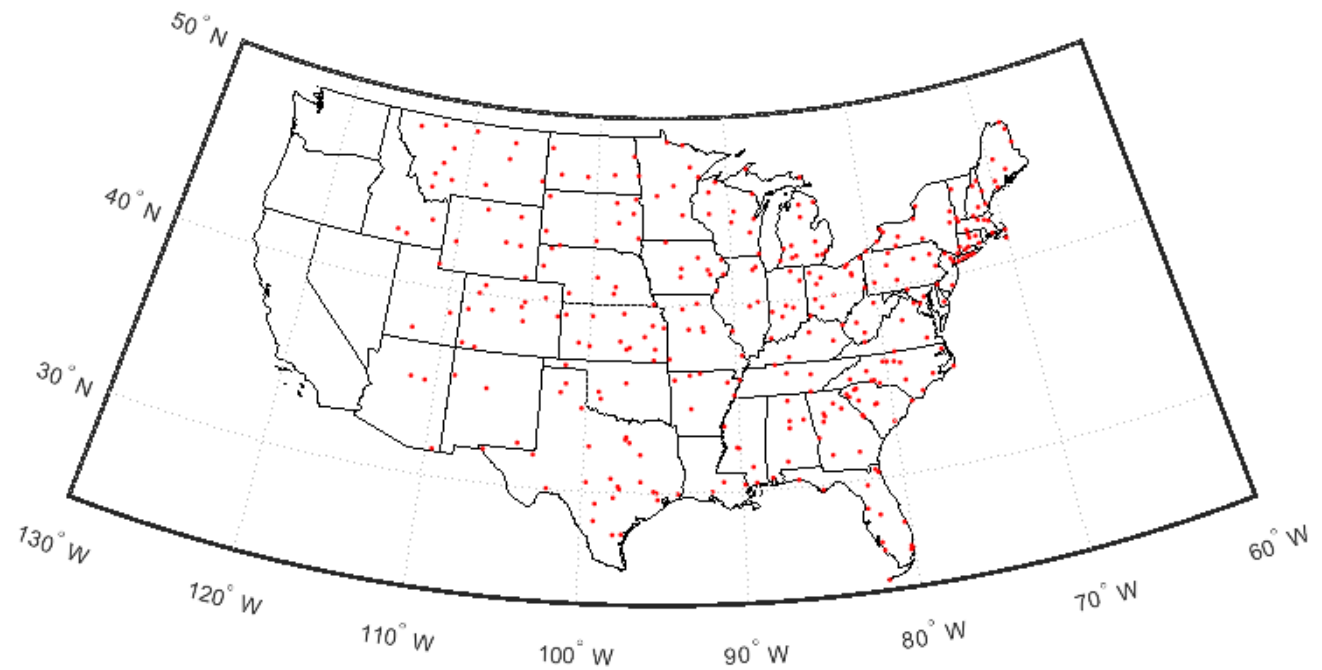
Error Estimation

- Verification is complicated
- Model is grid-box averages
- Model orography is smooth
- Observations are conditions at a point
- What if there are no observations



Automated Surface Observing System (ASOS)

- Operating since 2001
- Currently more than 900 sites
- 383 sites used

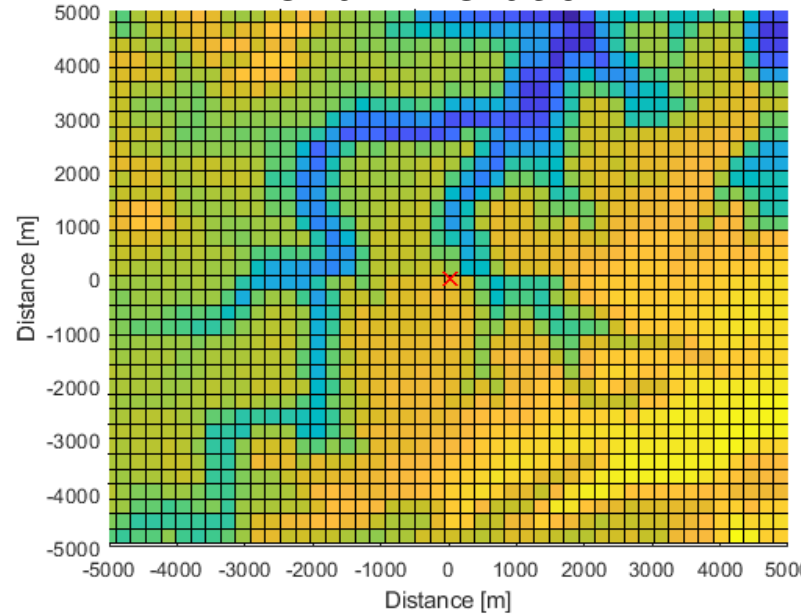


Terrain

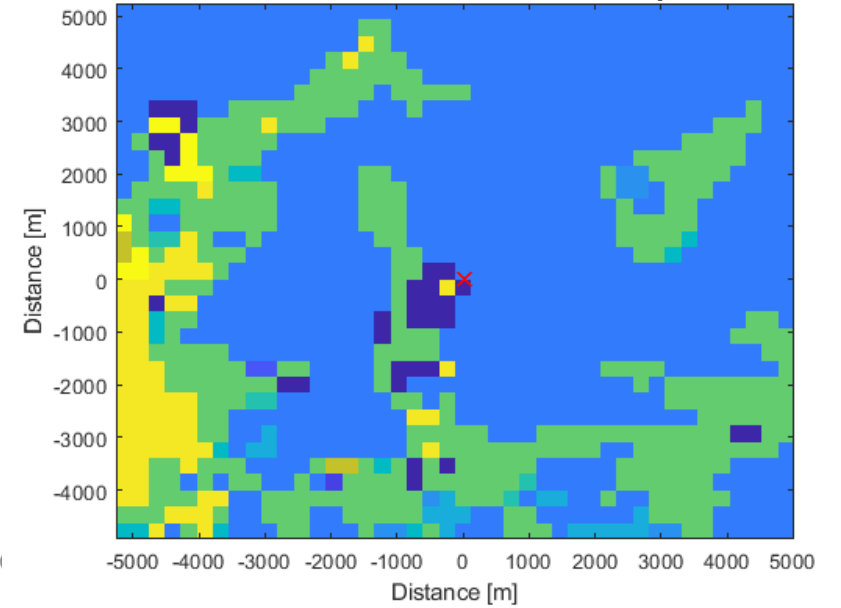
Terrain overview



Terrain Elevation

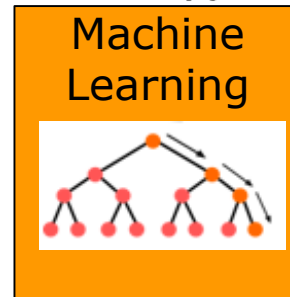


Land Use Variability



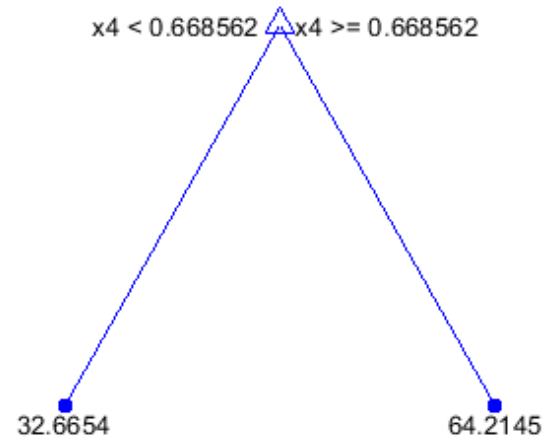
Predictors

- speed-up
- Ruggedness
- Land use/Roughness
- Etc.

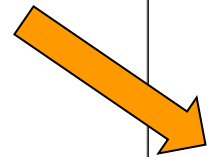
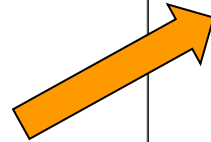
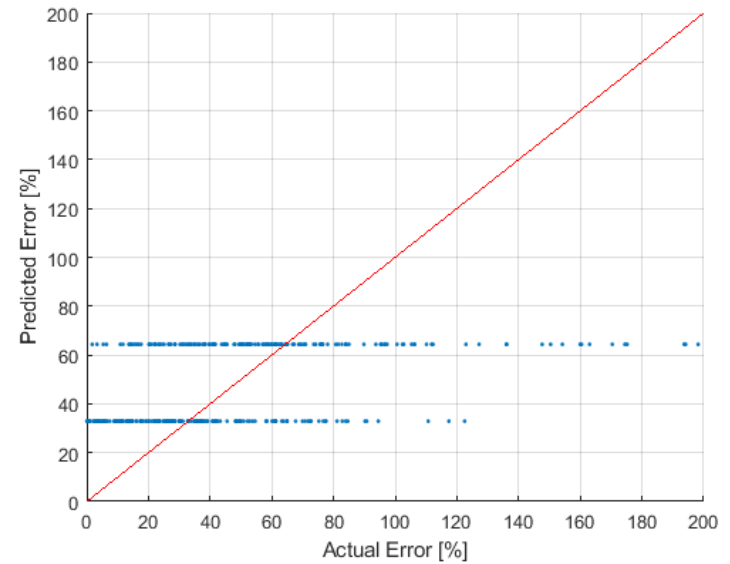
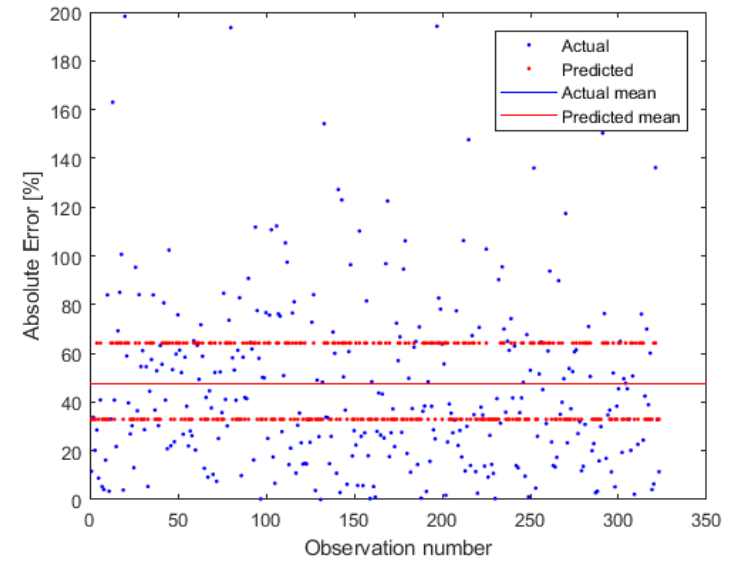
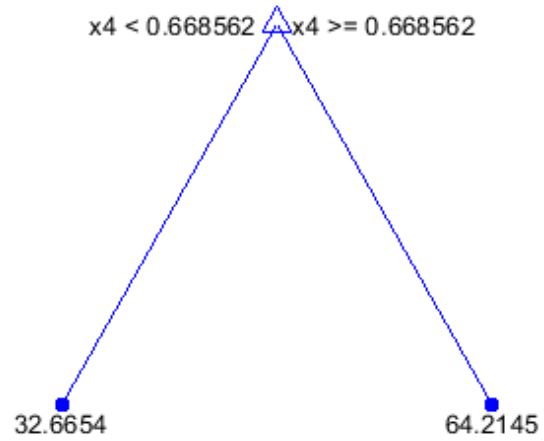


Response/Error

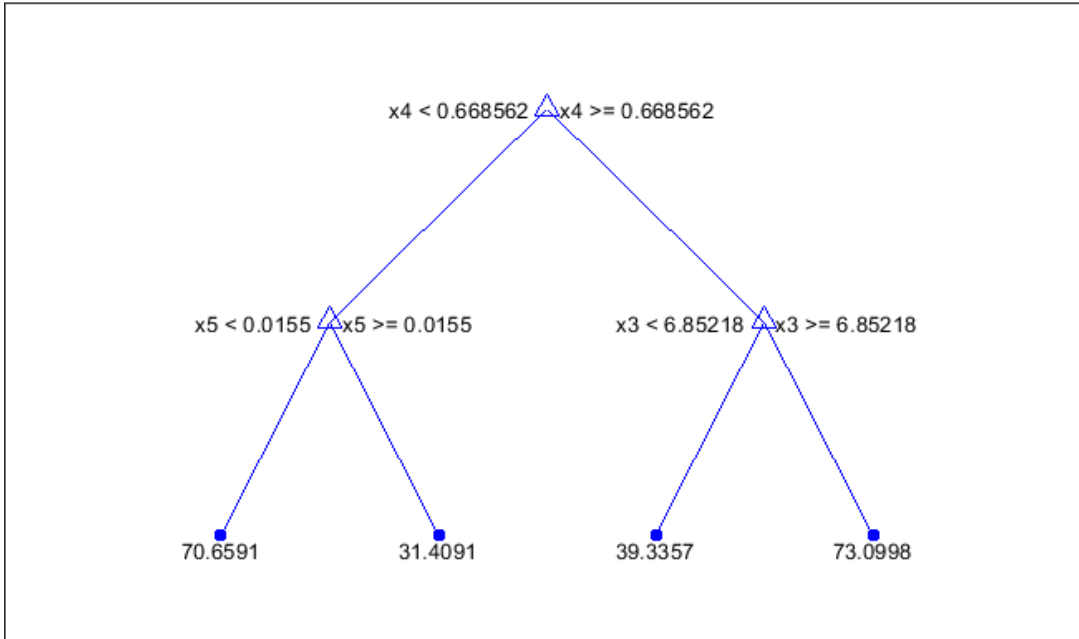
Decision Tree



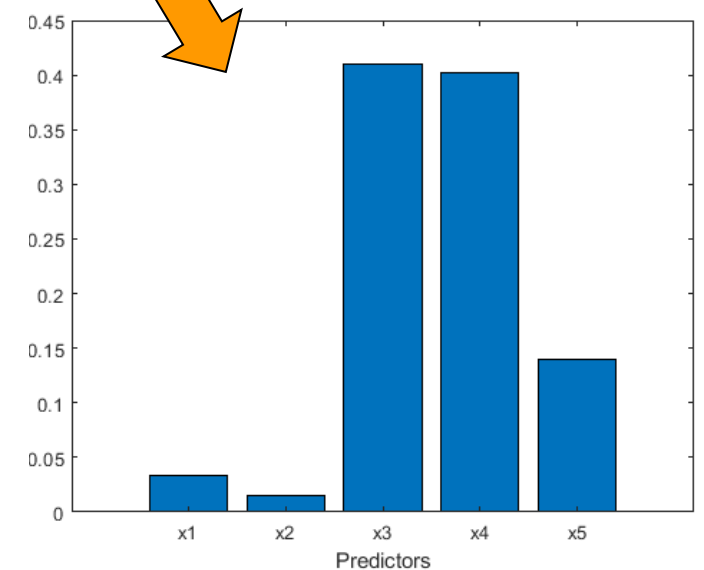
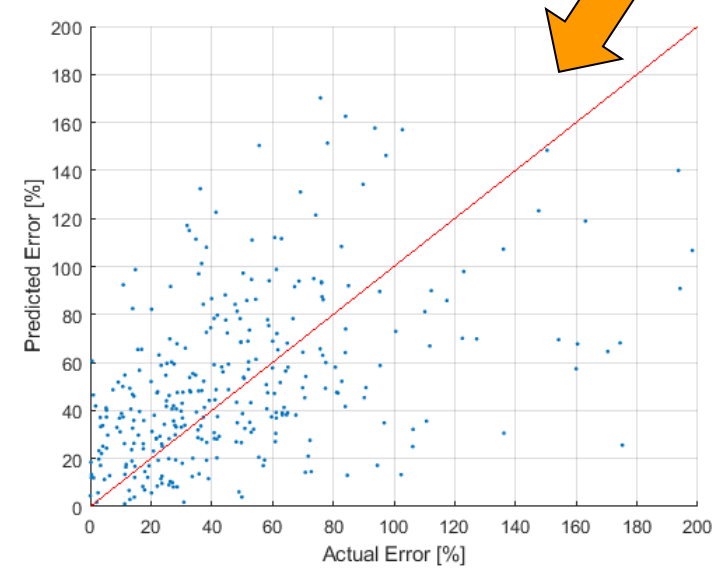
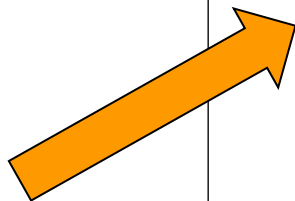
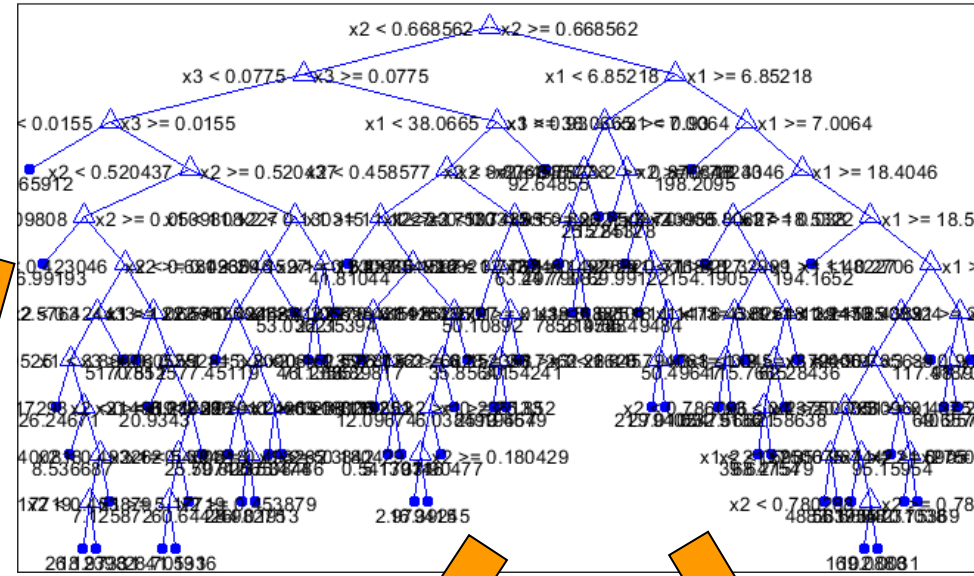
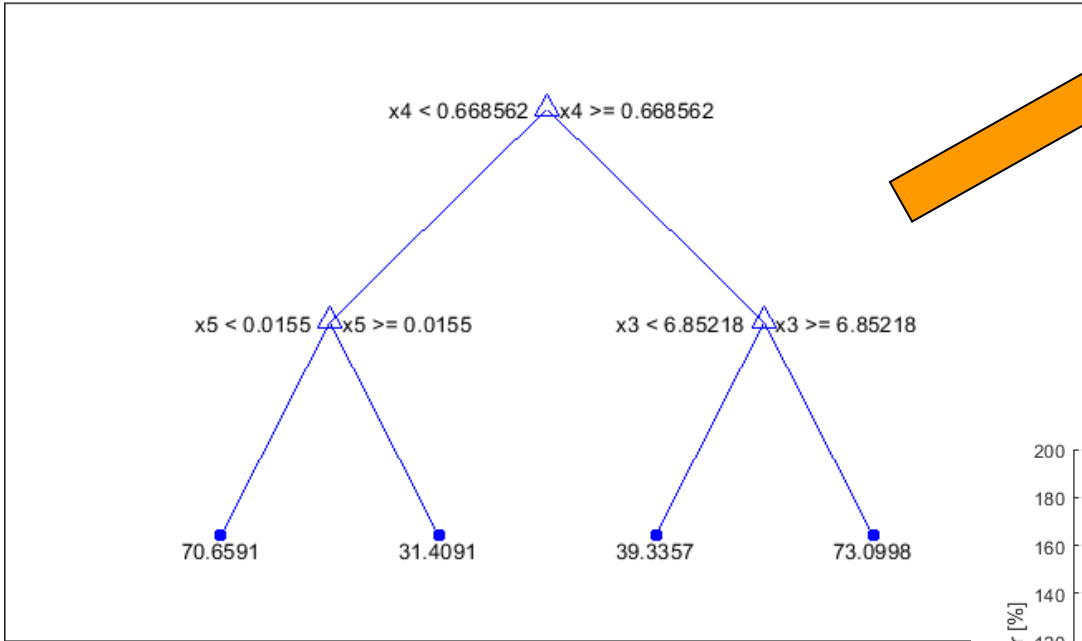
Decision Tree



Decision Tree

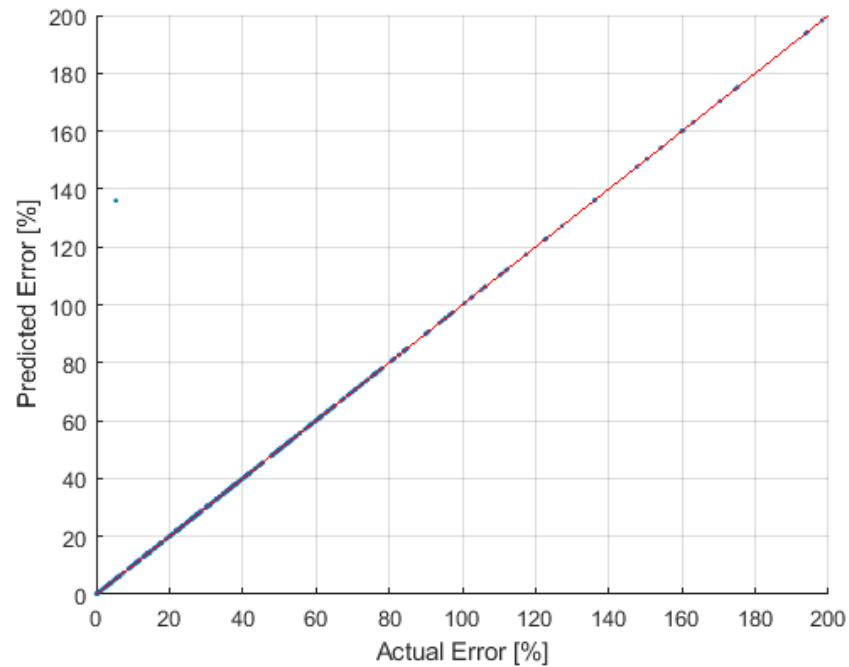


Decision Tree growing



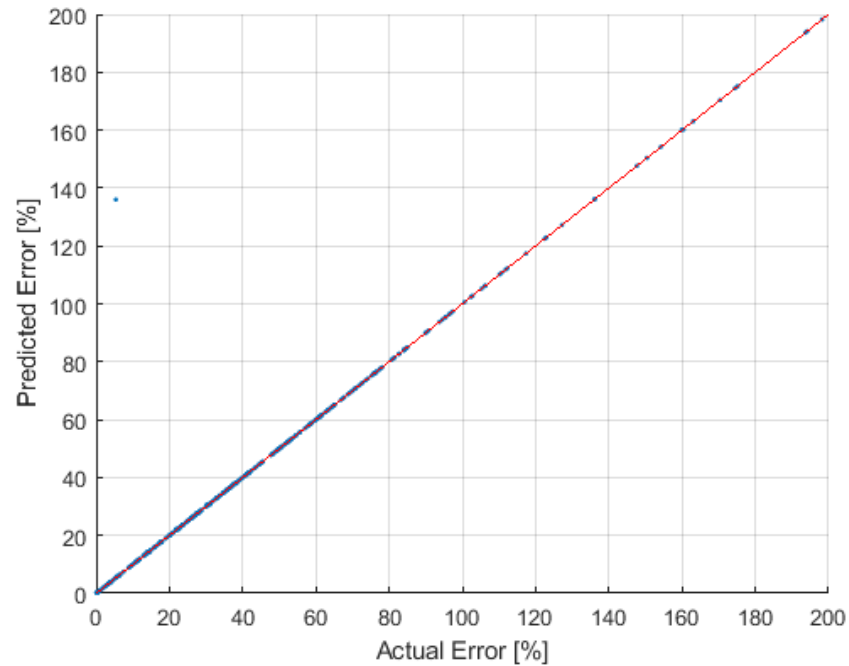
Decision Tree – Overfit

- Perfect fit for training data

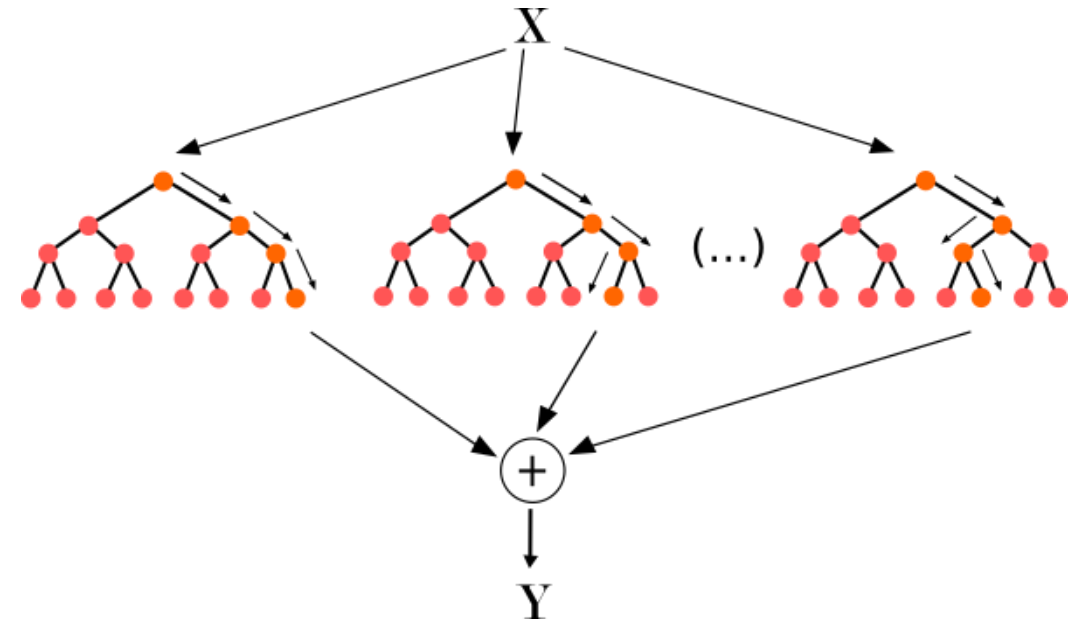


Decision Tree – Overfit

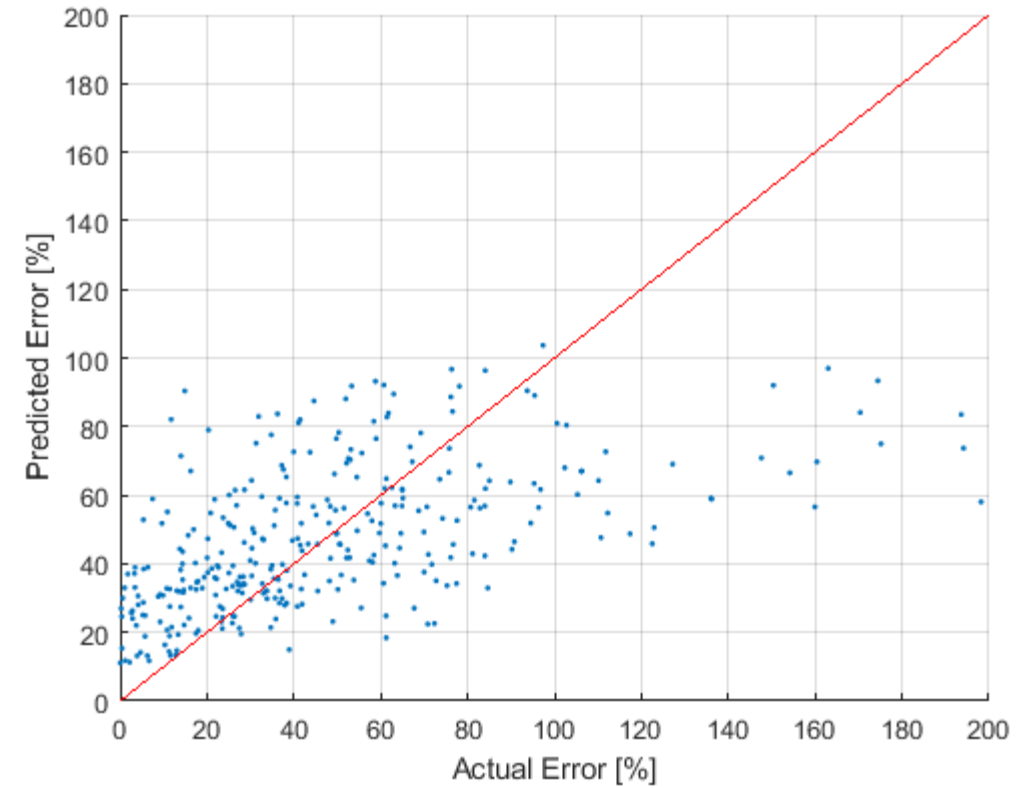
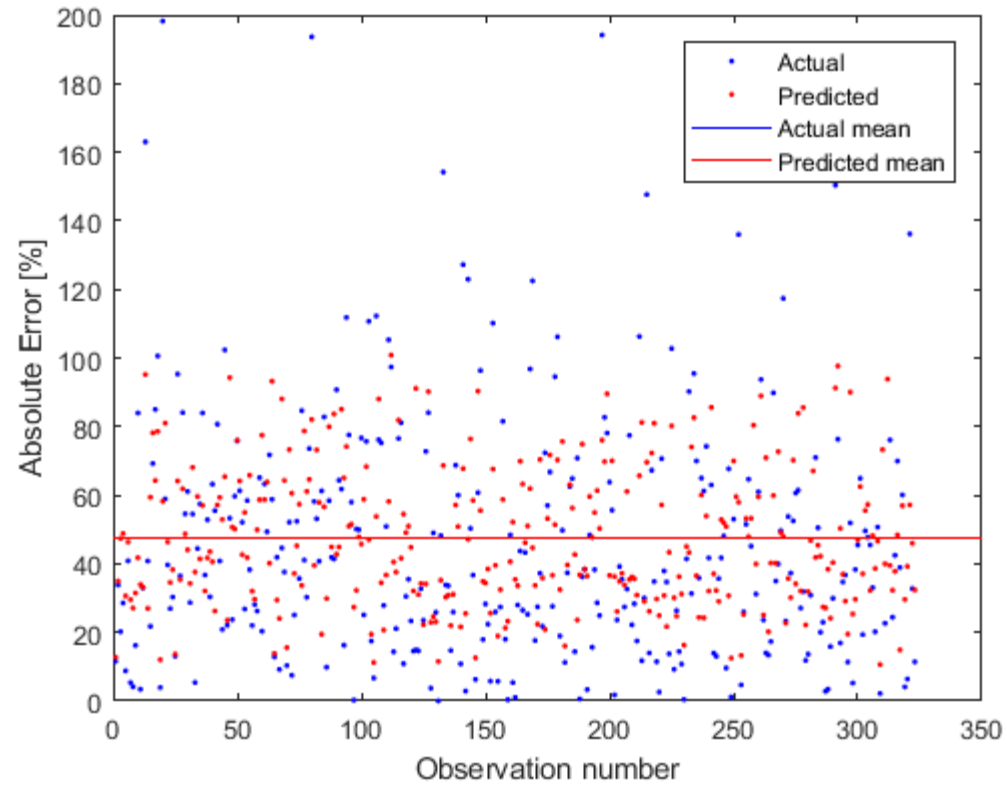
- Perfect fit for training data



- Prune tree
- Force tree to stop growing
- Random forest



Current Results



Thank you

