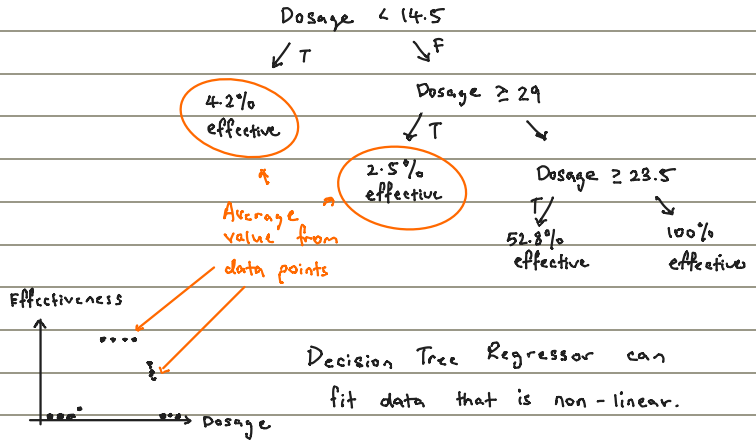
Decision Tree Regressor

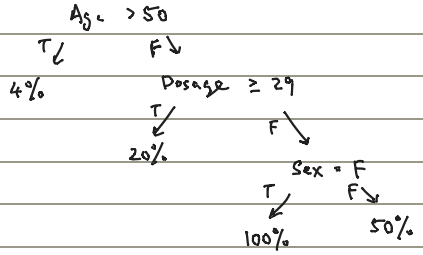
- To make regression prediction that is non-linear.
- Each leaf node is numeric value (prediction)



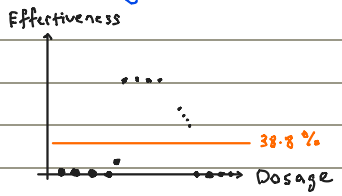
Decision Tree Regressor can fit data that is non-linear.

- can include both continuous & discrete features.

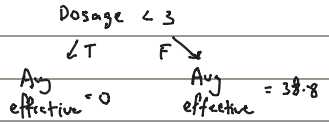
eg:



Building Regression Tree



1. Take first 2 data points & find avg dosage. (initially consider all data points)

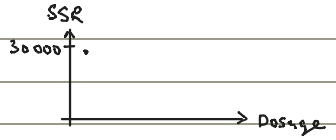


2. Find total Residual for (Dosage < 3) to quantify quality of prediction

$(0-0)^2 + (0-38.8)^2 + (0-38.8)^2 + (5-38.8)^2 + \cdots$

only point with Dosage < 3 ↑ $= 27468.5$

3. Plot sum of squared Residuals vs Dosage threshold



4. Repeat process but within the new threshold window (lesser data points)
5. Choose Dosage with lowest SSR as root node.
6. keep repeating & splitting until node can no longer be split
   - ↳ within specified min no. of data points required
   - All data points have the same target value.

Prevent overfitting

1) Require minimum number of data points before splitting (typically 20)
   ↳ if cannot split, leaf node output will be average of observation.

Categorical feature

- features are encoded then splits are performed similarly using variance reduction