⟨ Bias and Variance - Learning Curve ⟩

- learning curve : a way to help understand how your learning algorithm is doing as a function of the amount of experience it has
  ex) number of training example

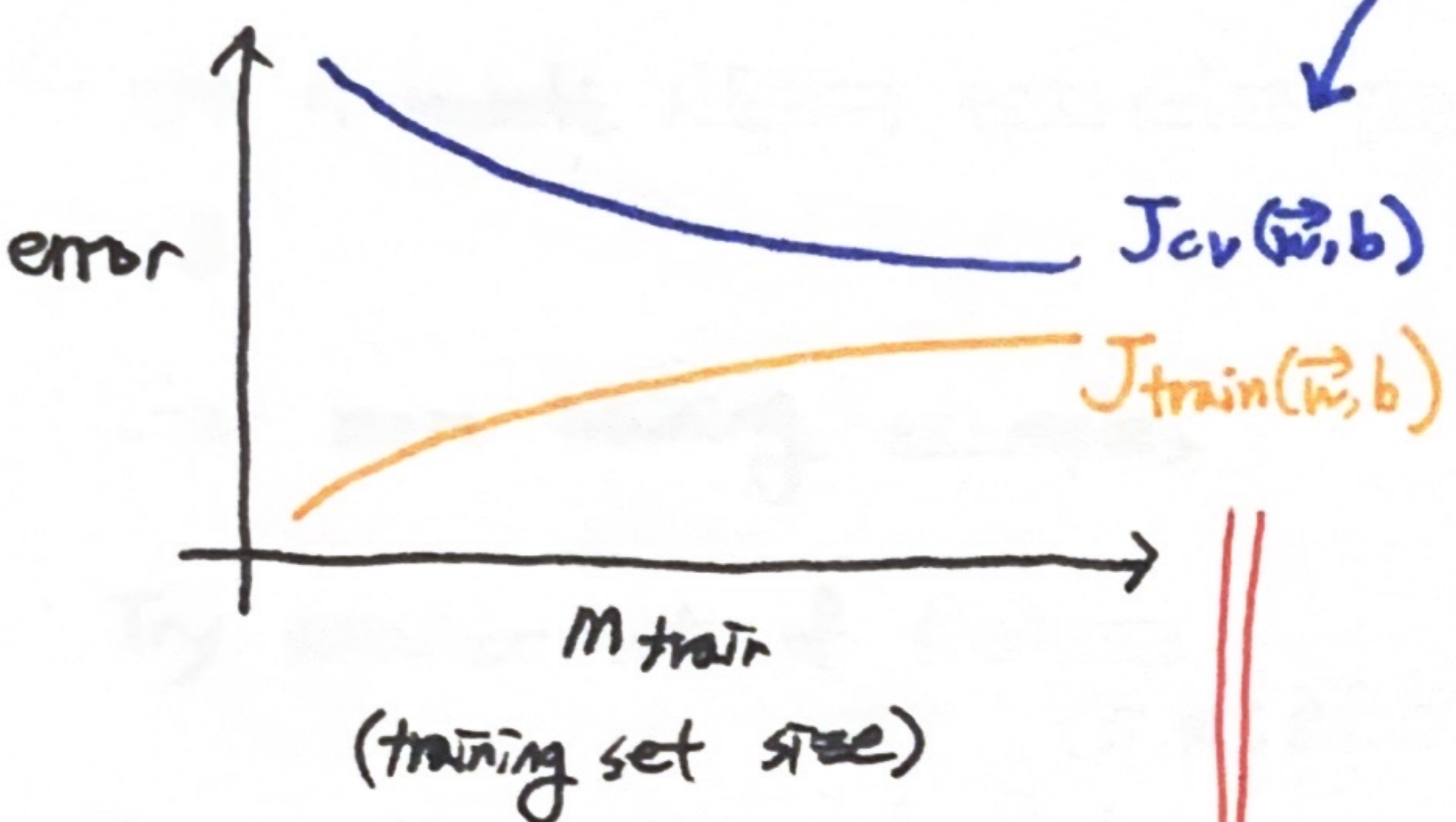
ex)

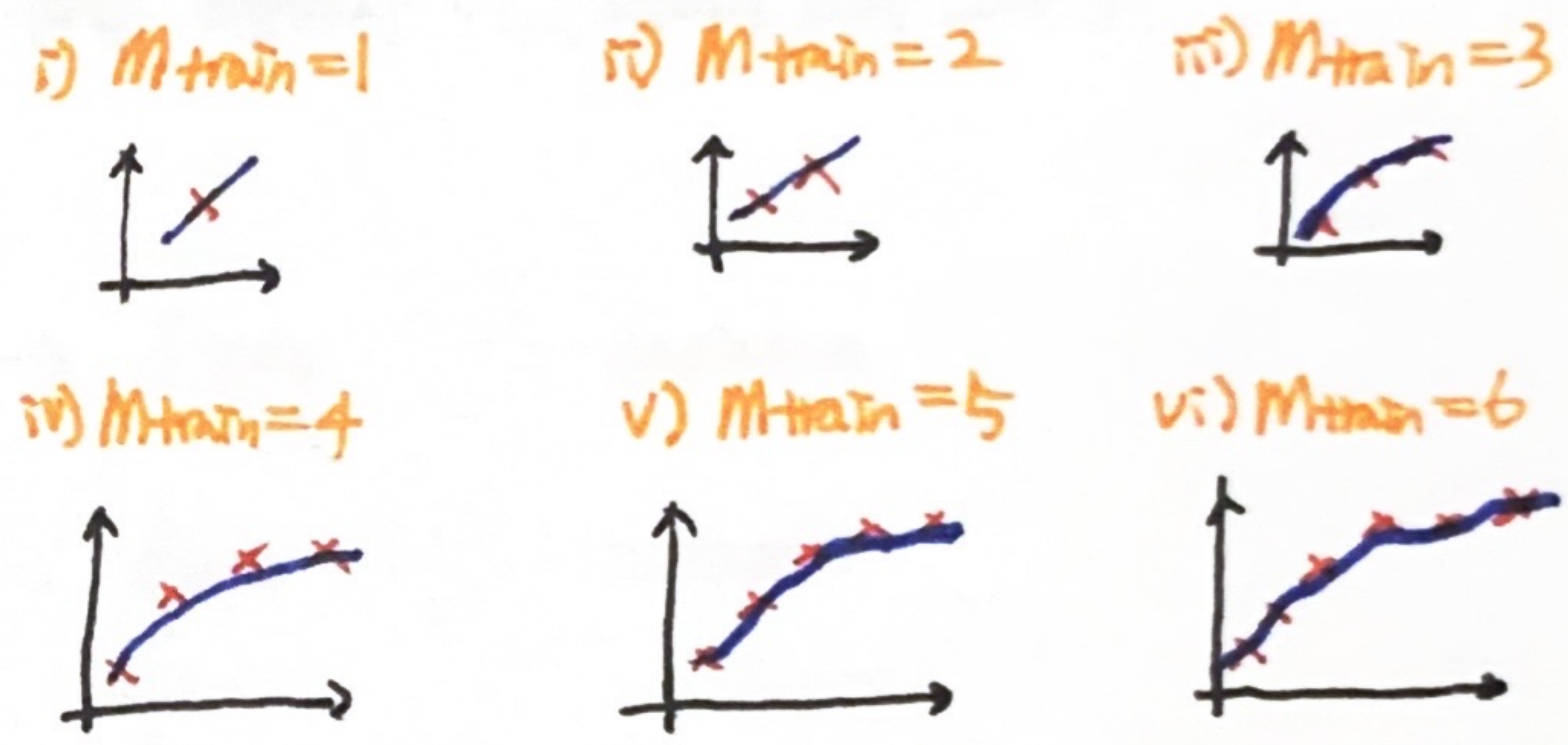
model : $f_{\vec{w},b}(x) = w_1 x + w_2 x^2 + b$

J_{train} : training error

J_{cv} : cross validation error

when training set size gets bigger, then learn better model so Jcv goes down





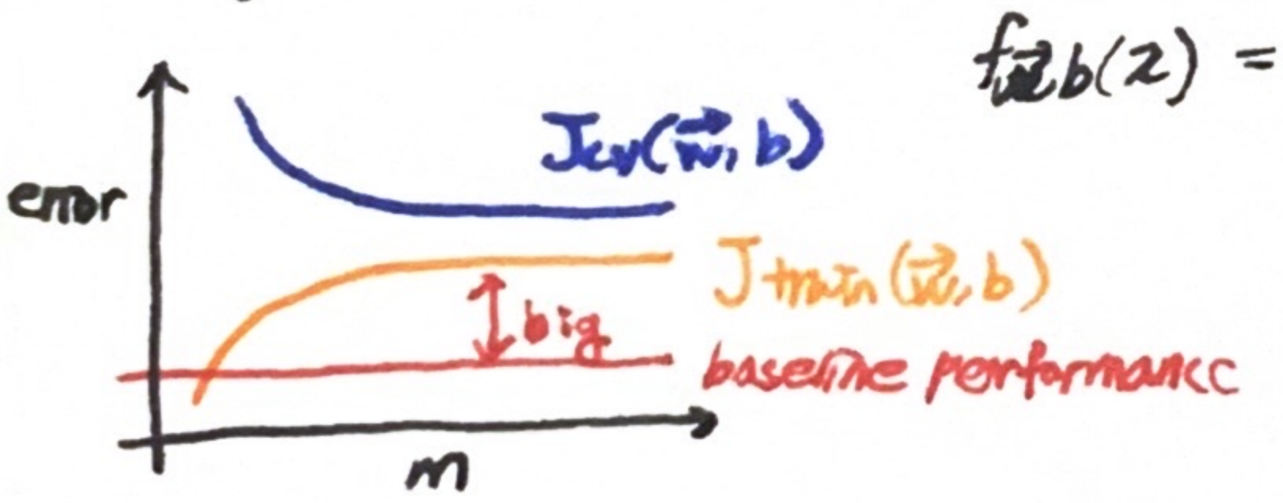
getting harder to fit curve to train set
⇒ "J_{train} increases"

J_{cv} will be typically higher than J_{train}
⇒ ∵ algorithm fit the parameter to train set

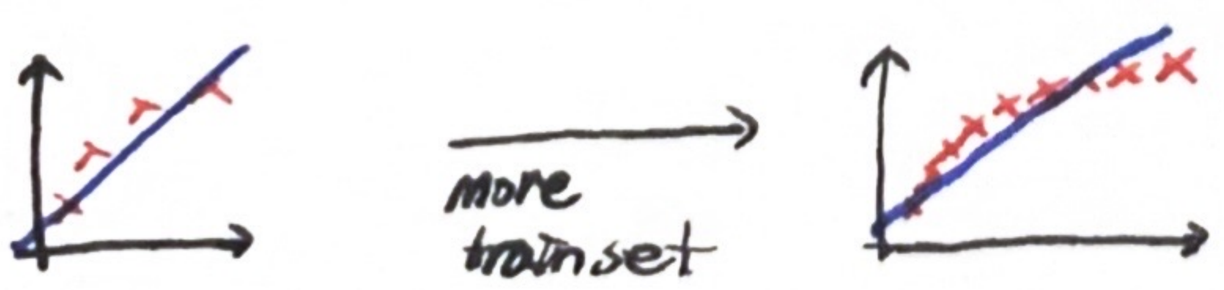
* Learning curve - high bias vs high variance

① High bias

ex) Model : $f_{\vec{w},b}(x) = w_1 x + b$



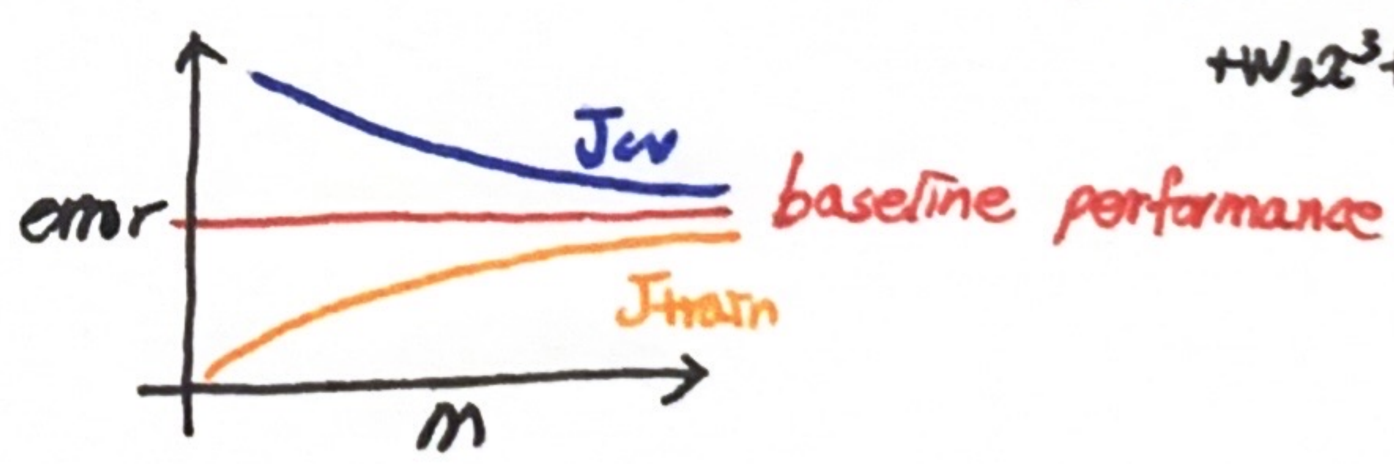
⇒ if a learning algorithm suffers from high bias, getting more training data will not (by itself) help.



no matter how many more examples you add to this figure straight line you're fitting
⇒ it isn't going to get that much better.

② High Variance

ex) Model : $f_{\vec{w},b}(x) = w_1 x + w_2 x^2 + w_3 x^3 + w_4 x^4 + b$



⇒ If a learning algorithm suffers from high variance, getting more training data is likely to help