General approaches for metrics optimization

Overview

- Loss vs metric
- Approaches to metrics optimization in general

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Synonyms: loss, cost, objective

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Custom loss for XGBoost

- **Define an 'objective':**
  - function that computes *first and second order derivatives* w.r.t. predictions.

```
def logregobj(preds, dtrain):
    labels = dtrain.get_label()
    preds = 1.0 / (1.0 + np.exp(-preds))
    grad = preds - labels
    hess = preds * (1.0-preds)
    return grad, hess
```

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- **Optimize another metric, use early stopping**
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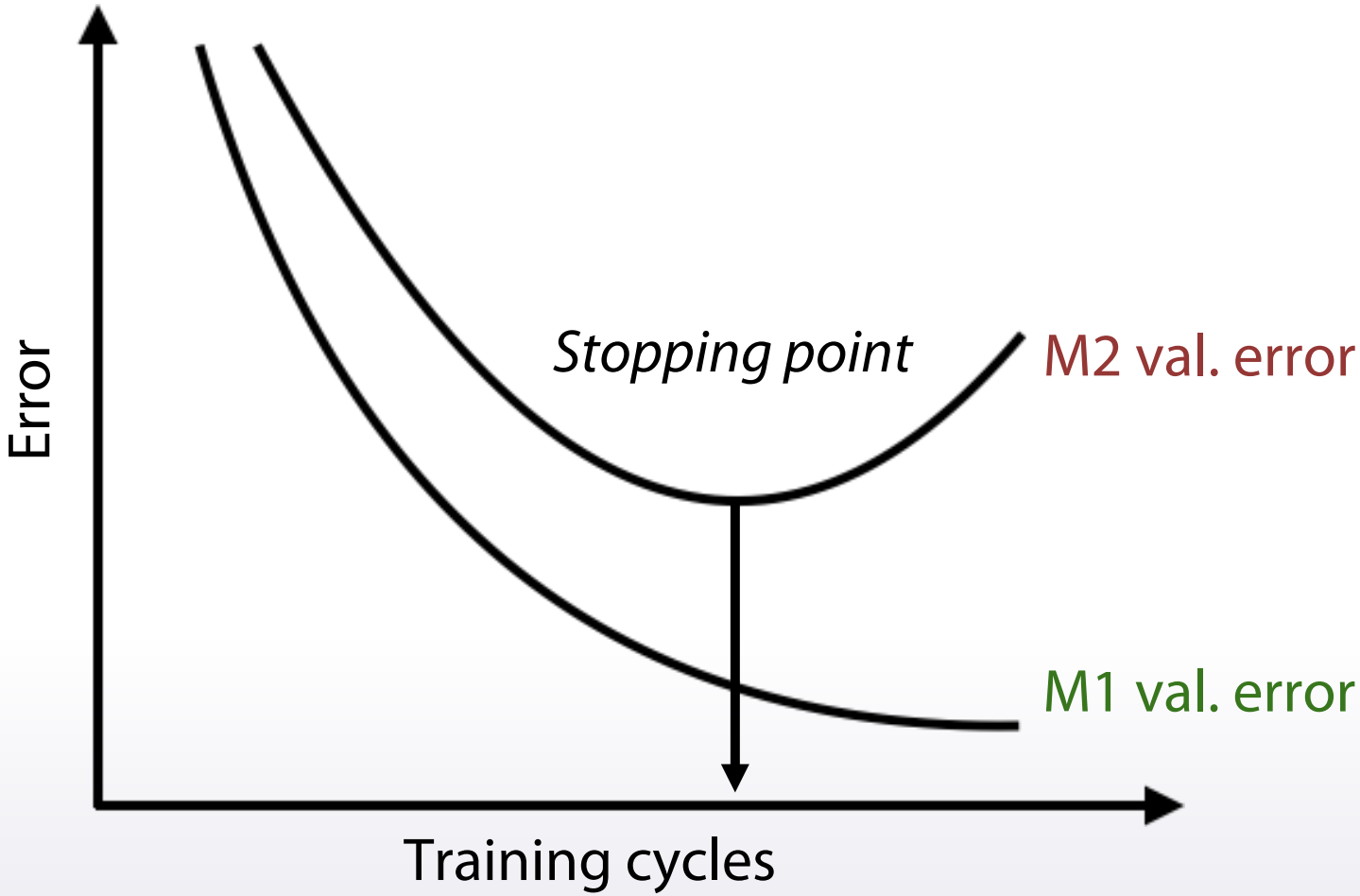
Early stopping

- Optimize metric M1, monitor metric M2
  - Stop when M2 score is the best



Conclusion

- **Loss vs metric**
- **Approaches in general:**
  - Just run the right model
  - Preprocess train and optimize another metric
  - Optimize another metric, postprocess predictions
  - Write a custom loss function
  - Optimize another metric, use early stopping