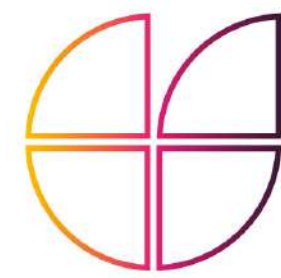


Planter: Seeding Trees Within Switches



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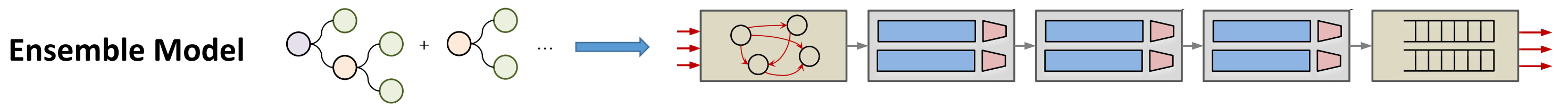
Changgang Zheng

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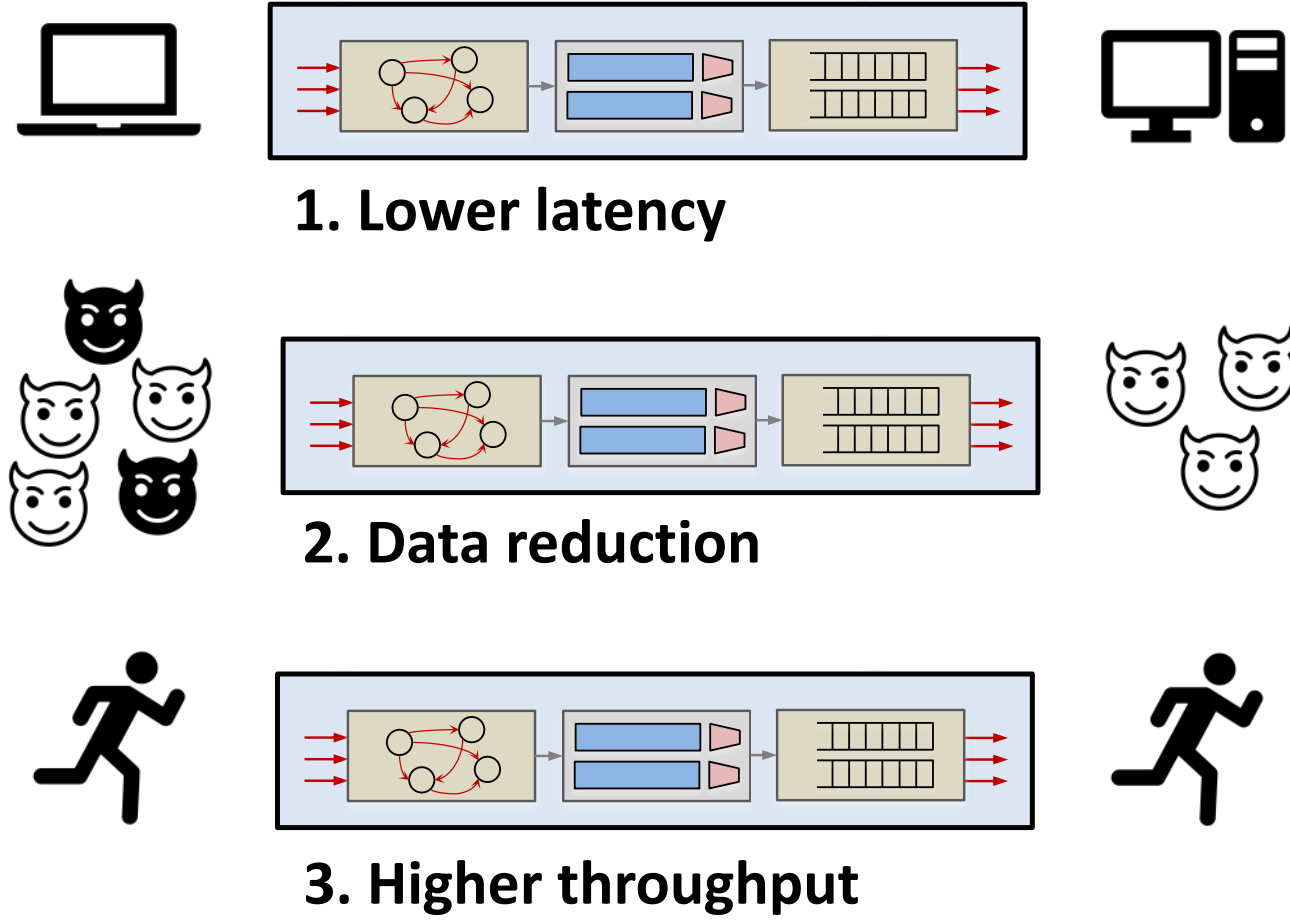
Noa Zilberman

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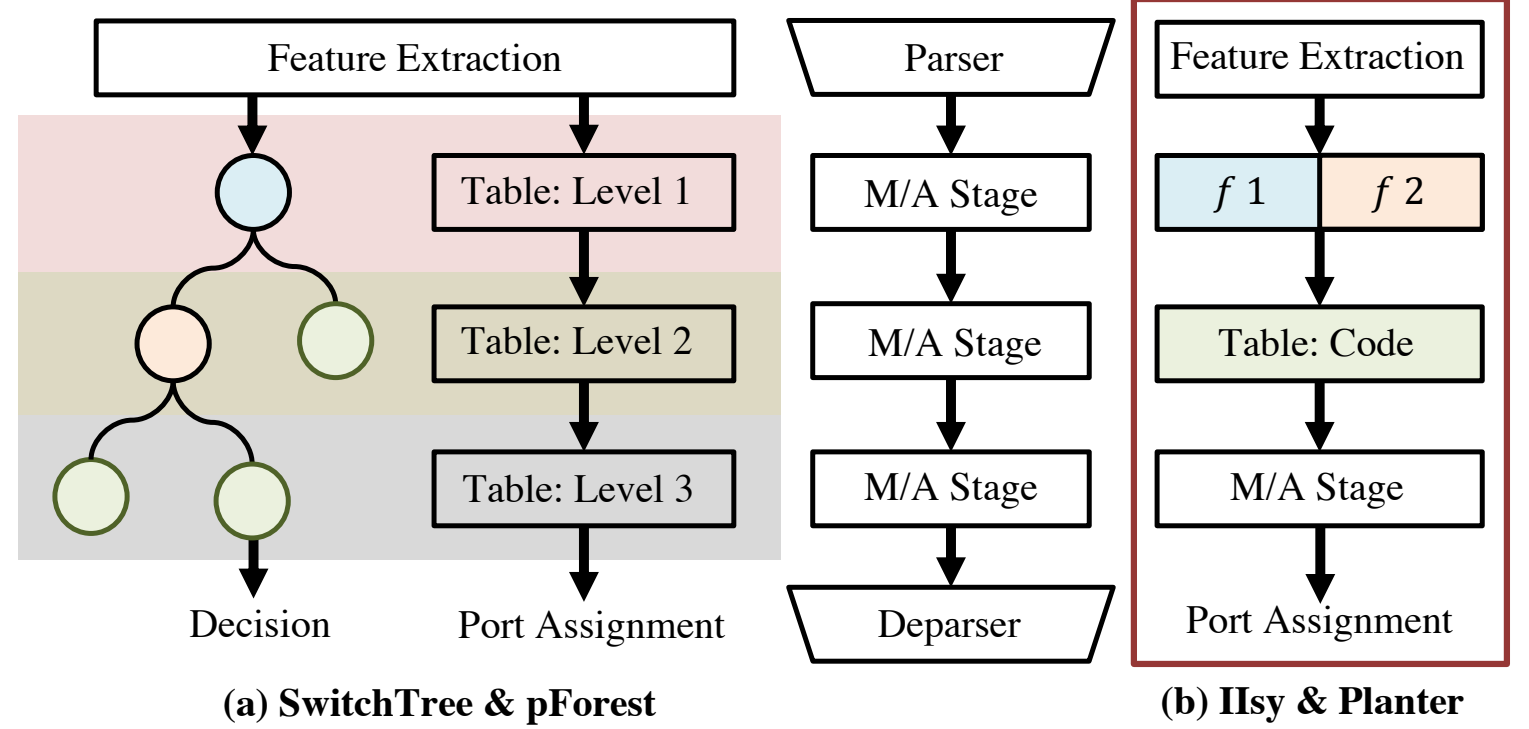
Goal: run tree based ensemble models on programmable network devices



Why In-network classification?

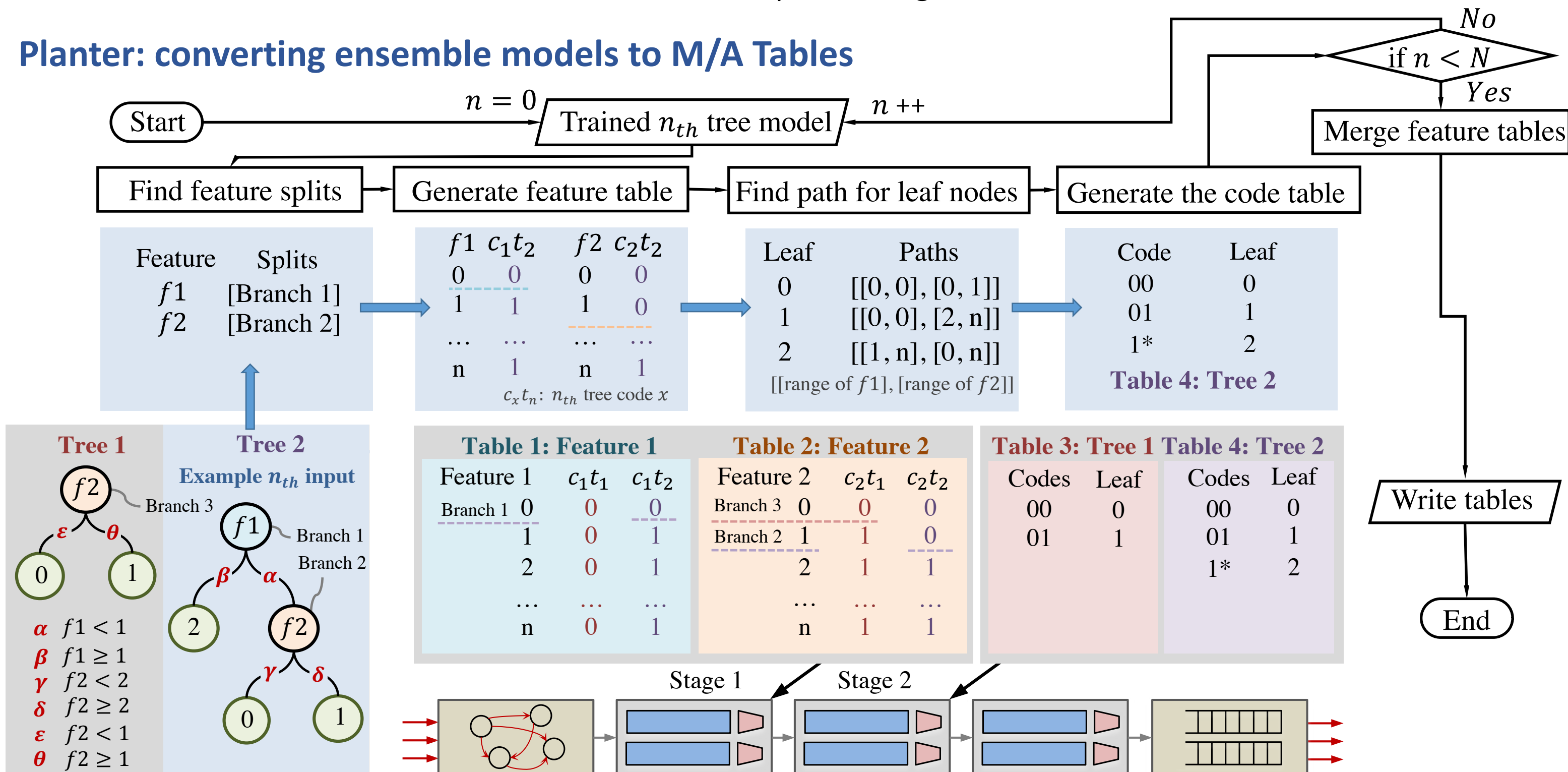


Comparing approaches



(a) **SwitchTree & pForest** use a match-action stage for each level in the tree.
 (b) **IIsy & Planter** use a table per feature, encode the path through the tree.

Planter: converting ensemble models to M/A Tables



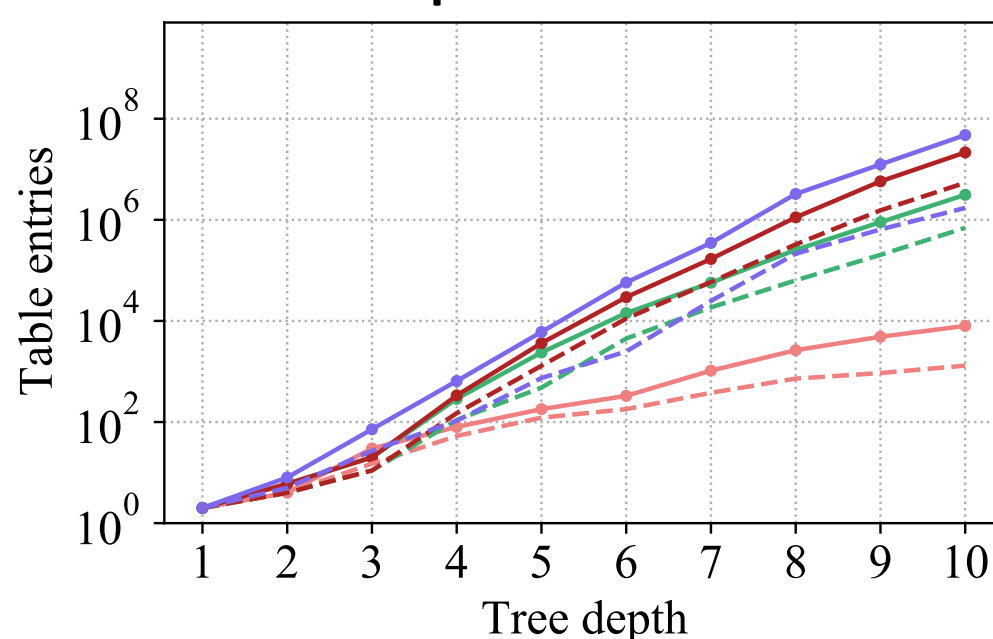
Preliminary results

Anomaly detection (UNSW dataset)

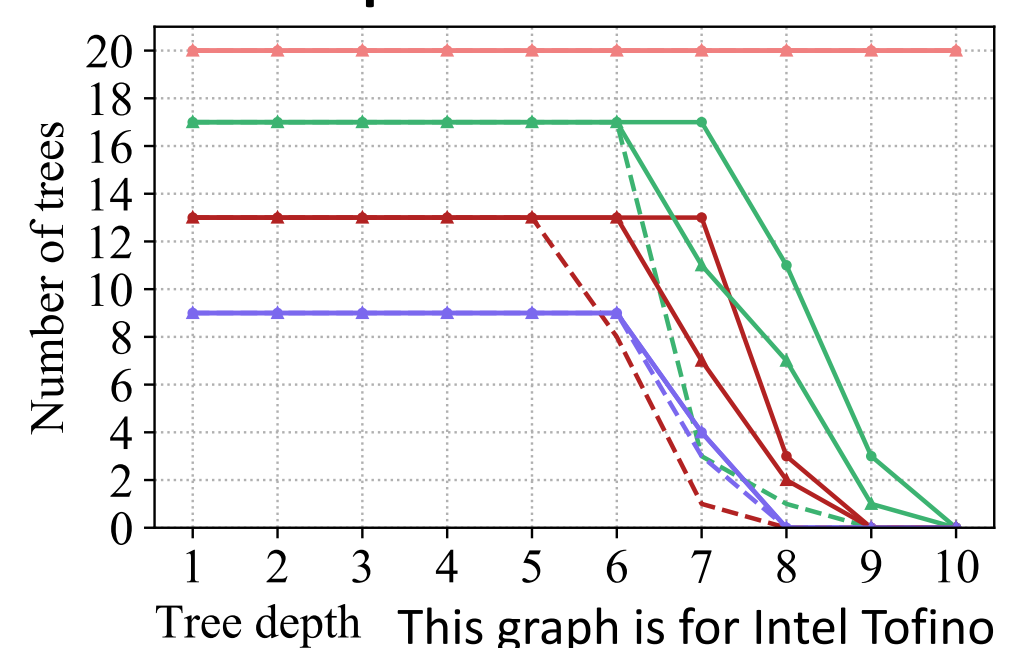
| Model | Trees | Tables | Memory |
|-------|-------|--------|--------|
| RF | 6 | 11 | 6.8% |
| XGB | 6 | 11 | 6.7% |

| Model | F1 | Acc | Baseline |
|-------|-------|-------|----------|
| RF | 96.9% | 97.0% | 98.5% |
| XGB | 96.8% | 96.7% | 98.7% |

Tree depth vs Table entries



Tree depth vs Number of trees



Legend: 3 features exact (red), 4 features exact (green), 5 features exact (orange), 6 features exact (blue), 3 features ternary (dashed red), 4 features ternary (dashed green), 5 features ternary (dashed orange), 6 features ternary (dashed blue)