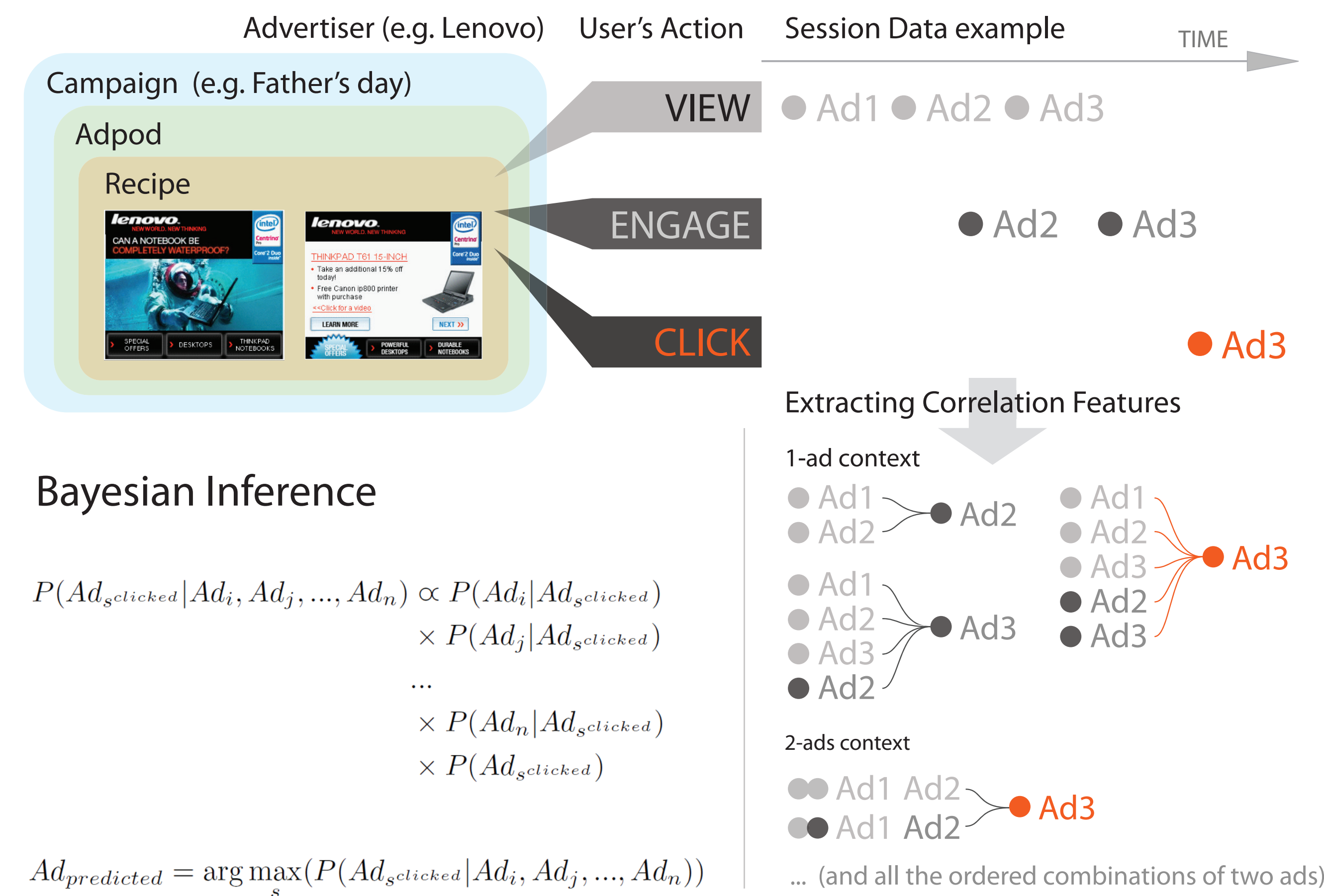# Targeted Online Advertising Based on Historical User Trails

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PROBLEM DEFINITION We aim to provide an effective advertisement selection mechanism which yields the most suitable ad for a user given his/her current session context. The system is based on studying the aggregated user behavior given historic trails.

DATA SET.

One day's advertisement log of one company (154 ads)
6 million views, 260k engagements and 3k clicks

Bayesian Inference

$$P(Ad_{s^{clicked}}|Ad_i, Ad_j, ..., Ad_n) \propto P(Ad_i|Ad_{s^{clicked}})$$
$$\times P(Ad_j|Ad_{s^{clicked}})$$
$$...$$
$$\times P(Ad_n|Ad_{s^{clicked}})$$
$$\times P(Ad_{s^{clicked}})$$

$$Ad_{predicted} = \arg\max_s(P(Ad_{s^{clicked}}|Ad_i, Ad_j, ..., Ad_n))$$

... (and all the ordered combinations of two ads)

APPROACH.

CHALLENGES : Due to low click through rate (<0.5%), the number of useful data points is very less. We measure the correlation of different events such as: non-success (view), partial-success (engage) and success (click) for each ad. By training a Naive Bayes' classifier, we build a prediction model that suggests the ad most likely to be clicked in the current context.

RECIPE ID

AdPod ID
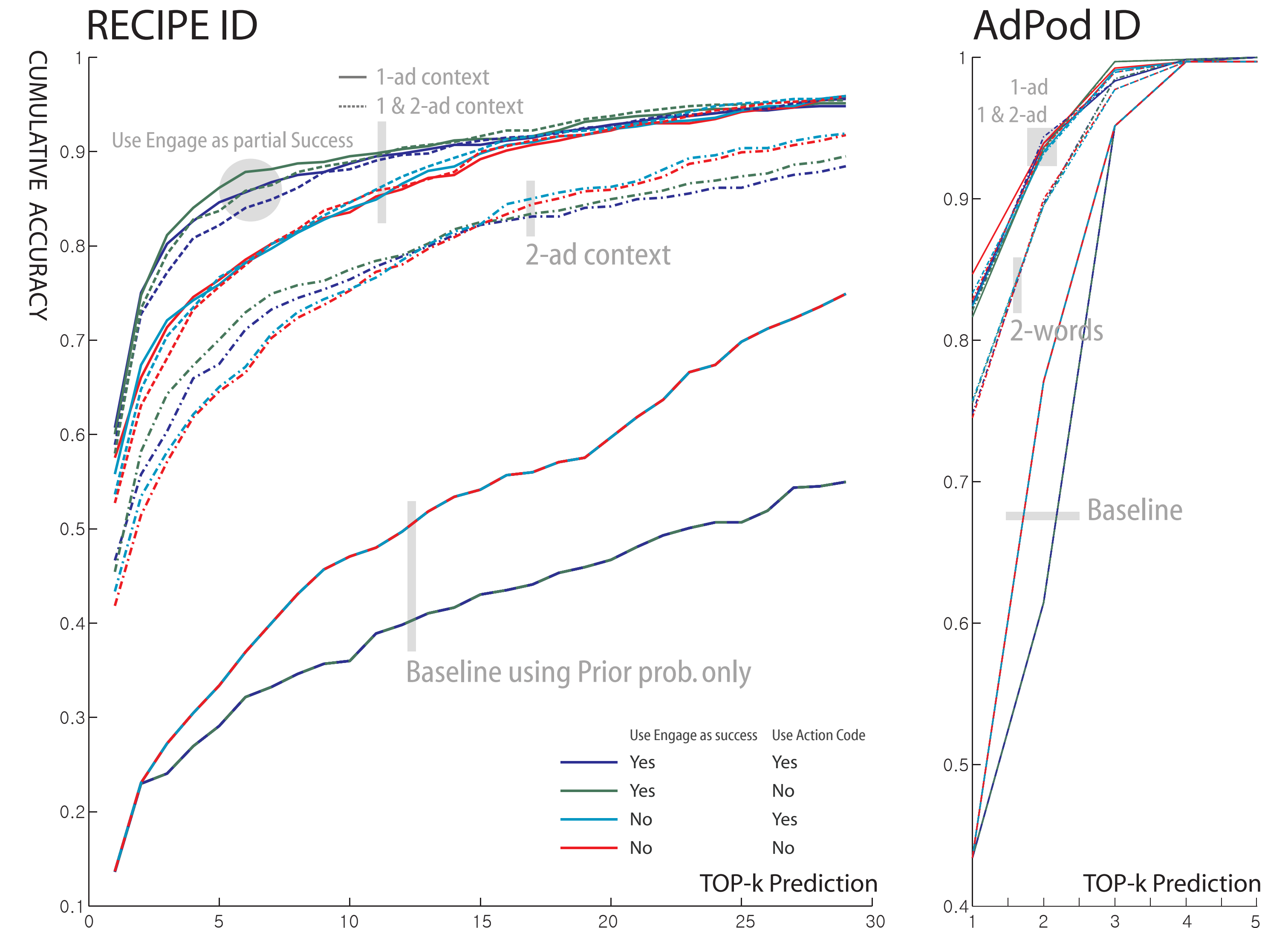
CONCLUSION.

-Different models Outperform baseline (prior based)
-Engagement as partial success increases accuracy.
-More Context can be bad with low data

FUTURE WORK.

1. Graph models with flow propagation for better accuracy.
2. User demographics for a more customized approach.
3. Fast evolving Online (adaptive) models