Continuous Experience-aware Language Model

Subhabrata Mukherjee[†], Stephan Günnemann[‡], Gerhard Weikum[†]
[†]MPI Informatik, [‡]TU Munich

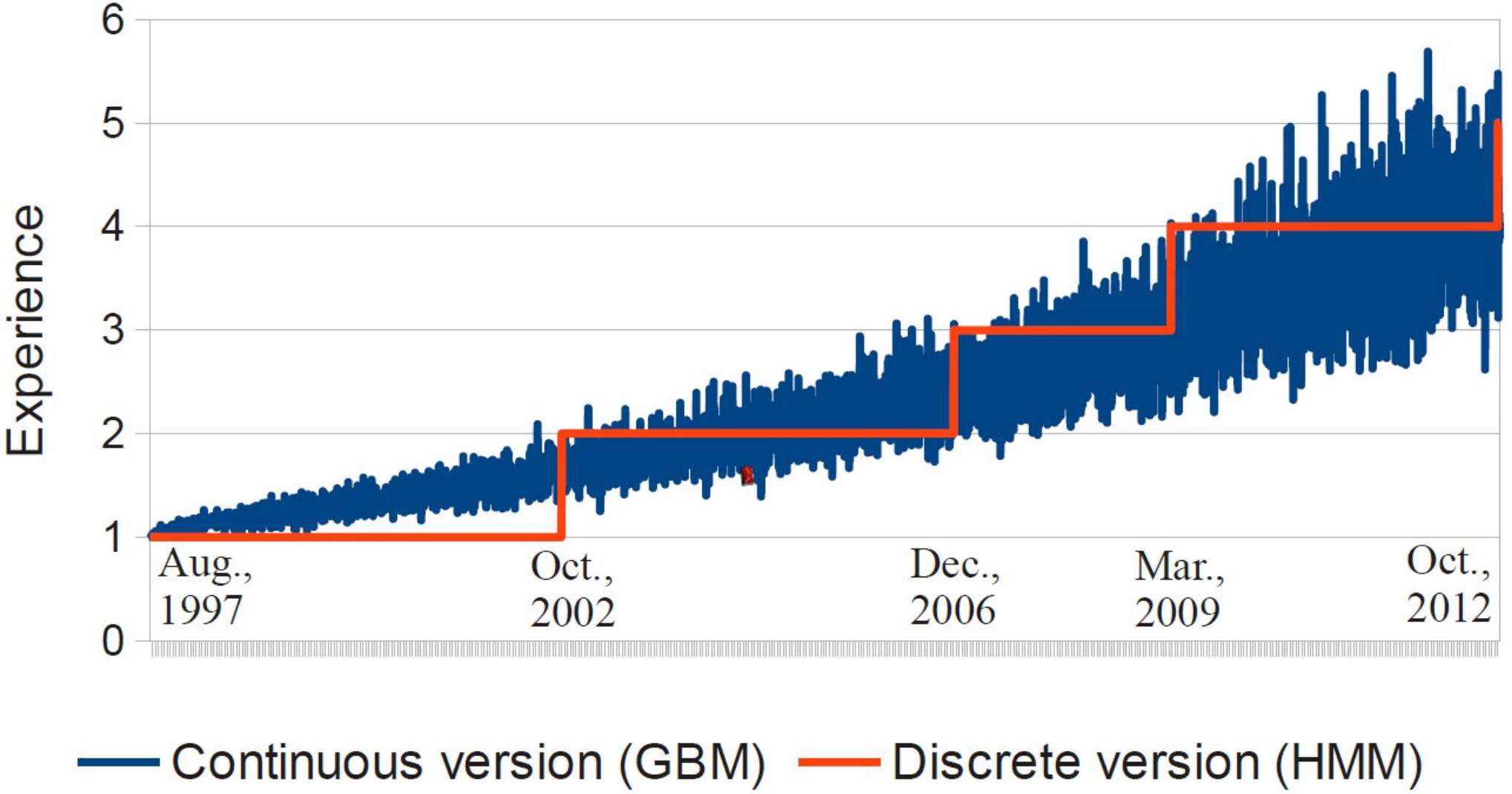
Experience-aware Item Recommendation

- Use-case:
  - i) *Identify* experienced users
  - ii) *Recommend* item based on user's maturity to consume it

  - “My first DSLR. Excellent camera, take great pictures with high definition, without a doubt it makes honor to its name.” *(5)*

  - “The EF 75-300 mm lens is only good to be used outside. The 2.2X HD lens can only be used for specific items; filters are useless if ISO, AP,... are correct. The short 18-55mm lens is cheap and should have a hood to keep light off lens.” *(3)*

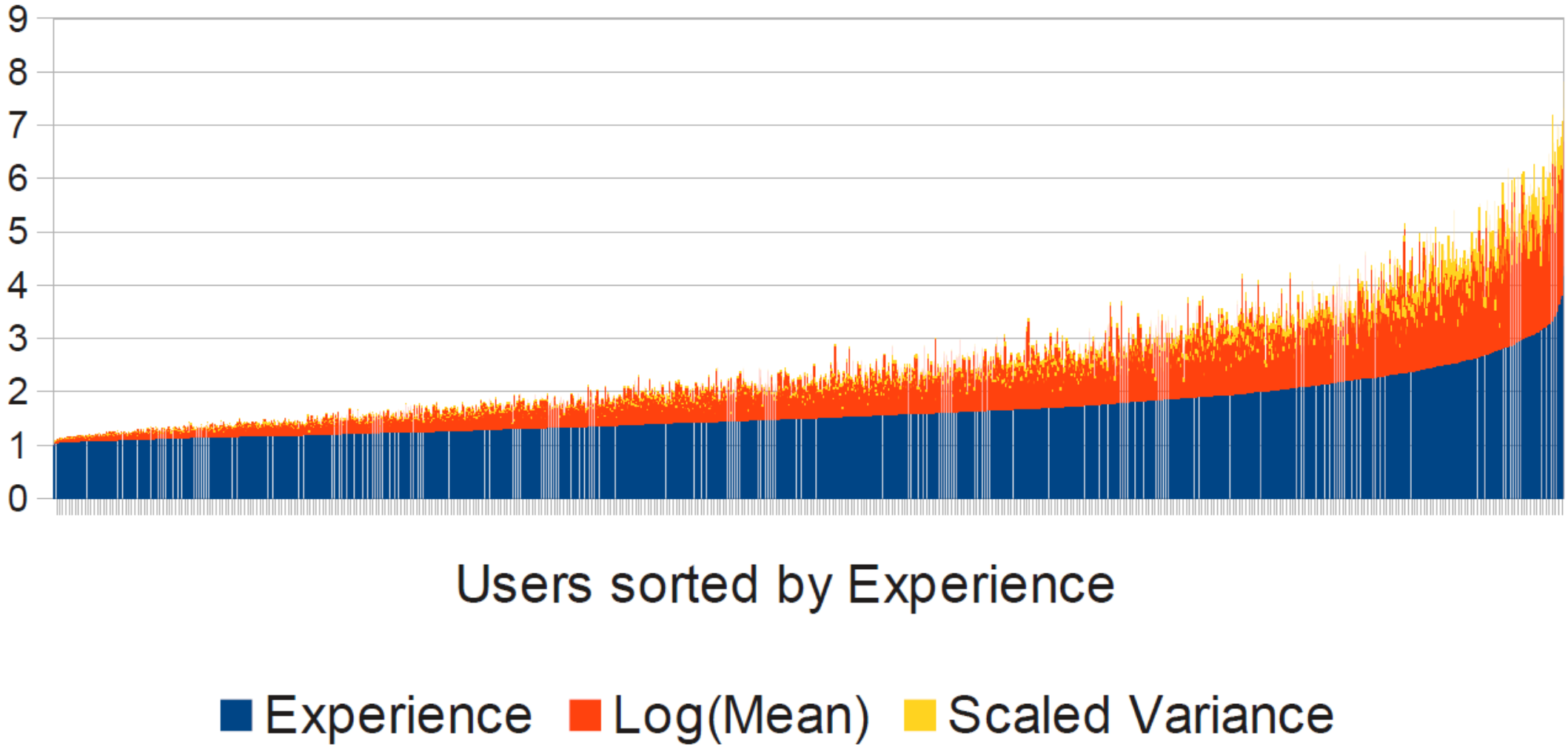
Continuous Experience Evolution



GBM: Geometric Brownian Motion

HMM: Hidden Markov Model

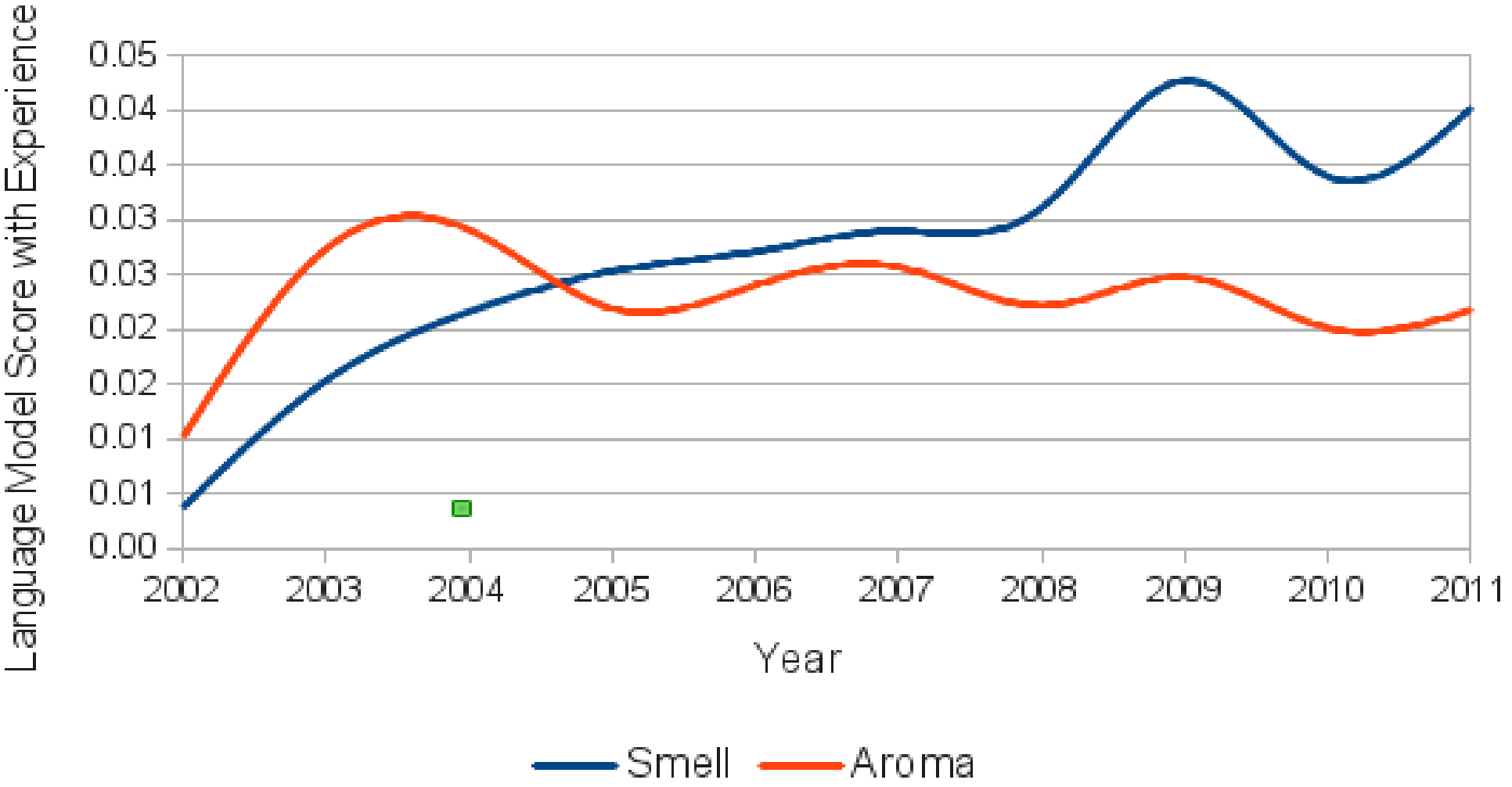
Variation of Experience with Mean and Variance of GBM Trajectory



Continuous Language Model

- Language model (LM) of users change with their (continuous) experience evolution
- Making LM *continuous* is tricky, as words have to be generated from *discrete* Multinomial
- Temporal granularity: LM does not evolve at the same resolution as experience does
- We model these using Brownian Motion

Trace Evolving Norms and Conventions in Community



Top Words by Experienced Users

Most Experience	Least Experience
BeerAdvocate	
chestnut_hued near_viscous rampant_perhaps faux_foreign cherry_wood sweet_burning bright_crystal faint_vanilla boned_dryness woody_herbal citrus_hops mouthfeel	originally flavor color didnt favorite dominated cheers tasted review doesnt drank version poured pleasant bad bitter sweet
Amazon	
aficionados minimalist underwritten theatrically unbridled seamless retrospect overdramatic diabolical recreated notwithstanding oblivious featurettes precocious	viewer entertainment battle actress tells emotional supporting evil nice strong sex style fine hero romantic direction superb living story
Yelp	
rex foie smoked marinated savory signature contemporary selections bacchanal delicate grits gourmet texture exotic balsamic	mexican chicken salad love better eat atmosphere sandwich local dont spot day friendly order sit
NewsTrust	
health actions cuts medicare oil climate major jobs house vote congressional spending unemployment citizens events	bad god religion iraq responsibility questions clear jon led meaningful lives california powerful

Find resources online:

- Paper: http://bit.do/exp-lm-kdd16
- Slides: http://bit.do/exp-lm-slides-kdd16
- Current summary slides: http://bit.do/exp-lm-summary-kdd16