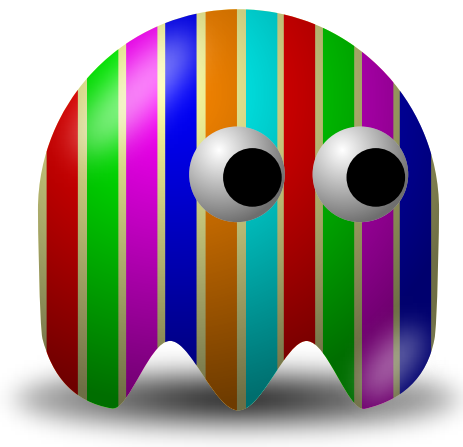
Shifting Experts on Easy Data



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Eternal Dilemma

Worst Case

IID

Huge Difference (Expert Setting Example)

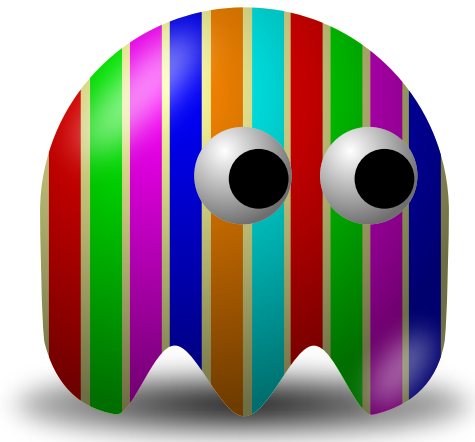
Hedge

$O(\sqrt{T})$

FTL

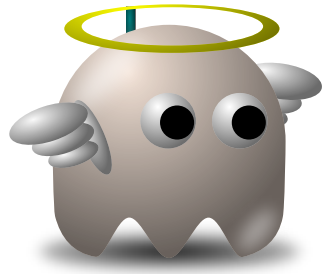
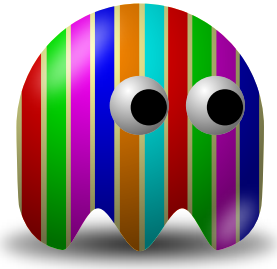
$O(1)$

Holy Grail



Adaptive

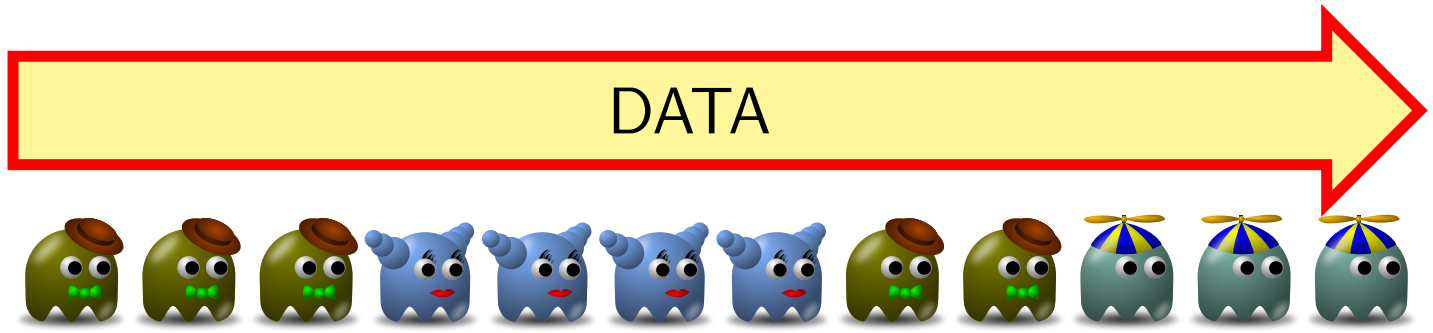
Status Quo

Experts	Hedge	FTL/ERM	FlipFlop
Bandits	EXP3	UCB	SAO
Shifting	Fixed Share	?	?
Freund's Problem	Mixing Past Posteriors	?	?

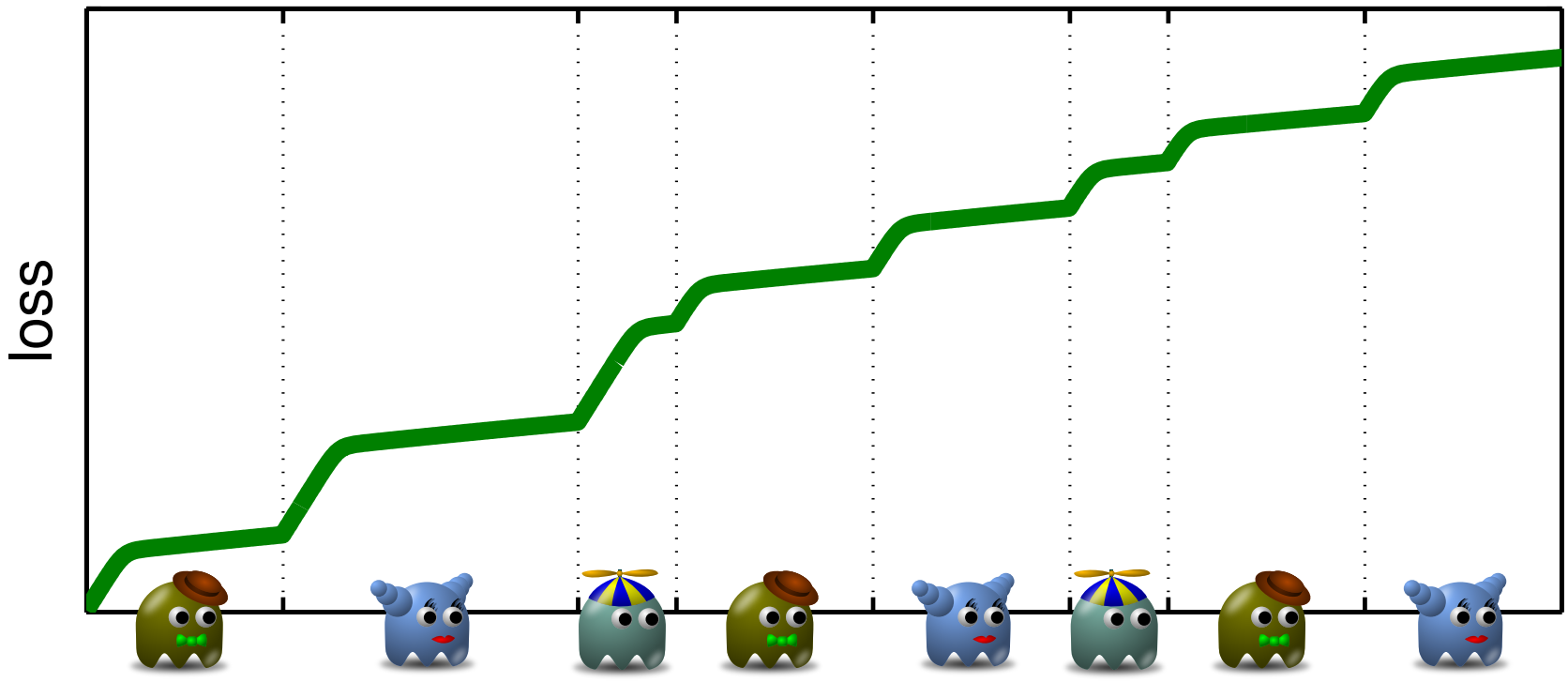
Shifting

Best model (expert) changes over time.



- Optimal algorithm for segment-wise IID data?
  Should pay $O(\ln \#\text{experts})$ per switch
- How to combine it with worst-case robustness?

Freund's Problem: Long-term Memory



- Optimal algorithm for segment-wise IID data?
  Should pay $O(\ln \#\text{good experts})$ per switch
- How to combine it with worst-case robustness?

Candidate Algorithms

For IID shifting:

- FL on the best partition
- FL on a shifting window
- FL on capped loss differences
- FL on exponentially decaying losses
- ...

For IID long-term memory?

The Big Question

Single algorithm for shifting

- worst-case robust
- adaptive to IID data