From Bandits to Experts:
On the Value of Side-Observations

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What We Do

- Sequential decision making: repeatedly choose among $k$ actions
- "Experts" Setting: Learner sees rewards of all actions
- "Bandits" Setting: Learner sees only its own reward

Our (More General) Model

By picking an action, Learner gets side-information on some subset of other actions. Captures:

Experts...

...bandits...

...and in between!
Why

• Captures **structure** between the actions
  – Web Advertising
  – Sensor and communication networks

• **Related work:** Focus on affinity (Bandits in Metric Spaces) or stochastic correlations, while we make no such assumptions
Results

- New Efficient Algorithms
- Regret upper and lower bounds
  - Non-trivial dependence on information feedback structure
- Experiments
- Many open questions!

Come see our poster!