Prediction Markets
# Types of Prediction Markets

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example</th>
<th>Details</th>
<th>Reveals market expectation of…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winner-takes-all</td>
<td>Event $y$: Al Gore wins the popular vote</td>
<td>Contract costs $p \text{, pays $1 if and only if event } y \text{ occurs} \text{, bid according to value of } p</td>
<td>Probability that event $y$ occurs, $p(y)$</td>
</tr>
<tr>
<td>Index</td>
<td>Contract pays $1$ for every percentage point of the popular vote won by Al Gore</td>
<td>Contract pays $y$.</td>
<td>Mean value of outcome $y$: $E[y]$</td>
</tr>
<tr>
<td>Spread</td>
<td>Contract pays even money if Gore wins more than $y^*%$ of the popular vote.</td>
<td>Contract costs $1 \text{, pays } 2 \text{ if } y &gt; y^* \text{, pays } 0 \text{ otherwise. Bid according to the value of } y^*$.</td>
<td>Median value of $y$.</td>
</tr>
</tbody>
</table>
Applications (What can we predict?)

- Financial markets
- Politics
- Current events
- Sports
- Hollywood
- Science and technology events
- Internal company affairs
- ...and more.
Are they accurate?

- Prediction markets from last four U.S. presidential elections have had an average absolute error of ~1.5% in the week leading up to the election. The final Gallup polls for the same period erred by 2.1%.

- Saddam Security matched other metrics (journalist’s estimates of likelihood of war with Iraq, and oil prices) closely.

![Figure 3: Predicting Movie Success](image)
Internal Prediction Markets

- Forecasting printer sales at Hewlett-Packard

- Predicting whether a software project deadline could be met at Siemens
Strengths and Weaknesses

Aggregate opinions and provides incentives for:

- truthful revelation
- research and information discovery

But...

- May be difficult to motivate people to participate in the market.
- Only as good as the information available to the public
Making Inferences

Correlation

- Example: Two contracts where $P$ is the future price of oil
  - One pays $P$ if Saddam is ousted in one year (purchase price refunded otherwise)
  - One pays $P$ if Saddam remains in power in one year (purchase price refunded otherwise)
  - Difference in equilibrium prices reflects market’s expectation of effect of ousting Saddam on oil prices.

Causation

- Still a problem
- Can add more contracts to compensate for additional variables
Discussion

Future applications?

How does this tie back to computer science? How is CS useful in building/running/analyzing prediction markets, and can it benefit from them?