How can computation... help you make decisions?

TV Series Recommendation
Imagine: You’re bored and need a recommendation for a TV series to start watching

Netflix Prize
$1 million prize awarded in 2009
training set included 100 million ratings for 480,000 users and 18,000 movies
Reading for Homework 3: “If You Liked...”

www.nanocrowd.com

Looking for a movie to watch?
- Type the name of a favorite movie, actor, or director.
- Click on results that you like, and "go!"
Tired of deciding if you’ll like a movie? Find out.

www.tastekid.com

Movies that seem to be kind of popular
- Snatch
- A Walk To Remember
- Surfaced
- Spider-Man
- Mean Girls
- X-Men
- American History X

Rotten Tomatoes

How does this program work?

www.jinni.com

TV Series Recommendation System
Flowcharts and Decision Trees: Informal

Flowchart:
- Visual representation of steps of algorithm
- Summarizes how algorithm behaves given specific answers

Decision Tree:
- Flowchart with no actions, just questions
- Shows final decision based on previous answers

Boxes: Represent states (or actions)
Arrows (or edges): Show transitions (or decisions) between states

Decision Trees

Initial State: 

Can we recreate TV decision tree?

Boxes/nodes: Name each something descriptive
Specify question

Lines/edges: Specify answer to move to state

Answer 1, Answer 2, Answer 3

Decision A, Decision B, Decision C

Edges/Arrow: Labeled with different answers
Arrive at later "internal" nodes depending upon previous answers
Different branches can have different # possible answers, depth

Can we recreate TV decision tree?

Initial State:

Drama or Comedy or Not Sure?

Drama: Sci Fi or Not?

Comedy: Improv or Scripted?

Desperate Housewives

Battlestar Galactica, The Wire, Curb Your Enthusiasm, The Office
How to Implement Decision Tree?

Initial State:
- Drama or Comedy or Not Sure?

Drama: Sci Fi or Not?
- Battlestar Galactica
- The Wire
- Curb Your Enthusiasm
- The Office

Comedy: Improv or Scripted?
- Curb Your Enthusiasm
- The Office
- Desperate Housewives

When in initial state:
- "Ask question…"
- If answer is D, go to state Drama
- If answer is C, go to state Comedy
- If answer is N, go to state Desperate

When in state Drama:
- "Ask question…"
- If answer is Y, go to state Battlestar
- Else, go to state Wire

Essential Control Constructs:
- If then else

Implement the Decision Tree?

How to Use If-Then (Else)

Cat Sprite
- Moves with arrow keys
- Meow when mouse is down (not when cat clicked)
- Weird color when on edge of stage; otherwise orange
Design your own Design Tree?

Challenge: Construct a decision tree with only yes/no questions leading to one TV show. Find the smallest number of questions to choose between 8 movies.

Some questions are much better than others!

Poor Questions: Need to ask a lot


Very poor if thousands of TV shows to pick from!

Good Questions: Need to ask only very few!

1) Some great yes/no question... 2) Some great yes/no question... 3) Some great yes/no question...

Goal: Find questions that divide choices into two equal-sized groups

Decision Trees Everywhere

Decision trees represent many activities
Choose Your Own Adventure

In paperback book:
- Pages in book represent different states (Nodes)
- Turn to different page for different decisions (Edges)
Cave of Time Decision Tree

Decision Trees: Straight-forward to Specify

Easy to implement in many frameworks

Basic format:
- State X:
  - if (decision A) goto state Y
  - if (decision B) goto state Z

Structure web pages to form tree:
- Current page is current state
- Click on different links to bring you to different pages

Example:
http://editthis.info/choose_your_own_adventure/Paladin

Programming Concepts

General advice
- Divide high-level functionality into logical units (e.g., scenes)
- Use descriptive names (messages)
- Specify initial state (what program looks like when started)
- Incrementally test code as you go
- Make “non-fragile” code

Control flow
- Scripts must be activated to run
  - When flag clicked; When receive message
- Execution within script proceeds sequentially
- forever, repeat, repeat until, if <expr> then <action1> else <action2>

Data Types: Strings (list of characters, words)
- Ask questions: User types string stored in variable “answer”
- String manipulation: letter <op> of <string>
Announcements

HW 3 due Monday
  • Create: Interactive story (see example)
  • Draw corresponding decision tree
  • Explore: Movie recommendation systems

Thursday: BYOL (Laptop) Day
  • How to make your program remember – Variables!