Delivering Effective Presentations

Joanna Wolfe, PhD
Director, Global Communication Center
The Global Communication Center
Director, Joanna Wolfe, Ph.D.
www.cmu.edu/gcc
Delivering an Effective Presentation

1. The problem with PowerPoint
2. The solution: the Assertion Evidence Model
3. A structure for your “critique” presentation
4. Draft & practice the opening to your critique
The Problem with PowerPoint
Motivations for Deep Architectures

- Insufficient depth can hurt
  - With shallow architecture (SVM, NB, KNN, etc.), the required number of nodes in the graph (i.e. computations, and also number of parameters, when we try to learn the function) may grow very large.
  - Many functions that can be represented efficiently with a deep architecture cannot be represented efficiently with a shallow one.

- The brain has a deep architecture
  - The visual cortex shows a sequence of areas each of which contains a representation of the input, and signals flow from one to the next.
  - Note that representations in the brain are in between dense distributed and purely local: they are sparse: about 1% of neurons are active simultaneously in the brain.

- Cognitive processes seem deep
  - Humans organize their ideas and concepts hierarchically.
  - Humans first learn simpler concepts and then compose them to represent more abstract ones.
  - Engineers break-up solutions into multiple levels of abstraction and processing
Within the Computer Science discipline, in the field of Artificial Intelligence, Deep Learning is a class of Machine Learning algorithms that are in the form of a Neural Network.

Deep Learning
- Multilayered neural network
- Requires vast amount of data
Digital Acquisition System Sampling

- Vibration measured by accelerometer
  - Analog voltage produced
  - Sinusoidal shape
- Analog signal converted to digital signal
- Signal sampled at a specific rate
- Rate $\rightarrow$ high enough to retain analog shape

[Alley, 2013]
Deep learning is modeled on the brain’s multi-layered, sparse, hierarchical, structure.
A digital acquisition system has to sample at a rate fast enough to retain the shape of the analog signal.
PowerPoint’s default designs wrongly push users to phrase headings and bulleted lists.

**Mineral Economics**

- Free Market:
  - Plentiful mineral resource
    - cheap
    - supply exceeds demand
  - Resource becomes scarce
    - price increases
    - Demand exceeds supply

**Digital Acquisition System**

- Accelerometer outputs an analog voltage
- Hardware converts analog signal to digital
- Computer samples a number of points
  - Data is exported to popular applications
    - Microsoft Excel
    - Matlab
Today’s presentation introduces a new model of slide design backed by research
Today’s presentation introduces a new model of slide design backed by research:

The Assertion-Evidence Model
Students in a geological sciences class did better on tests with the assertion-evidence design.
Engineering students also did better on tests with the assertion-evidence design.
Engineering students who created assertion-evidence slides learned the material better.
CMU grad students using assertion-evidence gave more effective conference presentations.
PowerPoint’s default designs wrongly push users to phrase headings and bulleted lists.

**Mineral Economics**

- Free Market:
  - Plentiful mineral resource
    - cheap
    - supply exceeds demand
  - Resource becomes scarce
    - price increases
    - Demand exceeds supply

**Digital Acquisition System**

- Accelerometer outputs an analog voltage
- Hardware converts analog signal to digital
- Computer samples a number of points
  - Data is exported to popular applications
    - Microsoft Excel
    - Matlab
By contrast, assertion-evidence combines complete sentence headings and visual evidence.

Deep learning is modeled on the brain’s multi-layered, sparse, hierarchical, structure.
The A-E model is based on dual coding theory, which suggests pairing **visual** and **verbal** inputs improves retention.
An ideal sentence heading is two lines long, left aligned, ~32 pt font

Deep learning is modeled on the brain’s multi-layered, sparse, hierarchical, structure.
We use sentence headings with both topical and data-driven slides
Sometimes it is hard to think of a visual for a topic-driven slide
In this case, consider using just a single sentence rather than a “decorative” visual.
But data-driven slides should always have a visual and a main sentence assertion.
Ulcer recurrence with ranitidine vs. triple therapy treatments
Triple therapy reduced ulcer recurrence

Ulcer recurrence with ranitidine vs. triple therapy treatments
Triple therapy reduced ulcer recurrence

Triple therapy vs. Ranitidine only treatments

Ulcer recurrence with ranitidine vs. triple therapy treatments
The experimental group outperformed the control group on all three measures.
Project risk is highest just before injection stops
Project risk is highest just before injection stops

Conceptual model of risk over lifetime of project
Think of this assertion heading like a newspaper headline.
Think of this assertion heading like a newspaper headline

Brazil vs. Italy in World Cup
Think of your story like a newspaper headline

❌ Brazil vs. Italy in World Cup

✅ Brazil defeats Italy to win World Cup
Results

Table 1: Results of Fog Warning System Implementation

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average vehicle speed</td>
<td>45.5 mph</td>
<td>45.7 mph</td>
</tr>
<tr>
<td>Standard deviations in vehicle speed</td>
<td>9.4 mph</td>
<td>7.2 mph</td>
</tr>
</tbody>
</table>
The fog warning system reduced deviations in vehicle speed, producing safer conditions

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average vehicle speed</td>
<td>45.5 mph</td>
<td>45.7 mph</td>
</tr>
<tr>
<td>Standard deviations in vehicle speed</td>
<td>9.4 mph</td>
<td>7.2 mph</td>
</tr>
</tbody>
</table>
## Results on the ILSVRC-2010 dataset

<table>
<thead>
<tr>
<th>Model</th>
<th>Top-1</th>
<th>Top-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparse Coding (Lin et al., 2010)</td>
<td>47.1</td>
<td>28.2</td>
</tr>
<tr>
<td>SIFT + Fisher Vectors (Sanchez and Perronnin, 2011)</td>
<td>45.7</td>
<td>25.7</td>
</tr>
<tr>
<td>Conv Net + dropout (Krizhevsky et al., 2012)</td>
<td>37.5</td>
<td>17.0</td>
</tr>
</tbody>
</table>
Convolutional nets with dropout outperform other methods by a large margin

<table>
<thead>
<tr>
<th>Model</th>
<th>Top-1</th>
<th>Top-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparse Coding (Lin et al., 2010)</td>
<td>47.1</td>
<td>28.2</td>
</tr>
<tr>
<td>SIFT + Fisher Vectors (Sanchez and Perronnin, 2011)</td>
<td>45.7</td>
<td>25.7</td>
</tr>
<tr>
<td>Conv Net + dropout (Krizhevsky et al., 2012)</td>
<td>37.5</td>
<td>17.0</td>
</tr>
</tbody>
</table>
Convolutional nets with dropout outperform other methods by a large margin

<table>
<thead>
<tr>
<th>Model</th>
<th>Top-1</th>
<th>Top-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparse Coding (Lin et al., 2010)</td>
<td>47.1</td>
<td>28.2</td>
</tr>
<tr>
<td>SIFT + Fisher Vectors (Sanchez and Perronnin, 2011)</td>
<td>45.7</td>
<td>25.7</td>
</tr>
<tr>
<td>Conv Net + dropout (Krizhevsky et al., 2012)</td>
<td>37.5</td>
<td>17.0</td>
</tr>
</tbody>
</table>
Effect on sparsity

Without dropout

With dropout $p < .05$
Dropout leads to sparse representations

Without dropout

With dropout $p < .05$
REVISE THE FOLLOWING
Evaluating integrated microbial data

A key question in analyzing environmental samples – which typically contain almost completely uncharacterized organisms – is the accuracy with which we can perform functional data integration in the absence of curated prior knowledge. Using cross-validation in characterized organisms, we find that functional networks predicted using unsupervised techniques can be nearly as accurate as supervised Bayesian data integration.
Unsupervised network integration is nearly as accurate as supervised Bayesian data integration.
Within the Computer Science discipline, in the field of Artificial Intelligence, Deep Learning is a class of Machine Learning algorithms that are in the form of a Neural Network.

Deep Learning
Multilayered neural network
Requires vast amount of data
Deep learning is an AI subfield that exposes multi-layered neural networks to vast amounts of data.
Test errors for different architectures with and without dropout
Dropout greatly improves error rates across all architectures
STRUCTURING YOUR PRESENTATION
Begin presentations with a problem or question and then answer that question

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>Controversy</td>
<td>Take Position</td>
</tr>
</tbody>
</table>
Your “critique” presentations should have a controversy/position structure

Controversy & Background

Position 1: Pros & Cons

Position 2: Pros & Cons

Your position
SAMPLE CONTROVERSY PRESENTATION
Social media giants allow 3rd parties to access enormous amounts of information with little oversight
Privacy experts tend to fall into two general camps

- Technology solutions
- Legal solutions
Technology solutions focus on giving users tools to protect themselves
These tech solutions include decentralizing techniques such as peer-to-peer browsers.
Legal solutions treat tech giants as information fiduciaries

$Fiduciary = Trust$
Legal solutions treat tech giants as **information fiduciaries**

“We have a responsibility to protect your data, and if we can't then we don't deserve to serve you.”

-- Mark Zuckerberg
Have a natural conversation: speak to people – not at them
Practice!
Practice! In front of other people
Other ways to perform

Take up space and use vocal variety
Take up space with your stance and gestures
Think of your voice like a wind instrument. You can make it louder, softer, faster, or slower. We are wired to pay attention to these kinds of vocal change, which is why it is so hard to listen to a monotonous speaker. In fact, even just a 10% increase in vocal variety can have a highly significant impact on your audience’s attention to and retention of your message.

Matt Abrahams
Common struggles and questions
How Do Indicators Work?

- An indicator tells you whether a solution is acidic or basic
- The most common indicator is phenolphthalein
Groupthink Mentality

The findings of Solomon Asch’s study on conformity depicted that on average, individual's will change their opinion to match the opinion of the majority up to $\frac{1}{3}$ of the time when the majority is at least 3.
Free throws (also called foul shots) are especially important because they are “free”, uncontested shots that could make the difference in a game loss or win.
What if I need a bulleted list?

Methodology: Data Collection

• An e-mail was sent to Nutrition Department faculty requesting assistance in the administration of the in-class tool.

• The e-mail stated this was for a graduate research project, and the IRB proposal had been approved, it stated the general premise of the survey. It also stated it was a voluntary survey, that there was no right or wrong response, and that it would take approximately five minutes.

• Surveys were completed in class, time estimated was 5 minutes per student.

• Surveys were returned in sealed envelopes.
WAIT. Isn’t this model too radical?
Free Communication Consulting
Expert feedback to improve your papers & presentations

Carnegie Mellon University
Global Communication Center