Carnegie Mellon University Global Communication Center



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

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

Deep learning is modeled on the brain's multilayered, 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
 - o Microsoft Excel
 - o Matlab

Today's presentation introduces a new model of slide design backed by research

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The Assertion-Evidence Model

Students in a geological sciences class did better on tests with the assertion-evidence design



Traditional

Engineering students also did better on tests with the assertion-evidence design



Traditional

Engineering students who created assertionevidence slides learned the material better



Traditional

CMU grad students using assertion-evidence gave more effective conference presentations



Traditional

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By contrast, assertion-evidence combines complete sentence headings and visual evidence



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





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

State	Homicide Rate per 100,000
Maine	1.8
New Hampshire	2.2
Rhode Island	2.8
Connecticut	3.9
Colorado	4.7
New York	6.3
Florida	7.7
Georgia	8.7
California	8.8
Arizona	9.0







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



Think of your story like a newspaper headline



Brazil defeats Italy to win World Cup

Results

Table 1: Results of Fog Warning System Implementation

Implementation	Before	After
Average vehicle speed	45.5 mph	45.7 mph
Standard deviations in vehicle speed	9.4 mph	7.2 mph

The fog warning system reduced deviations in vehicle speed, producing safer conditions

Implementation	Before	After
Average vehicle speed	45.5 mph	45.7 mph
Standard deviations in vehicle speed	9.4 mph	7.2 mph
Results on the ILSVRC-2010 dataset

Model	Top-1	Top-5
Sparse Coding (Lin et al., 2010)	47.1	28.2
SIFT + Fisher Vectors (Sanchez and Perronnin, 2011)	45.7	25.7
Conv Net $+$ dropout (Krizhevsky et al., 2012)	37.5	17.0

Convolutional nets with dropout outperform other methods by a large margin

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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





Broader Computer Science Context

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 is an AI subfield that exposes multilayered neural networks to vast amounts of data



Test errors for different architectures with and without dropout



Dropout greatly improves error rates across all architectures





Figure 4: Relative error vs. processing time for BLB (with $b = n^{0.7}$) and the bootstrap (BOOT) on 150 GB of data in the classification setting. The left plot shows results with the full dataset stored only on disk; the right plot shows results with the full dataset cached in memory. Because BLB's computation is fully parallelized across all subsamples, we show only the processing time and relative error of BLB's final output.

BLB provides high-accuracy output in less time than bootstrapping can process a single resample



10 worker nodes 60 GB memory 20 worker nodes 240 GB memory

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STRUCTURING YOUR PRESENTATION

Begin presentations with a problem or question and then answer that question

Problem	Solution
Question	Answer
Controversy	Take Position

Your "critique" presentations should have a controversy/position structure



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



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

PRESENTATION SKILLS

Have a natural conversation: speak to people – not at them



Pace

Ask questions and check-in

Practice!



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Delivering Effective Presentations

Juliann Reineke, PhD Associate Director, Global Communication Center

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

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


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 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?



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