

Teaching AI Through Real Business Problems

Research-based cases and hands-on replication

Liu Liu

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Leeds School of Business, University of Colorado Boulder

MSBC 5190 Modern AI: Introduction to AI for Business

- A core course in the Master's in Business Analytics program
- Students bring Python, statistics, and machine learning foundations

The goal: fluency in technical and business reasoning

- Formulate the problem. Assess the data. Evaluate the approach.
- Explain what the results mean for a business.

How my research informs my teaching

AI methods for understanding consumers and informing business decisions

Research questions

Substantive problems students can investigate

Data, methods, and validation

Choices to examine in case discussions

Empirical investigations

Analyses students can carry out in replication labs

Three roles of technology in this course

Teaching about technology

AI concepts, models, and limitations

Teaching students to work with technology

Business problems, analyses, evaluation, and decisions

Using technology to support learning

A notebook environment where students run and inspect the analysis

The learning experience I wanted to create

IN THE MATERIALS I REVIEWED

Technical courses

Methods and implementation practice, disconnected from real business problems

Business cases

Problems and managerial discussion, without hands-on work with real data

I wanted students to work through both in one investigation.

TWO DESIGN DECISIONS

01 Research papers as technical cases

The paper supplies the question, the data, the method, the evidence, and the managerial implications. Students discuss it as a case, then carry out selected steps of the analysis with the original data.

02 A four-part sequence for each technology

Lecture, then a lab on the method, then the case discussion, then the replication lab. The same arc for computer vision, NLP, and LLMs.

Think it through. Do it through.

Four activities, illustrated with computer vision

01

Lecture

Understand
concepts and
methods

Convolutional
networks and
transfer learning

02

Lab for the lecture

Practice the
method in a
focused exercise

Image classification
with
Keras/TensorFlow
in Colab

03

Case discussion

Examine a business
investigation from
start to finish

Visual Listening In:
brand portrayal in
consumer photos

04

Replication lab

Implement and
evaluate the
analysis

Fine-tune, apply to
brand photos, and
interpret results

The case discussion prepares students for the lab

Problem formulation

What do we want to learn about a brand or customer?

Data choices

Consumer photos, company photos, or surveys?

Methods

Which part of the business task can this model perform?

Results and implications

What does the evidence support, and what could a manager do?

Visual Listening In: the business problem

How are brands portrayed in consumer photos?



#eddiebauer → rugged?

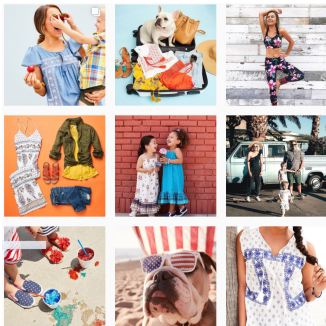
Liu, Dzyabura, and Mizik (2020), Visual Listening In; course case, slide 11.



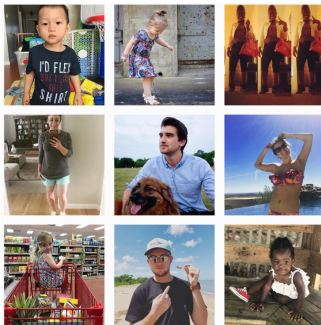
#prada → glamorous?

You are the brand manager of Old Navy

What the brand posts



What consumers post



What do these photos say about the brand?

Instagram examples from Visual Listening In, Liu, Dzyabura, and Mizik (2020).

What students work with in the replication lab

TRAINING IMAGES



Glamorous



Drab



Rugged



Gentle



Healthy



Unhealthy



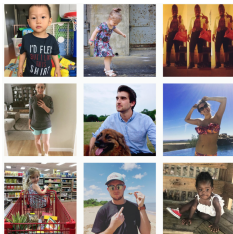
Fun



Dull



APPLICATION IMAGES



Instagram photos tagged #oldnavy

Colab + Keras/TensorFlow

- Fine-tune, apply to brand photos, inspect predictions

Training-image examples and Instagram brand photos from Liu et al. (2020). Tools as used in the course today.

The replication lab: what students build

1

Train or fine-tune

Labeled images and a pretrained model

2

Apply and summarize

Image predictions become brand measures

3

Evaluate and interpret

Image judgments, survey evidence, business implications

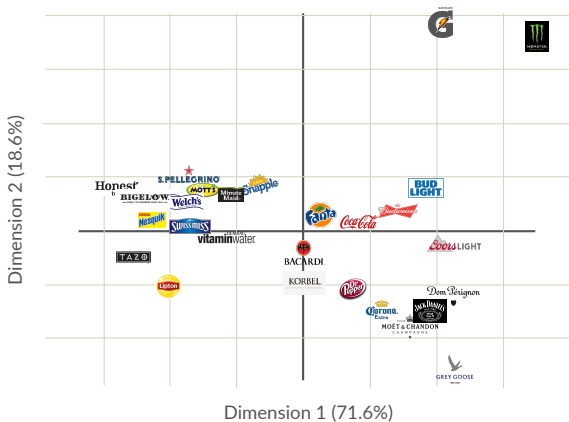
Original research

- Caffe + K80 GPU
- University computing cluster

Classroom implementation

- Colab + Keras/TensorFlow
- Pretrained model + fine-tuning

Brand portrayal across the market



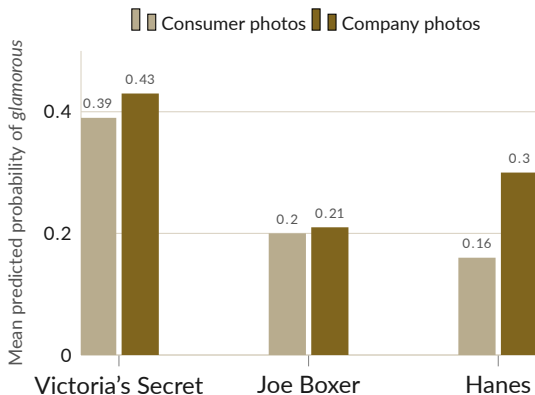
Which brands have similar portrayals?

Consumer photos summarized into brand measures

RESEARCH ILLUSTRATION

Source: beverage brand map from MSBC5190 L05, slide 47. Original brand positions and logos retained.

Interpreting a gap in brand portrayal



Hanes

Company photos convey more glamour than consumer photos.

What might the gap mean?

What else would we need to know?

PUBLISHED RESEARCH RESULT

Liu et al. (2020), Table 7, Panel A. Mean predicted probabilities in the validation sample; not student results.

Identifying customer needs from online reviews

The same four-part sequence, applied to text

Before LLMs

Selecting useful text for analysts

With LLMs

Formulating the customer need

What does this customer need?

"The brush shuts off after 2 minutes but the 30 second timer is missing."

A CUSTOMER NEED

"I know the right amount of time to spend on each step of my oral care routine."



Typical study: 80–120 needs

Interview-study budget: about \$50,000

Case figures from 2019: 300,000+ Amazon reviews across health and personal-care products

Before LLMs: selecting text for analysts

The task: find diverse customer needs with limited review effort

Find useful text

A classifier identifies
informative sentences

Reduce repetition

Embeddings and clustering
select diverse content

Formulate needs

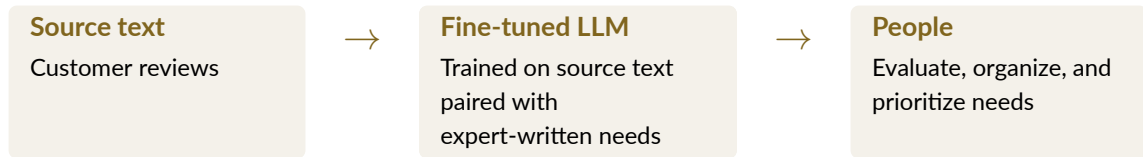
People interpret the text
and write need statements

Evaluation: distinct needs identified for a given amount of review effort

Timoshenko and Hauser (2019), Identifying Customer Needs from User-Generated Content.

With LLMs: the model formulates, people evaluate

The same business problem, but the model now does a different part of the work.



Students practice prompting, fine-tuning, and evaluation with the OpenAI API.

HOW DO WE JUDGE THE OUTPUT?

1 Is it a customer need?

2 Is it specific enough to guide product development?

3 Does it follow from the source?

Timoshenko, Mao, and Hauser (January 2026), Transforming the Voice of the Customer.

Three roles of technology, revisited

Teaching about technology

Lecture and methods lab
Convolutional networks and transfer learning. Text classification, embeddings, fine-tuning an LLM.

Teaching students to work with technology

Case discussion and replication lab
Brand portrayal from consumer photos.
Customer needs from reviews, before and after LLMs.

Using technology to support learning

Colab, Keras/TensorFlow, pretrained models, OpenAI API
An analysis from a published paper that students can run themselves.

Think it through. Do it through.

Thank you