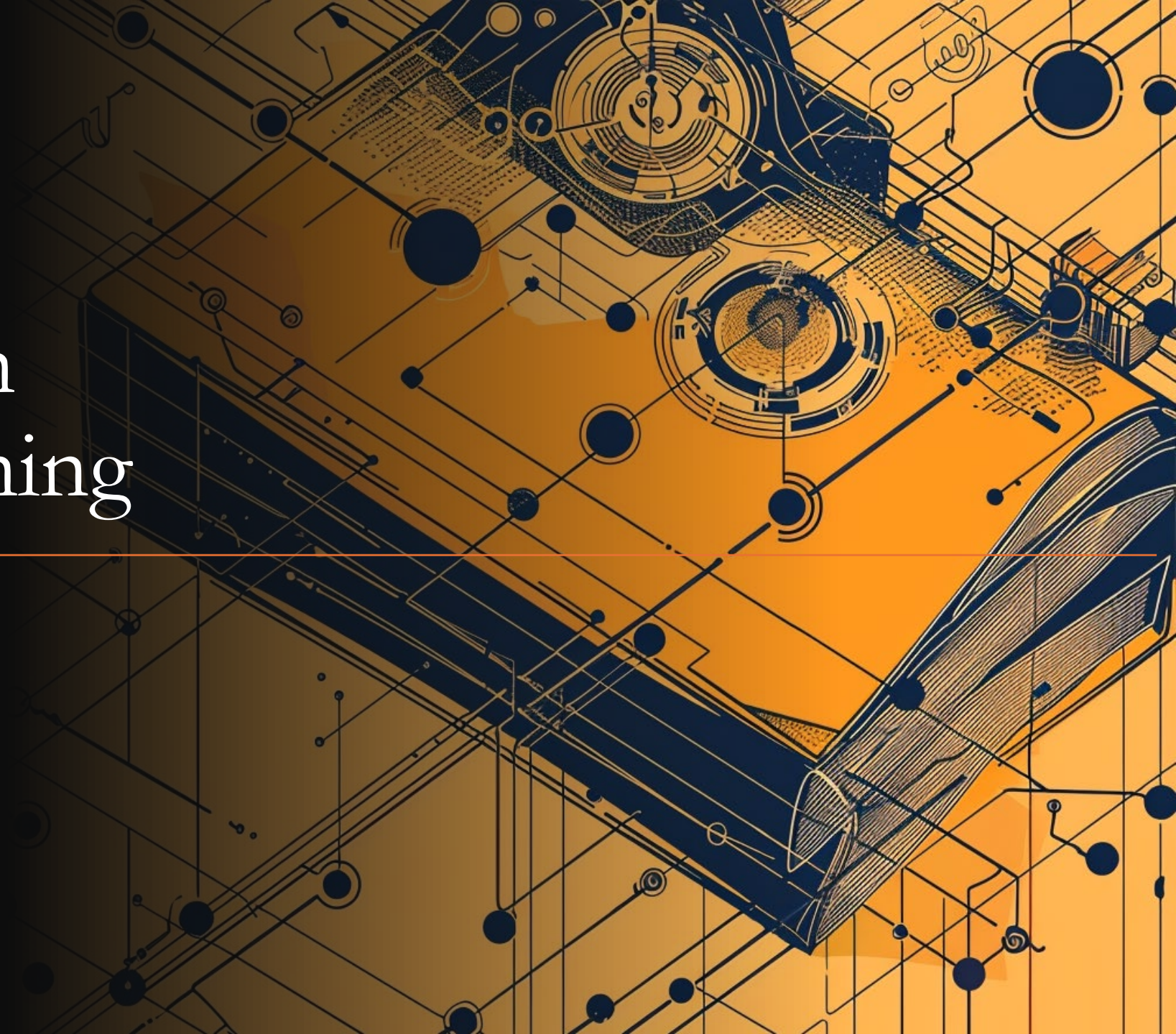


# Theory Driven Machine Learning

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Steven Hyde

Boise State University





# Wolf or Dog?



# Blackbox & Invisible Variables

- AI is atheoretical
- Spurious correlations
- Abstract concepts
- Answer: Its all about the fundamentals



# Measuring CEO Deception: A Case Study

- History of shotty methods
- High stakes
- Important for literature


<https://github.com/ebachUTSA/DeceptionClassifier>.

## RESEARCH ARTICLE

SMS | Strategic Management Journal

WILEY

### The tangled webs we weave: Examining the effects of CEO deception on analyst recommendations

Steven J. Hyde<sup>1</sup> | Eric Bachura<sup>2</sup> | Jonathan Bundy<sup>3</sup>  |  
Richard T. Gretz<sup>4</sup> | Wm. Gerard Sanders<sup>5</sup>

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<sup>2</sup>Department of Business, University of  
Texas San Antonio, San Antonio,  
Texas, USA

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School of Business, Arizona State  
University, Tempe, Arizona, USA

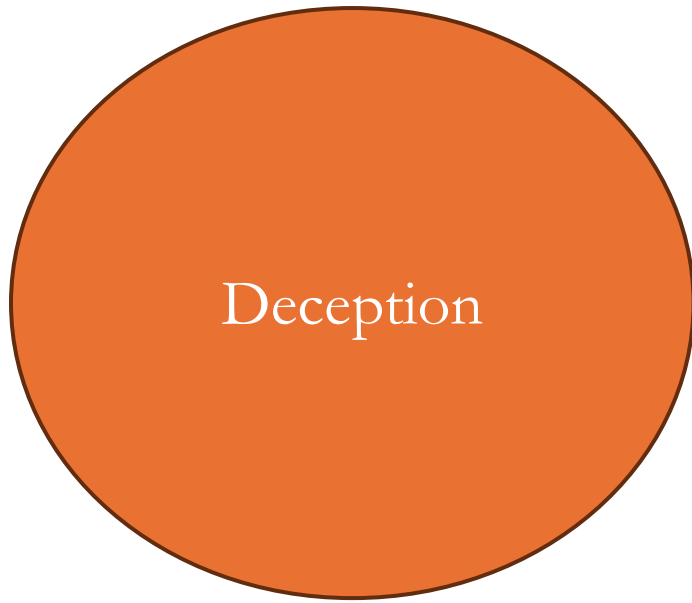
<sup>4</sup>College of Business, University of Texas  
San Antonio, San Antonio, Texas, USA

#### Abstract

**Research Summary:** Organizations are punished by analysts and investors when material deceit by their CEO is uncovered. However, few studies examine analysts' responses to deceptive CEOs before their deceit is publicly known. We use machine learning (ML) models to operationalize the likelihood of CEO deception as well as analysts' suspicion of CEO decep-

# Step 1 - Clear Theoretical Grounding

- Theory > Methods
  - Truth by default theory



Construct



Operationalization

## Step 2: Overcoming the "Black Box"

### Prior

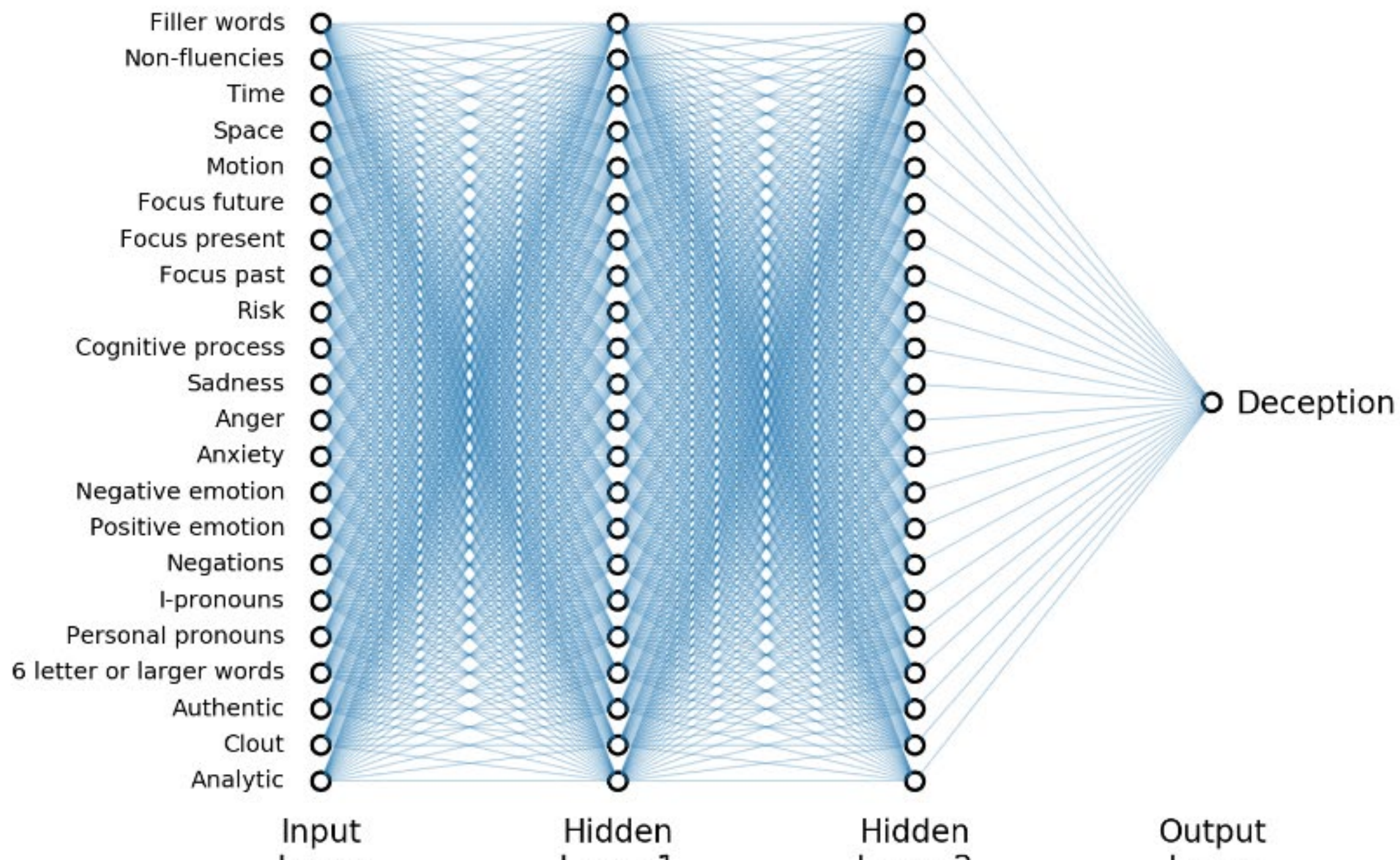
- Theory-informed feature selection
- Attention Masks
- Feature engineering

### Post

- SHAP values
- Sparse Autoencoder
- Partial Dependence Plots
- Etc



# Neural Network architecture



# Step 3 - Establishing Validity: 1 is not enough

## Controls

Standard

Tone

Obfuscation

Concrete

Tentative Language

Charisma

Clout

Suspiciousness

## Validity

Face: Features

Criterion: Hold-out

Discriminant: Big Five

Face: Case examples

Predictive: Data breaches

Predictive: Lawsuits

Predictive: Coverage Drop

Predictive: Fraud

Construct: Gender

External: Peer review

External: Youtube

External: MU3D

## Robustness

Endogeneity

Predictive Power

DV Related

Fraud Robustness

DV Related



# Future Directions



- Implications
- Limitations
- Advancements

## Questions?