2019 SIOP Machine Learning Competition

Isaac Thompson, Co-Chair
Nick Koenig, Co-Chair
Mengqiao Liu, Co-Chair

SHAKER + amazon

Machine Learning Competition

Disrupt or be disrupted

The AI revolution is here. If you are not keeping up you are falling behind.

AI is underrealized in its current state. The research and tools are available but it has yet to be applied to most fields.

In the next few years many tasks will be subsumed by AI. Entire industries and occupations will be disrupted.

How can we not only benefit from this disruption but be the disruptors?

SHAKER + amazon

Driving Goals

Learn by doing.

Vision: Informed & transparent conversation around AI (new NLP methods)

Guiding principles

- Innovation
- Diversity and inclusion
- Automation

SHAKER + amazon

Machine Learning Competition

Competition

Entire community working to solve the toughest problems

e.g. Kaggle (parkinson's disease from movement data, 2013)

Process

Frame a problem

Gather and release the data

Community works on it

Winners are announced and innovations are shared

Open source problem solving

SHAKER + amazon

Competition Stats

Participants
- 100+ teams (450 people)

Number of submissions
- almost 1000

First ever ML comp?
- 2/3rds

Age
- 22 to 70.

Gender
- 2/3rds male; 1/3rd female

University vs industry
- 56% vs 44%

Education
- 50% Ph.D., 30% MS, 20% BS

Analytic methods
- 86% used ML; 47% used DL

Programming language
- 72% used R
- 64% used Python
- 36% used both

SHAKER + amazon

Open Data

Purpose

- Bring modern NLP methods (ML/DL) to the forefront of I-O Conversation
- Data will serve as a benchmark for new methods

Design

- New instrument with 5 open ended SJT (one for each OCEAN)
- Big Five (BFI-2)
- Collected via MTurk
- n = 1687 (1087, 300, 300)

Example: Extraversion Prompt

You and a colleague have had a long day at work and you just find out you have been invited to a networking meeting with one of your largest clients. Your colleague is leaning towards not going and if they don't go you won't know anyone there. What would you do and why?

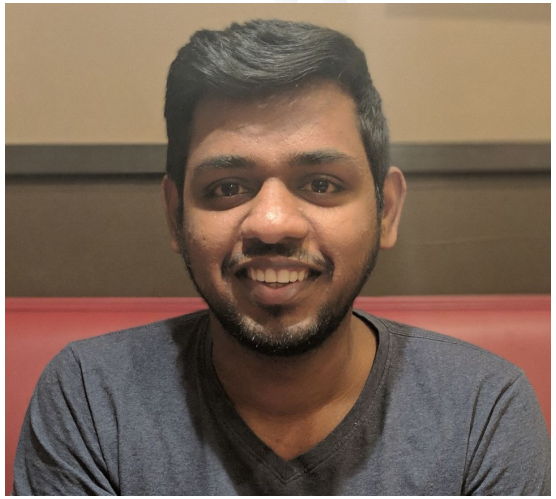
SHAKER + amazon

Open Competition

- Hosted competition on EvalAI, open source AI challenge platform.
- Teams would register to submit predictions (50, 5)
- A live public leaderboard showed progress

EvalAI

Rishabh:
Rishabh is a visiting research scholar at Georgia Tech and one of the lead developers of EvalAI Project.



Deshraj:
Co-founder of caliper.ai, MS in CS from Georgia Tech.

SHAKER + amazon

Open Solutions

- Solutions were written in open source and fully reproducible code sets
- All made completely available on Github

GitHub

python

R

SHAKER + amazon

Overview of the Session

- Results of competition
  - Previous research compared to the current study
- Winning teams present
  - 4th
  - 3rd
  - 2nd
  - 1st
- Winning teams panel discussion
- Closing remarks

SHAKER + amazon

Previous Research

Data type	Correlation	Mean *r*	Author	n
Traditional SJIs	0.10 - 0.53	0.326	Oostrom et al., 2018	157
Twitter Tweets	0.25 - 0.42	0.332	Hadrien – Arnoux et al., 2017	1,300
Facebook Status Updates	0.31 - 0.42	0.354	Schwartz et al., 2013	75,000
Open ended SJI short responses	**0.25 - 0.47**	**0.313**	**This competition!**	**1,687**

SHAKER + amazon

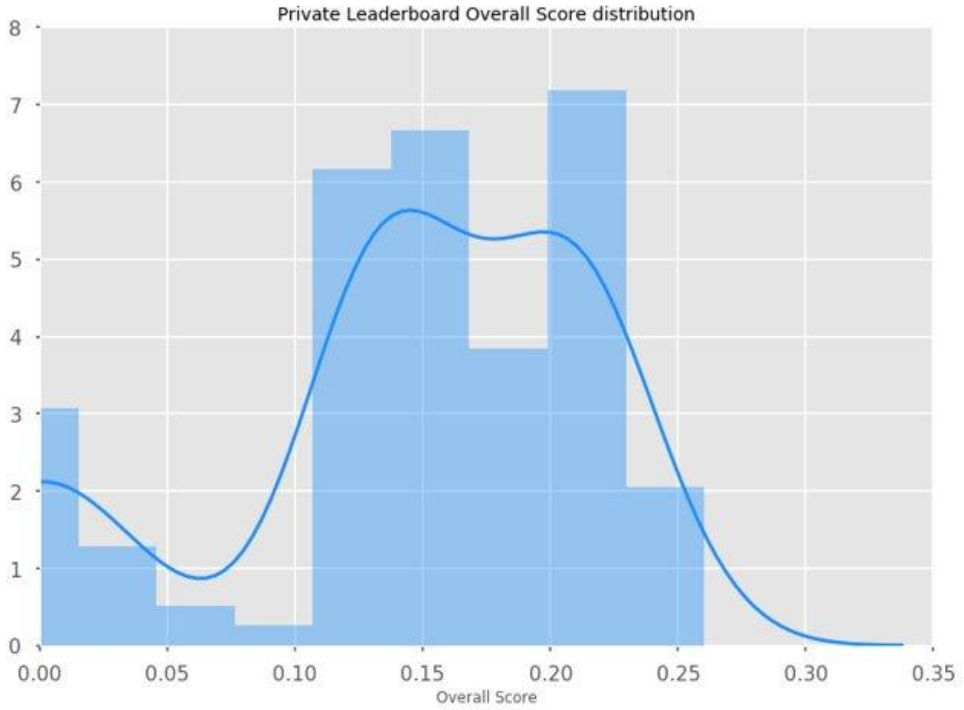
Convergent Validity with External Ratings

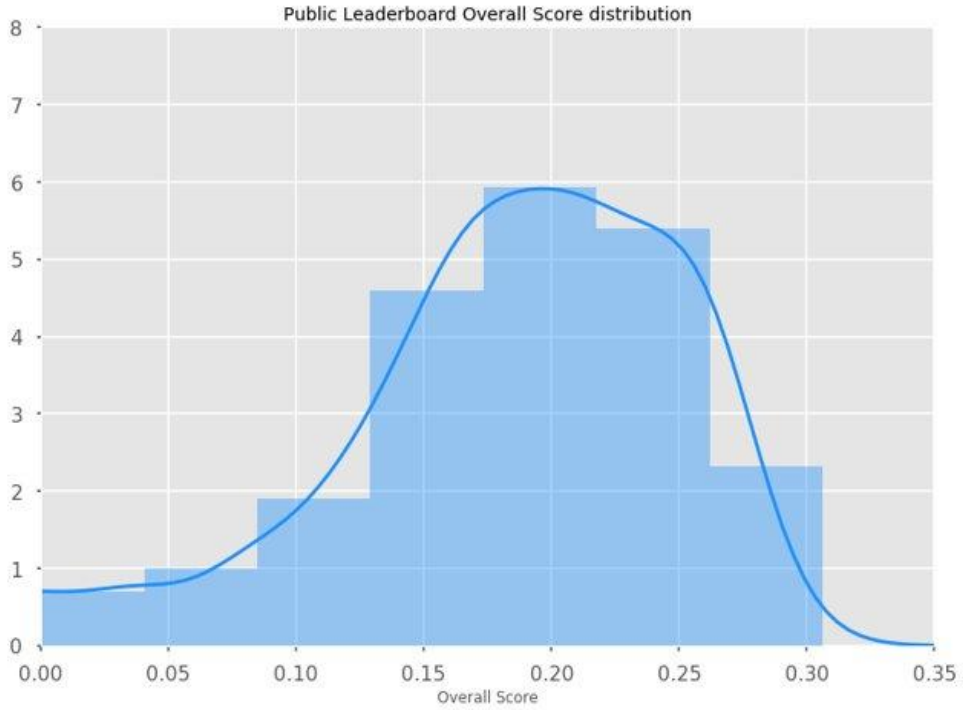
Data type	Correlation	Mean *r*	Author	n
Stranger Ratings	-0.01 - 0.29	0.14	Connolly et al., 2007	724
Peer Ratings	0.27 - 0.41	0.344	Connolly et al., 2007	3,937
Close Relatives	0.35 - 0.49	0.394	Connolly et al., 2007	4,000
Open ended SJT short responses	**0.25 - 0.47**	**0.313**	**This competition!**	**1,687**

Moral of the story....predicting personality is hard!

SHAKER + amazon

Private and Public Leaderboard Distributions



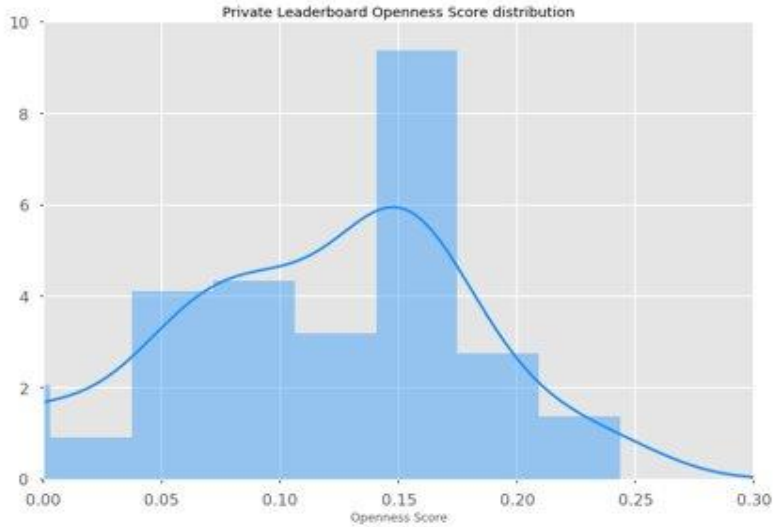


SHAKER + amazon

Individual Trait Scores

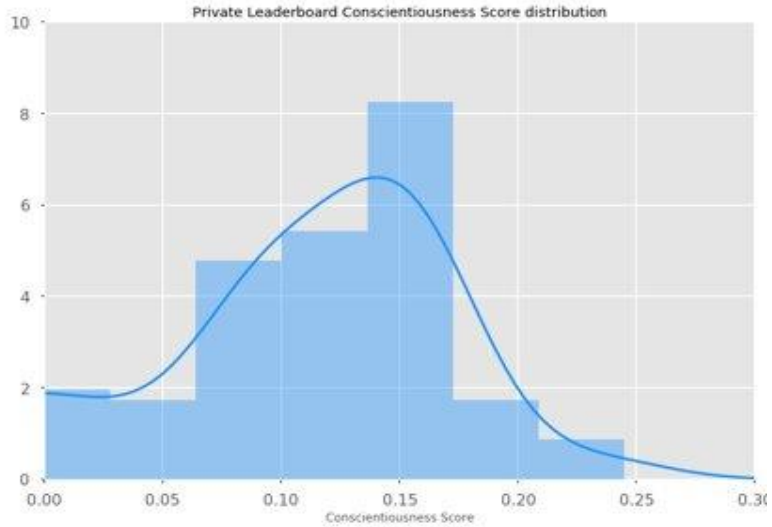
Openness

- Public Max: 0.278
- Private Max: 0.244



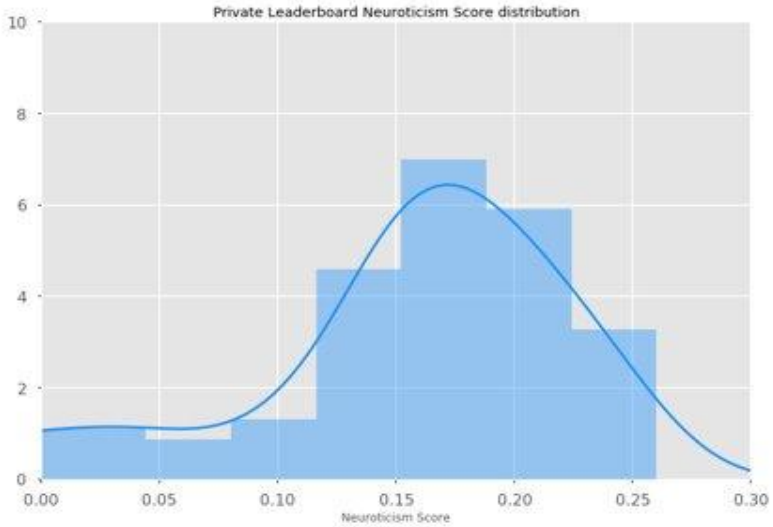
Conscientiousness

- Public Max: 0.263
- Private Max: 0.245



Neuroticism

- Public Max: 0.288
- Private Max: 0.260

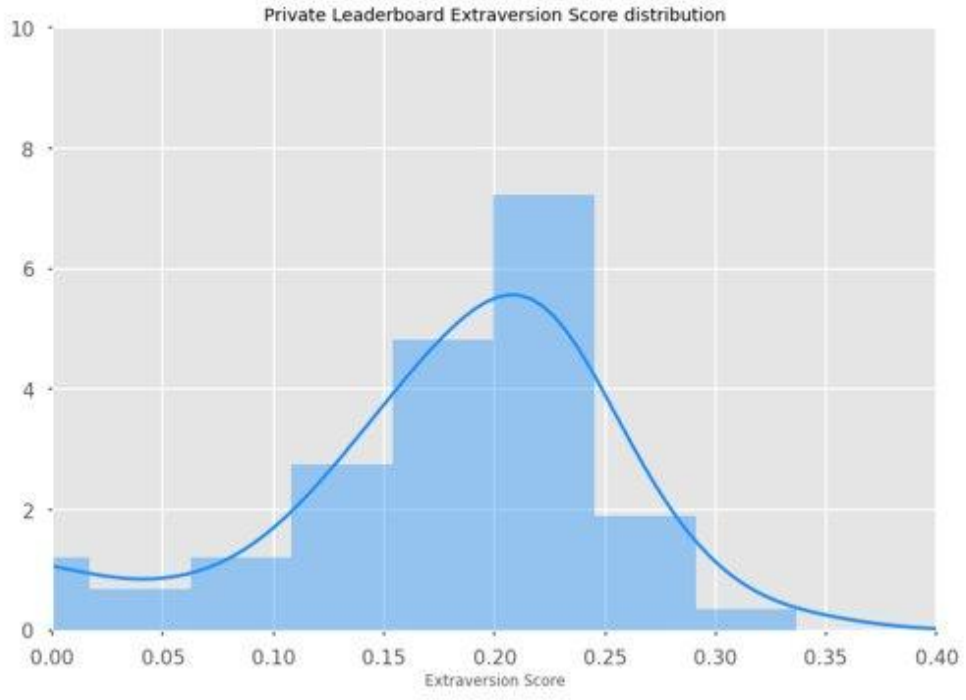


SHAKER + amazon

Individual Trait Scores

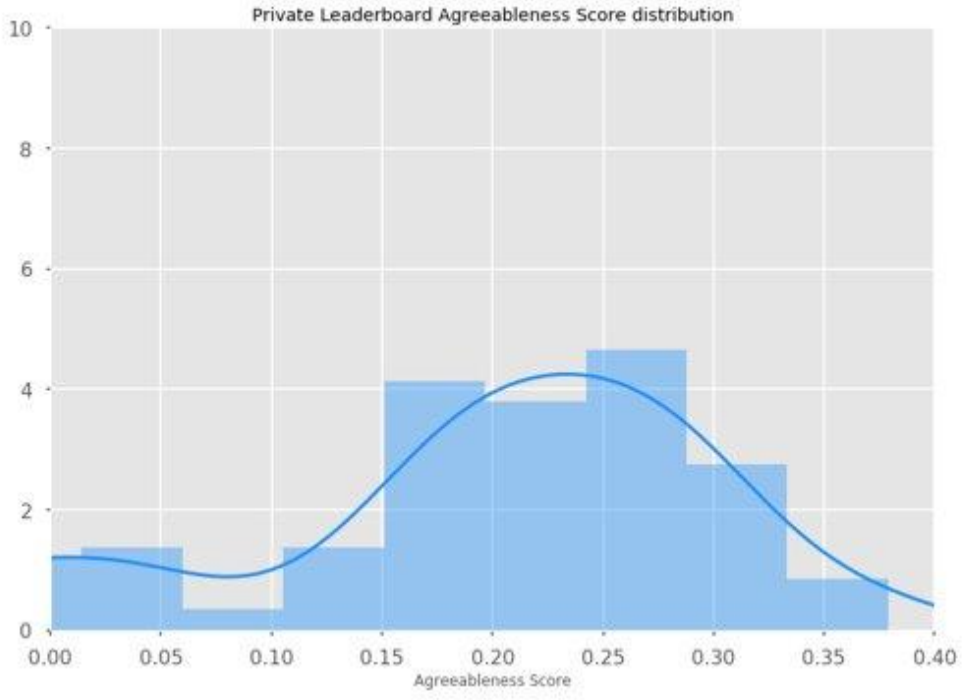
Extraversion

- Public Max: 0.363
- Private Max: 0.337



Agreeableness

- Public Max: 0.467
- Private Max: 0.379



SHAKER + amazon

Top 20 Public and Private Leaderboards

Private Leaderboard

Rank	Team Name	Mean R
1	?????????????	??
2	?????????????	??
3	?????????????	??
4	?????????????	??
5	Data and Confused	0.23
6	Deep_Labeling	0.22
7	Computational Organizational Research Lab	0.22
8	prediction_engine_91	0.22
9	FurstPerson	0.22
10	Viridi	0.21
11	Textual Healing	0.2
12	Corpus Sovereign	0.2
13	PSYCIEs	0.19
14	Golden Pandas	0.19
15	Our name hasnt converged yet	0.17
16	Team MHS	0.17
17	indistinct chatter	0.16
18	Frederic	0.16
19	Anscombe_s Quartet	0.16
20	Wonderlic	0.15

SHAKER + amazon

4th Place

PI-RATES

Wes Barlow, Fred Shumate, Fabian Castro,

Frank DeVilbis

0.2293

SHAKER

+

amazon

3rd Place
Logistic Aggression

Ross Walker, Jacob Bradburn, Jeff Olenick

0.23252

SHAKER
+
amazon

2nd Place

Team Procrustination

Feng Guo, Nick Howald, Marie Childers,
Jordan Dovel, Sami Nesnidol, Andrew Samo,
Sam T. McAbee

0.24784

SHAKER + amazon

1st Place

Natural Selection

Josh Allen, Matthew Arsenault, Blaize Berry, David Futrell

0.26021

SHAKER + amazon

Panel Question

Tell us your biggest struggle OR learning from participating in this competition.

SHAKER + amazon

Panel Question

Tell us one area where ML/DL has the biggest value to bring to I/O.

SHAKER + amazon

Panel Question

What is one piece of advice that you have for I/Os who want to use ML/DL for their research/work?

SHAKER + amazon

Closing Remarks

- With rapid innovation, I-O has bright future
- Deep learning
  - lot of leading solutions, is not mentioned
- Ensemble models
  - lot of leading solutions, not mentioned in field

Rank	Company	Team name	Presenting Member(s)	Other Team Members
	Walmart	Natural Selection	Josh Allen David Futrell	Matthew Arsenault Blaize Berry
	BGSU	Team Procrustination	Feng Guo Nicholas Howald	Marie Childers Jordan Dovel Samuel T. McAbee Samantha Nesnidol Andrew Samo
	Michigan State University	Logistic Aggression	Ross Walker	Jacob Bradburn Jeff Olenick
	USAA	PI-RATES	Wes Barlow	Fabian Castro Frank DeVilbis Fred Shumate

Thank you

SHAKER + amazon