P.C. – Personality Cortex

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DATA SCIENCE PART-TIME BOOTCAMP

#BATCH 602 – LONDON

SEPTEMBER 2021

Team introduction

DR. LUKE VANO

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CHRISTOPHER HOLMES.
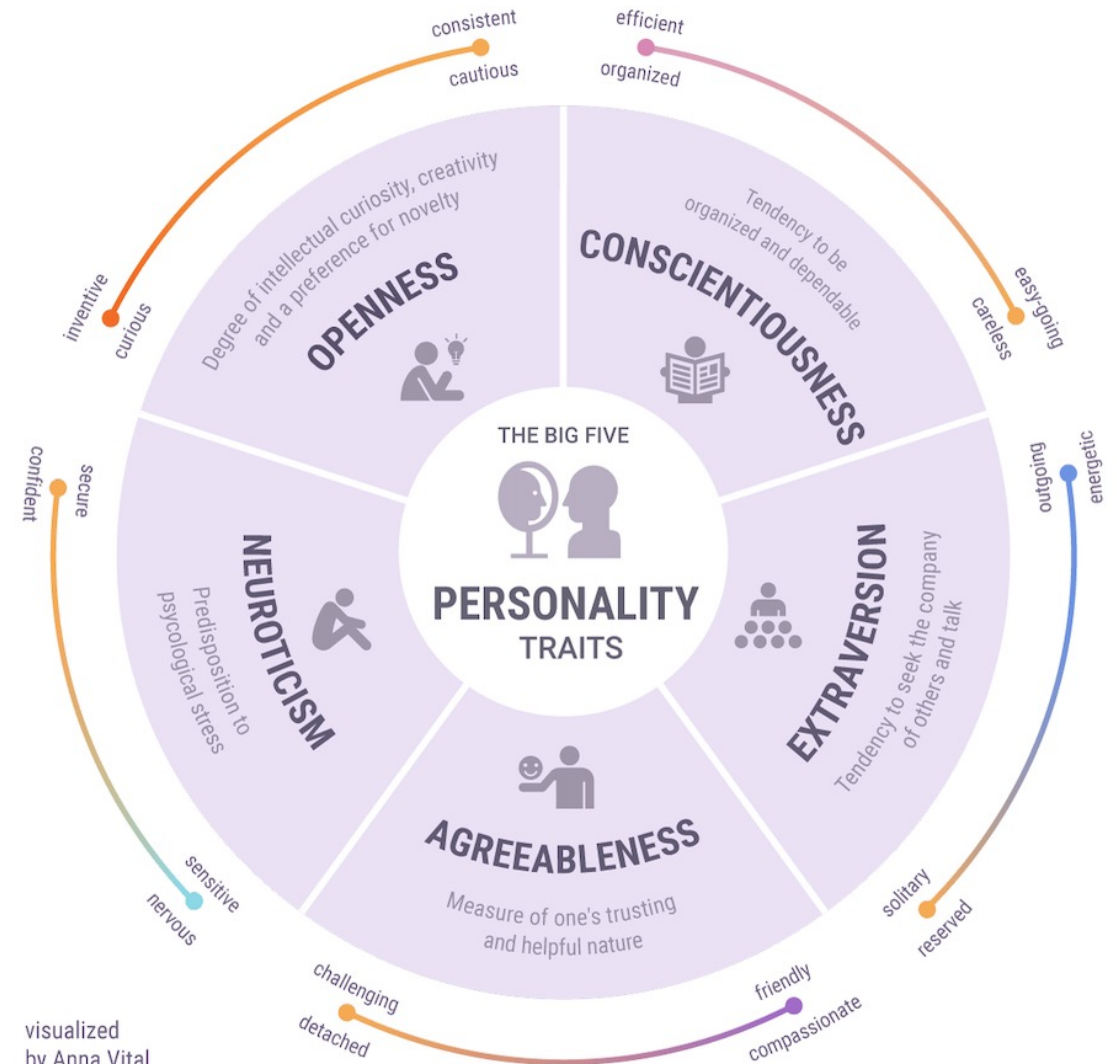
FRANCISCO COSTA DUARTE.

What is the problem?

TESTS CLUSTERING PERSONALITY
TYPE ARE UNSCIENTIFIC

consistent
cautious
efficient
organized

Degree of intellectual curiosity, creativity and a preference for novelty

Tendency to be organized and dependable

OPENNESS

CONSCIENTIOUSNESS

inventive
curious

easy-going
careless

THE BIG FIVE

PERSONALITY
TRAITS

confident
secure

outgoing
energetic

NEUROTICISM

EXTRAVERSION

Predisposition to psycological stress

Tendency to seek the company of others and talk

AGREEABLENESS

sensitive
nervous

Measure of one's trusting and helpful nature

solitary
reserved

challenging
detached

friendly
compassionate

visualized
by Anna Vital

Source: J. M. Digman
Personality Structure: Emergence of the Five-Factor Model

adioma

What is the problem?

NO CURRENT TOOLS PREDICT
PERSONALITY FROM BRAIN IMAGING DATA

TAKES UP TO 24 HOURS TO GENERATE
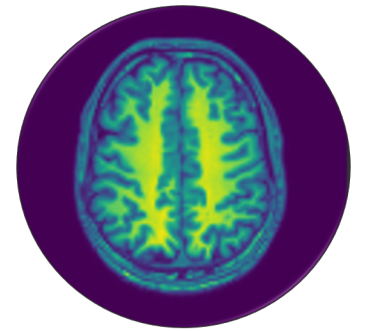BRAIN THICKNESS DATA

Data

- **The Amsterdam Open MRI Collection (AOMIC)** is a collection of three datasets with multimodal (3T) MRI data including structural (T1-weighted), diffusion-weighted, and (resting-state and task-based) functional BOLD MRI data, as well as detailed demographics and psychometric variables from a large set of healthy participants 1370 (Female= 53%, Male= 47%). *source: https://nilab-uva.github.io/AOMIC.github.io/*

- Study data:
  - Excel/dataset: 140 brain features; 5 personal aspects; 5 personality
  - MRI scans

- Inputs & Targets:
  - Inputs: brain features
  - Targets: 5 personality traits: openness; conscientiousness; extraversion; agreeableness and neuroticism

Methodology

Tests clustering personality type are unscientific:
- K-means

Takes up to 24 hours to generate brain thickness data:

- CNN (computer vision)

No current tools predict personality from brain imaging data:

- Random Forest
- Gradient Boosting
- Logistic Regression

Output

Personality Clustering

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Leader	-0.628408	0.665268	0.719670	0.602292	0.751134
Task Orientated	-0.716684	0.473713	-0.913176	0.248072	0.632283
Maverick	0.328691	0.383938	0.577548	-1.054190	-0.709333
Anxious	1.083981	-0.632645	0.495470	0.680510	-0.637687
Workaholic	0.150865	-1.013037	-0.758509	-0.297822	-0.149096

Leader (Calm extrovert open agreeable organised)
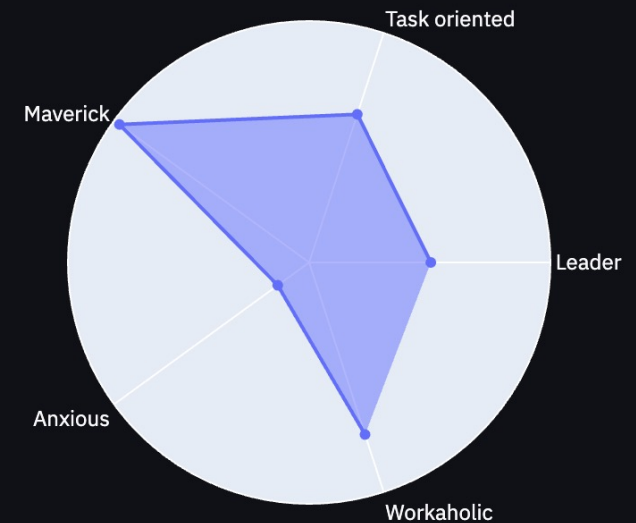Task Orientated (Calm slightly extrovert close-minded organised)
Maverick (Slightly neurotic slightly extrovert open-ish disagreeable disorganised)
Anxious (Anxious introvert open-ish agreeable disorganised)
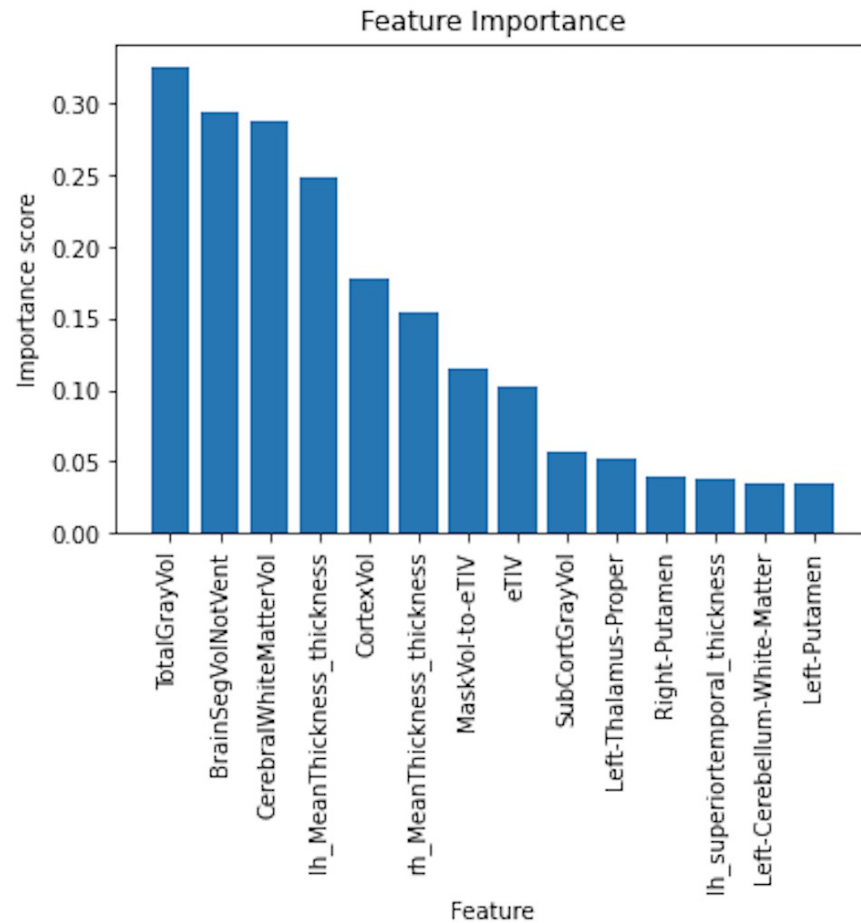Workaholic (Introvert closeminded)

Prediction

Check out your prediction!

Task oriented

Maverick

Leader

Anxious

Workaholic

You play by your own rules and don't care what others think about you. When completing tasks you find it difficult to be organised but are able to rise to unforeseen challenges. You are passionate but sometimes your emotions make it difficult for you to think clearly.

Feature importance + Performance

Classification Metrics

Feature Importance

Female models

	precision	recall	f1-score	support
0	0.54	0.60	0.57	183
1	0.55	0.61	0.58	153
2	0.57	0.51	0.54	130
3	0.50	0.45	0.48	133
4	0.57	0.52	0.54	128
accuracy			0.54	727
macro avg	0.55	0.54	0.54	727
weighted avg	0.54	0.54	0.54	727

Male models

	precision	recall	f1-score	support
0	0.63	0.65	0.64	164
1	0.61	0.62	0.62	167
2	0.80	0.65	0.72	43
3	0.75	0.63	0.68	70
4	0.61	0.65	0.63	182
accuracy			0.64	626
macro avg	0.68	0.64	0.66	626
weighted avg	0.65	0.64	0.64	626

Demo – PC personality cortex

https://personalitycortex.herokuapp.com/