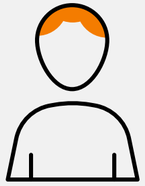
Dharwad
ज्ञानेन विकासः

DS398/CS399
MINI PROJECT-I

Linguistics, Cognitive Science, and Machine Learning

Under the guidance of Dr. Chinmayananda A

Group 13



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What is Personality?

Personality is a set of enduring traits that influence our thoughts, feelings, and behaviors. It is shaped by our genes and environment, and personality tests can be used to measure and identify these traits.

How does the environment impact personality?

Environmental factors, such as climate, topography, and culture, can significantly impact an individual's personality.

For example, people living in harsh winters tend to be more conscientious and anxious, while people living in collectivist societies tend to be more agreeable and emotionally stable.

Problem Statement

To investigate how geographical and climatic conditions affect personality and identify the specific environmental factors and mechanisms that contribute to this relationship.

A Comparative Analysis of Key Findings of Various Studies

Personality and geography: Introverts prefer mountains

- Introverts are more likely to prefer mountains than extroverts.
- Extroverts are more likely to prefer oceans than introverts.
- Introverts are drawn to the seclusion and peacefulness of mountains.
- Extroverts are drawn to the social and stimulating environment of oceans.
- The findings of the study are consistent with the person-environment fit theory.
- The study's authors hope that their findings will help people to make better choices about where to live, work, and vacation.

Cont'd...

Geographical Psychology: Exploring the Interaction of Environment and Behavior

- Noise pollution can impair cognitive performance, especially in tasks that require concentration and attention.
- Certain urban designs can help reduce crime rates and improve feelings of safety among residents.
- Spending time in nature can help improve physical and mental health outcomes, like reducing stress and improving mood.

Toward a Geography of Personality Traits: Patterns of Profiles across 36 Cultures

- There is a relationship between geography and personality traits across cultures.
- European and American cultures are higher in extraversion and openness to experience, but lower in agreeableness.
- Asian and African cultures are lower in extraversion and openness to experience, but higher in agreeableness.
- There are differences in how different cultures approach and deal with psychological challenges, which are reflected in their personality profiles.
- The causes of these differences can be attributed to differences in gene pools or features of culture.
- These findings have significant implications for travelers, businesspersons, and diplomats.

Cont'd...

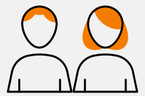
Geography and personality: Why do different neighborhoods have different vibes?

- Individuals living in high-rise buildings and busy streets experienced more stress and a lack of privacy.
- Those who valued peacefulness and privacy preferred suburban neighborhoods with easy access to nature.
- Individuals who valued solitude or a slower pace of life preferred areas with large, open spaces and farmland.

The Geographic Distribution of Big Five Personality Traits: Patterns and Profiles of Human Self-Description Across 56 Nations

- The five-dimensional structure of the BFI is highly replicable in all major cultural regions.
- People from different geographic regions show different levels of personality traits.
- Personality traits can be used to predict and explain differences in behavior and outcomes across cultures.

Further Findings



The average person's personality is established by their 20s.

Temperature has an impact on cognitive function and brain efficiency.

Physical health can influence both personality and mental well-being.

Human thought and behavior are complex and often display inconsistencies.

People from the same geographic region tend to have similar patterns of thought.

A Closer Look at Our Methodological Framework

01

Data Collection

A questionnaire was created consisting of questions about geography and personality. The questionnaire was disseminated in several batches and responses were collected from a diverse group of participants.

02

Data Filtering

Incomplete or duplicate responses were removed and participants who had only completed one portion of the questionnaire were filtered out.

03

Data Processing

The data was cleaned, missing values were removed, and it was transformed into a format that was suitable for machine learning algorithms.

Cont'd...

04

Machine Learning Algorithms

A variety of machine learning algorithms were used to analyze the data and determine the relationship between geography and personality. These included decision tree, logistic regression, random forest, k-neighbours, and support vector classification (SVC).

05

Multi-Output Model

A multi-output model was used to analyze multiple target variables and investigate their relationships with geography and personality.

06

Model Evaluation

The f1 scores and accuracies of each model for each target variable were plotted. This allowed us to evaluate the performance of each model and identify the most effective machine learning algorithm for the study.

A Comparative Analysis of the Performance of Machine Learning Models in Predicting Personality Traits

Implications of Our Findings

Accuracy

- SVM is particularly good at predicting Openness and Agreeableness.
- Other models, such as Random Forest and MLP, are also effective.
- Decision Tree and Logistic Regression are less accurate.
- Future studies should use a larger and more diverse dataset.

Model	Openness (F3)	Extraversion (F1)	Agreeableness (F4)	Neuroticism (F2)	Conscientiousness (F5)
MultiOutputClassifier(MLPClassifier)	0.583333	0.666667	0.833333	0.583333	0.166667
DecisionTreeClassifier	0.583333	0.500000	0.333333	0.333333	0.166667
LogisticRegression	0.500000	0.583333	0.583333	0.500000	0.083333
RandomForestClassifier	0.750000	0.666667	0.583333	0.416667	0.166667
KNeighborsClassifier	0.583333	0.500000	0.500000	0.583333	0.416667
SVC	0.500000	0.666667	0.750000	0.583333	0.416667

SVM is the most accurate model for predicting personality traits (58.33%)

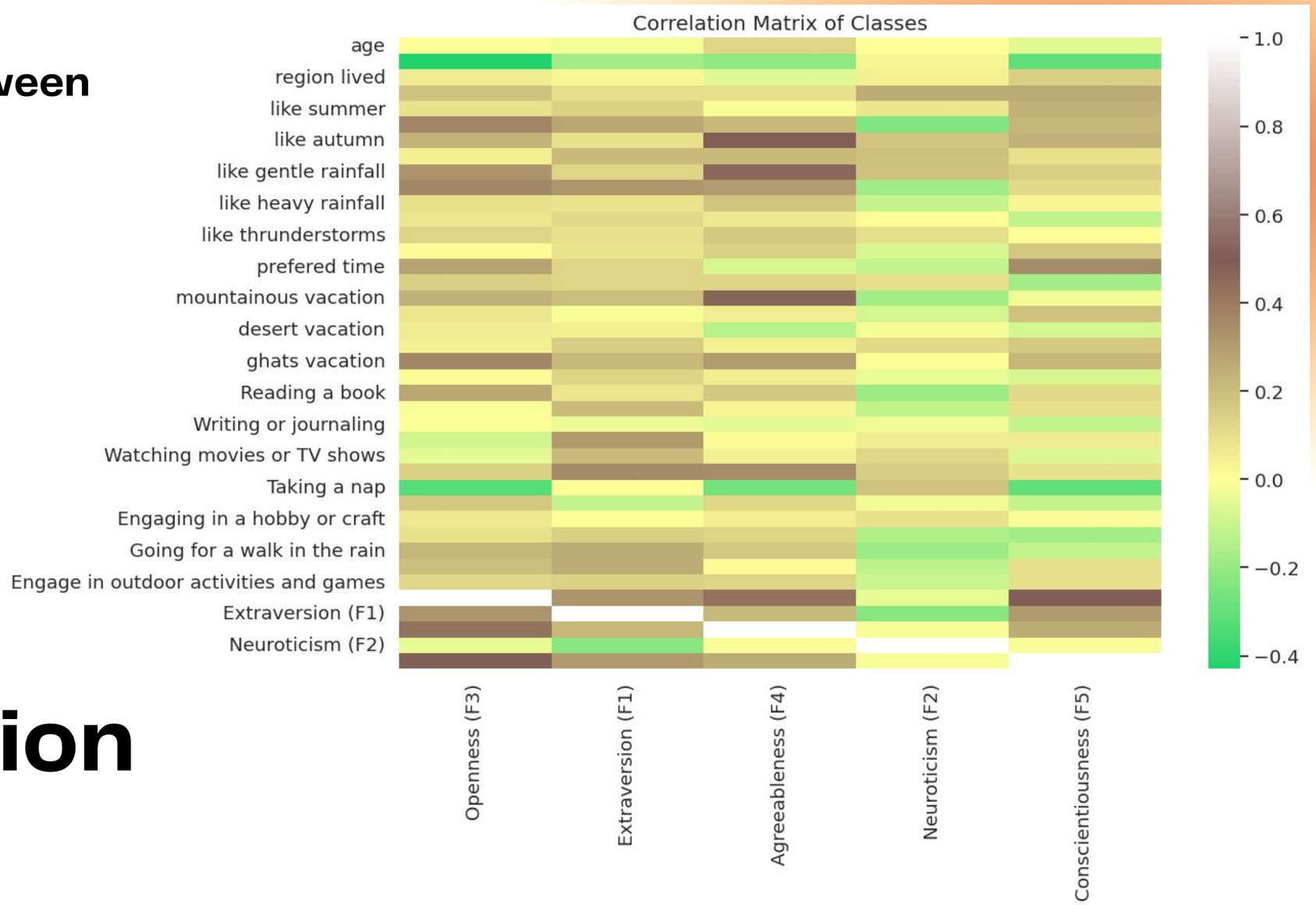
F1 Score

- KNeighborsClassifier and RandomForestClassifier also achieved high scores.
- SVC model had a higher accuracy, but not the highest F1 score.
- Evaluation metric can influence model selection.
- Accuracy alone may not be sufficient to assess the performance of a model.

Model	Openness (F3)	Extraversion (F1)	Agreeableness (F4)	Neuroticism (F2)	Conscientiousness (F5)
MultiOutputClassifier(MLPClassifier)	0.569444	0.704762	0.758333	0.555128	0.128205
DecisionTreeClassifier	0.583333	0.500000	0.412821	0.360269	0.151515
LogisticRegression	0.492063	0.617857	0.638889	0.484848	0.075758
RandomForestClassifier	0.642857	0.553922	0.611111	0.492308	0.192308
KNeighborsClassifier	0.570588	0.505952	0.496528	0.564815	0.393519
SVC	0.492063	0.533333	0.642857	0.429825	0.245098

MLPClassifier is the best performing model in terms of F1 score (0.543175)

A tool to examine relationships between variables...



Correlation Matrix

Insights from Our Study

Advancing the Understanding of the Complex Interplay between Environment and Personality

01

Environment shapes personality.

02

Machine learning can identify personality-environment associations.

03

Findings have implications for public policy and personal development.

04

Understanding environmental impact on personality can help individuals make informed choices.

05

This study advances understanding of human experience and opens new research and practical opportunities.

Thank you!