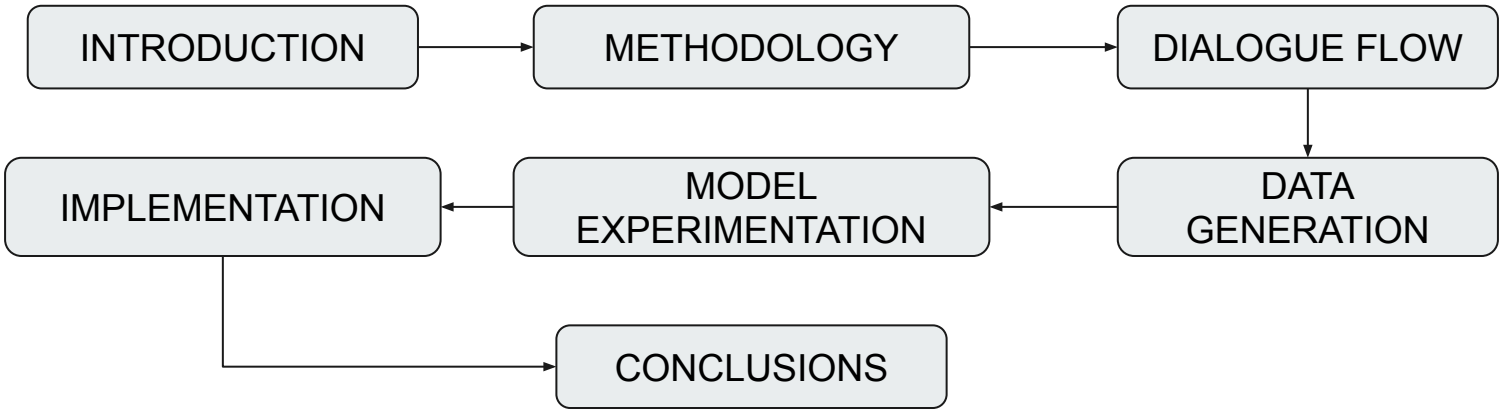
Kai: An AI-powered Chatbot to Support Therapy

Thesis Defence Presentation

Mariama C. Djalo D.

ABSTRACT

OVERVIEW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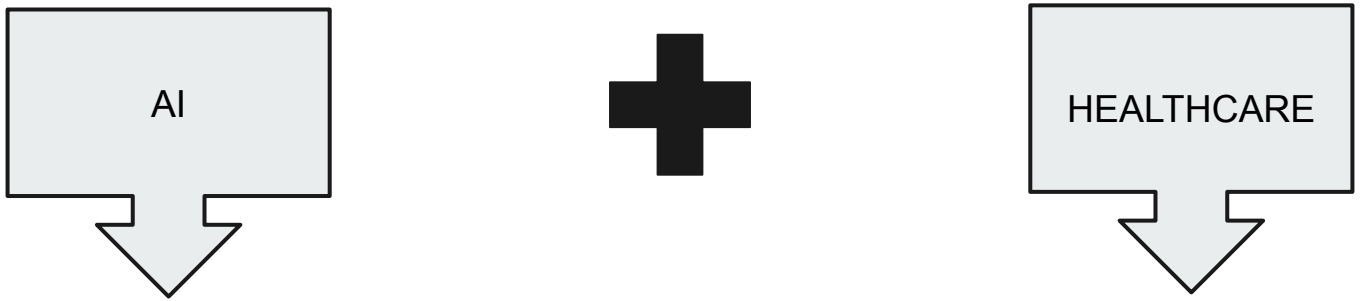
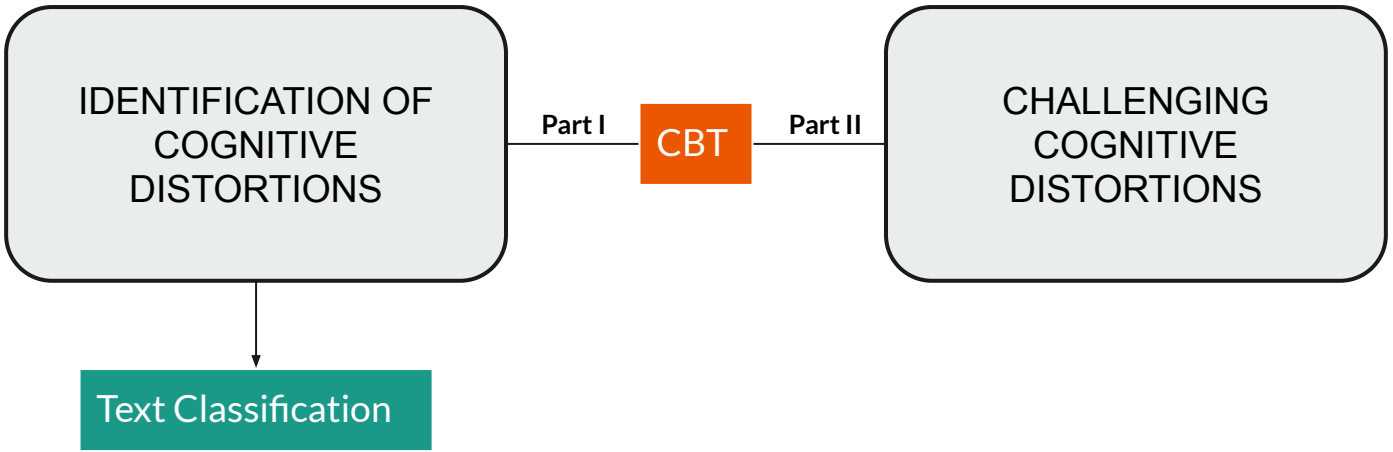
INTRODUCTION



Text Classification

CBT

INTRODUCTION



INTRODUCTION

Cognitive Distortion	Definition	Example
Jumping to Conclusions	Drawing judgments without enough evidence.	*”She’s not responding so she must be ignoring me or even worse, she must be mad at me”*
Mental Filter	Focusing only on the negative part of everything.	*”I did well on most of the exam, but I got one question wrong, so I must be a complete failure.”*
Emotional Reasoning	Thinking that because you feel something it must be real.	*”I feel like a failure, so I must be a failure.”*

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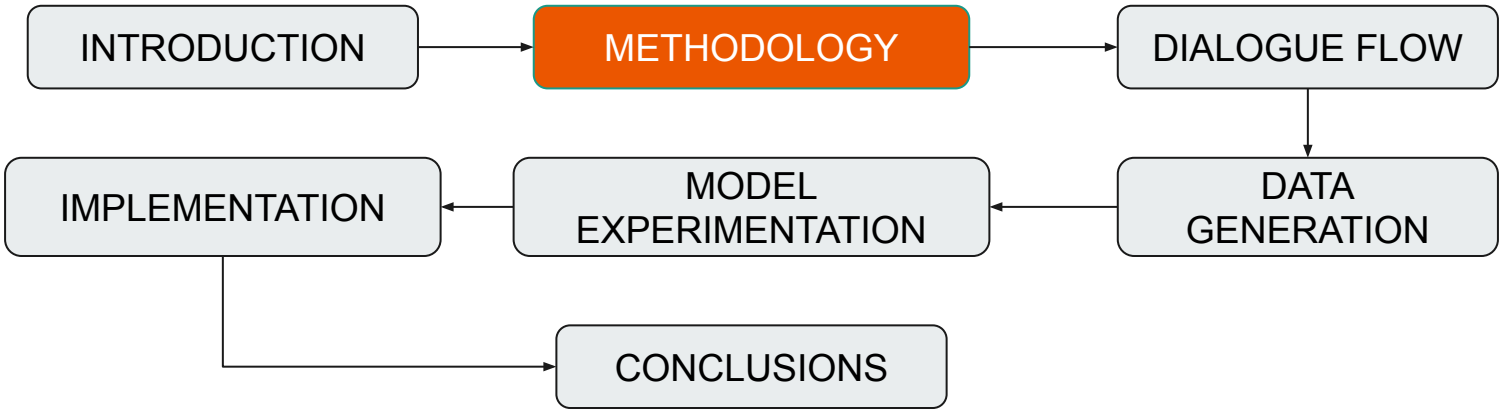
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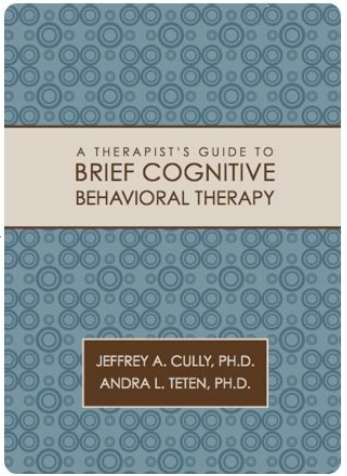
METHODOLOGY

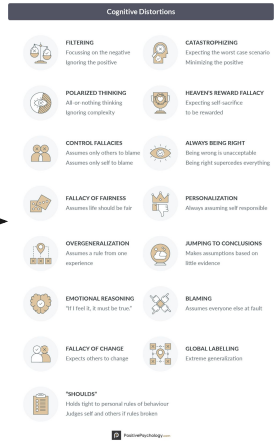
Dialogue Flow



A Therapist's Guide to Brief Cognitive Behavioral Therapy by Jeffrey A. Cully et al.

METHODOLOGY

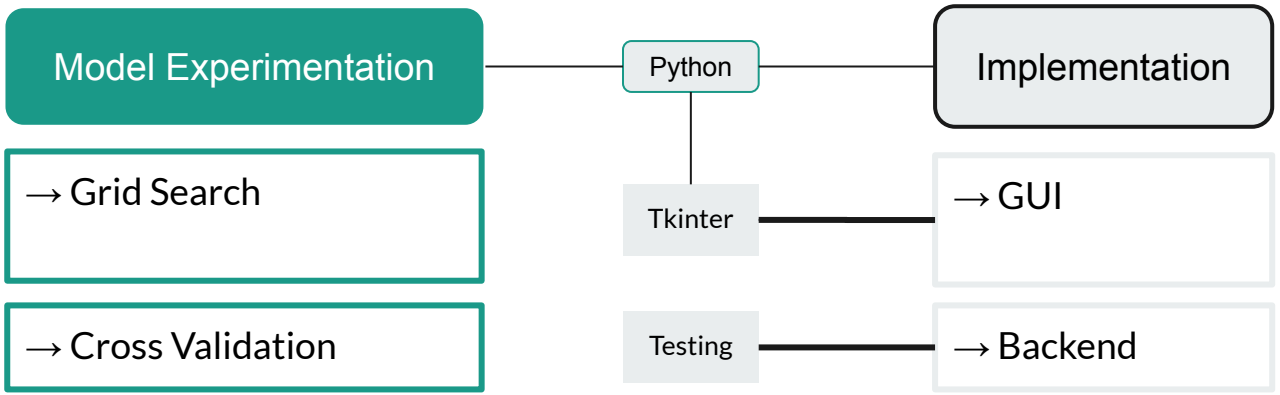
Data Generation



15 Cognitive Distortions by PositivePsychology.com

Bias?

METHODOLOGY



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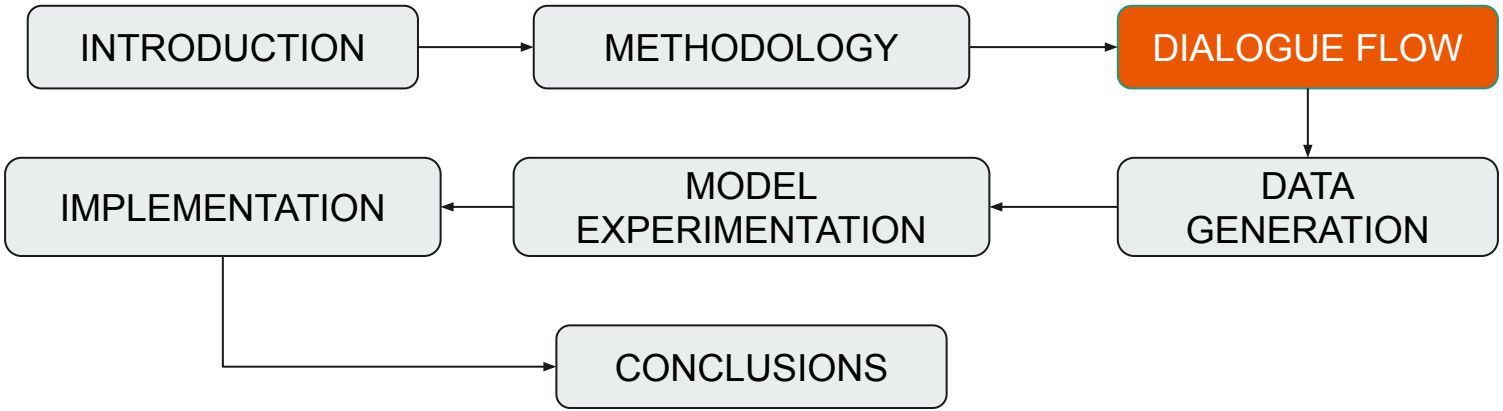
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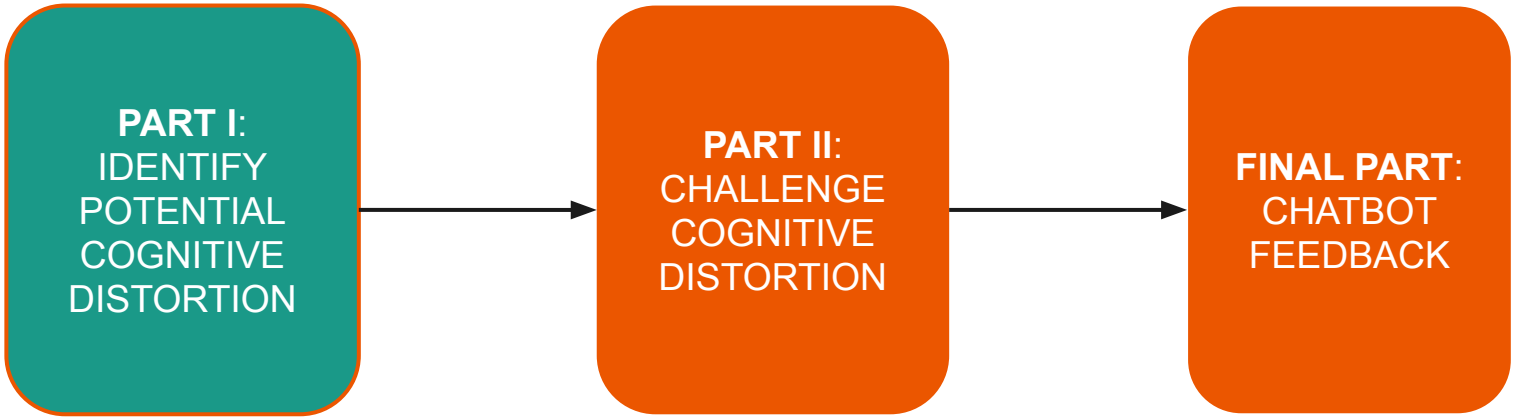

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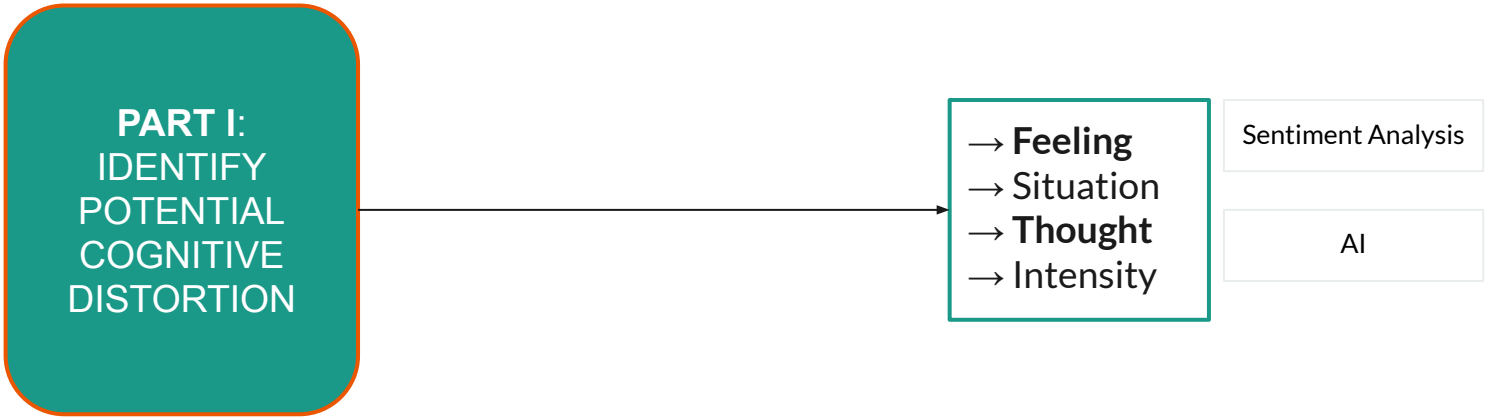

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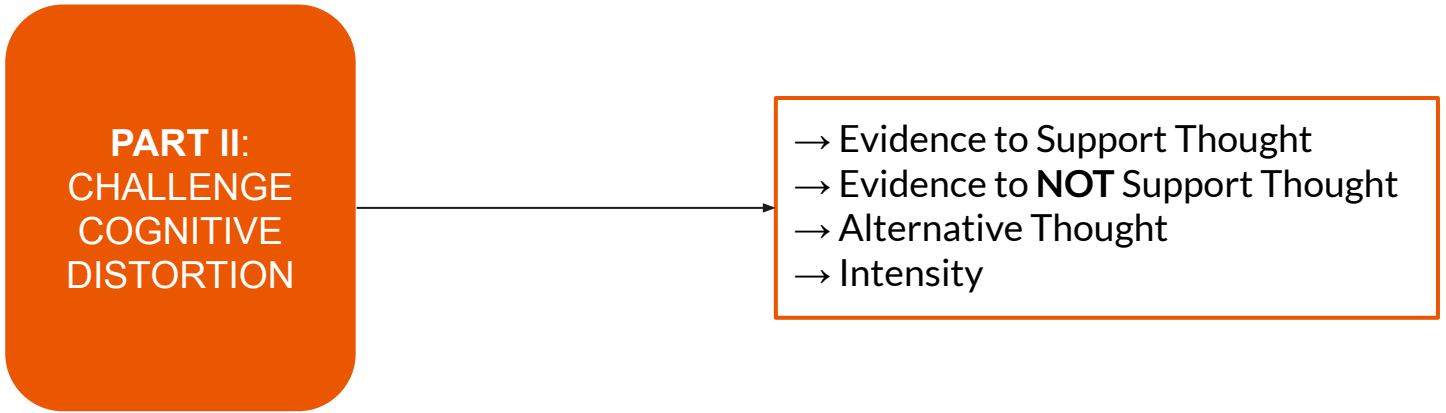

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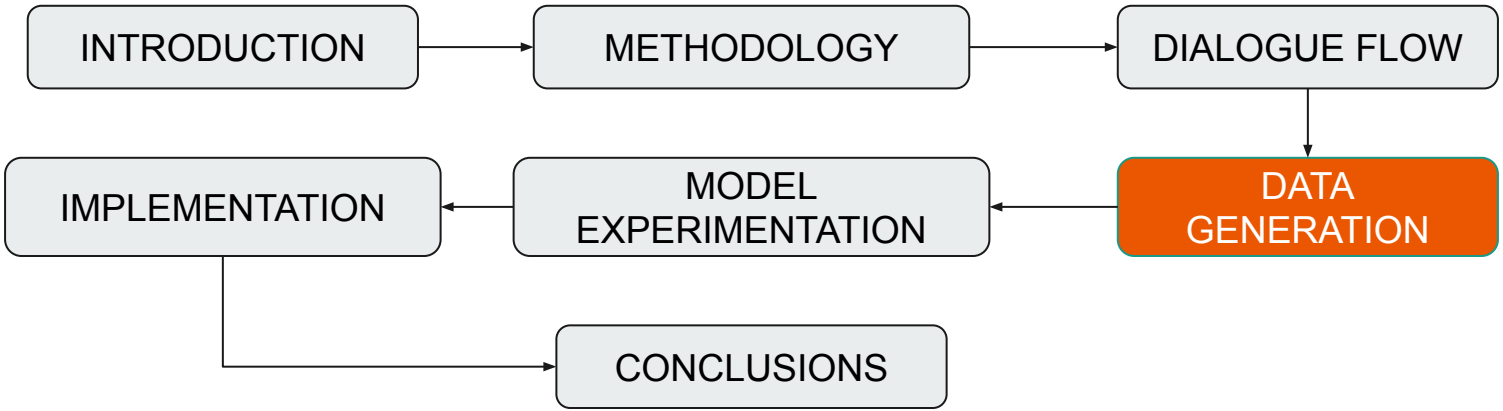
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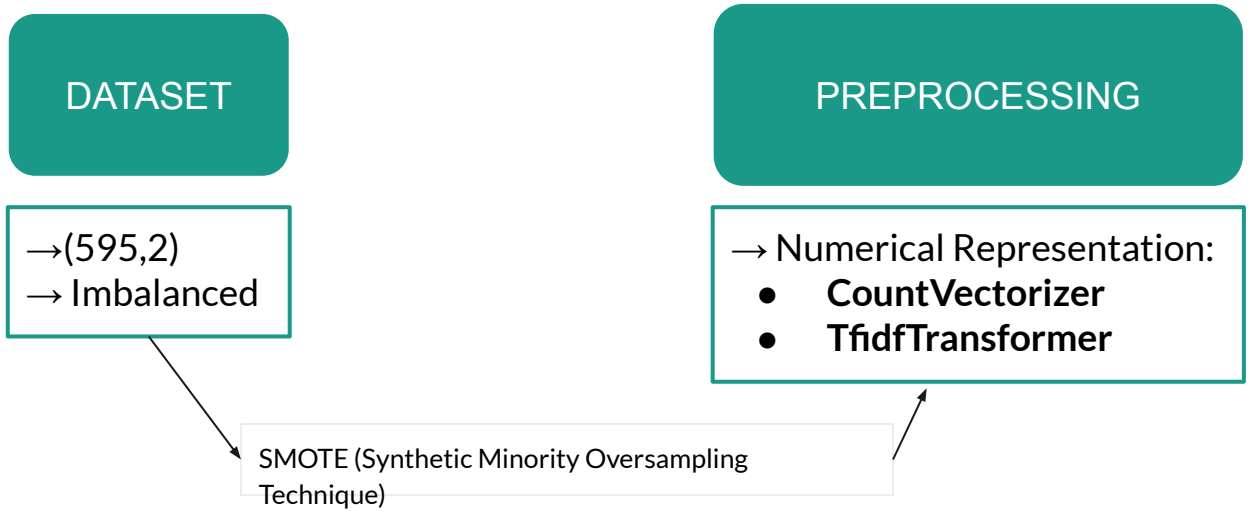

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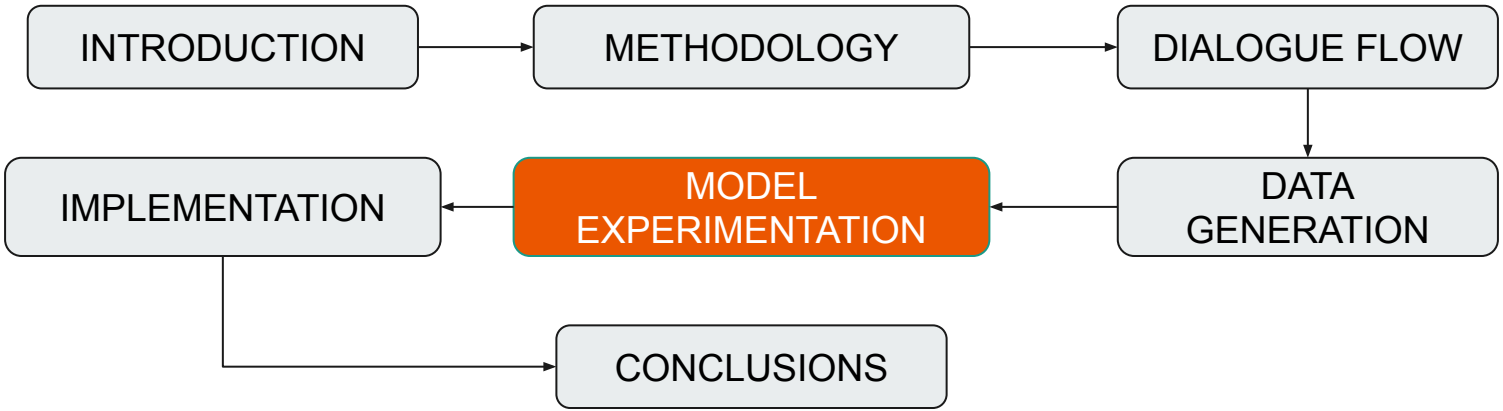
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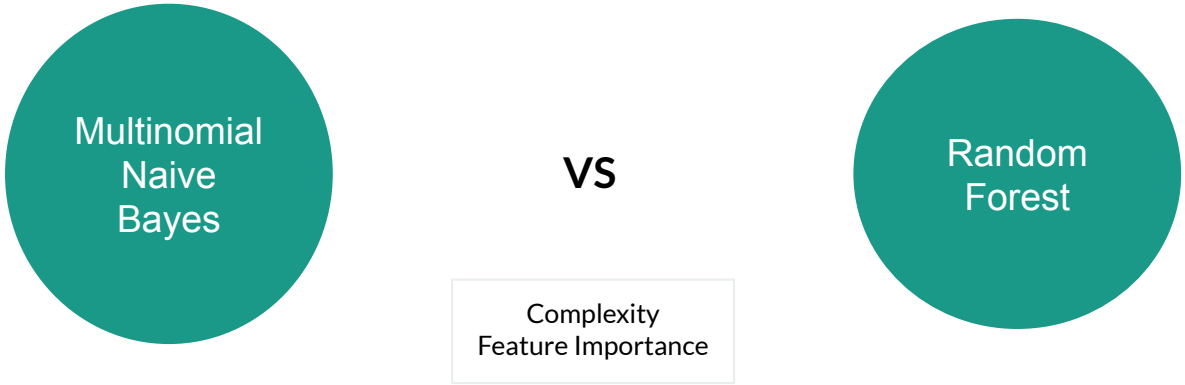
MODEL EXPERIMENTATION

MODEL EXPERIMENTATION

MODEL	BEST PARAMETERS	ACCURACY	PRECISION	RECALL	F1-SCORE	GRIDSEARCHCV
Random Forest	-	0.69	0.71	0.69	0.68	0.67
Multinomial Naive Bayes	*alpha: 0.1*	0.69	0.71	0.69	0.69	0.68
Support Vector Machine	*C: 1.0, decision_function_shape: ovo*	0.67	0.75	0.67	0.67	0.64
Multinomial Logistic Regression	*C: 0.01, penalty: none, solver: saga*	0.65	0.65	0.65	0.64	0.69
K-Nearest Neighbour	*p: 2, weights: distance, k_neighbors: 10*	0.53	0.55	0.53	0.51	0.54

Model Performance

MODEL EXPERIMENTATION



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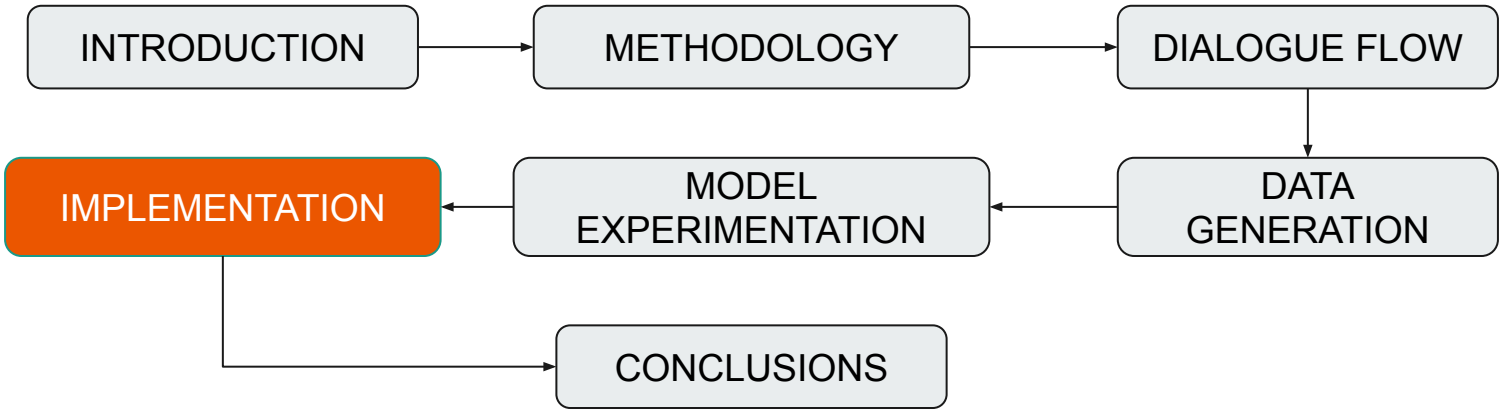
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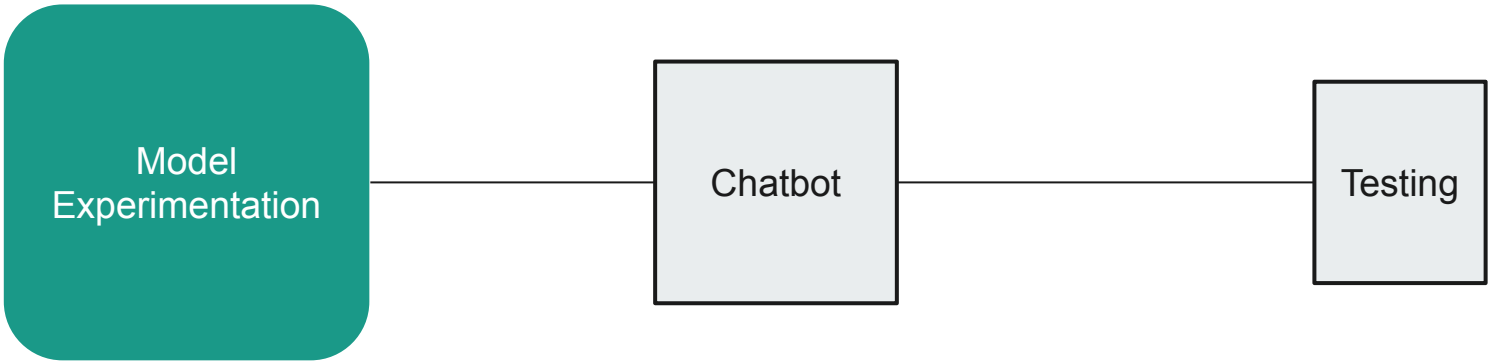


IMPLEMENTATION

Sklearn

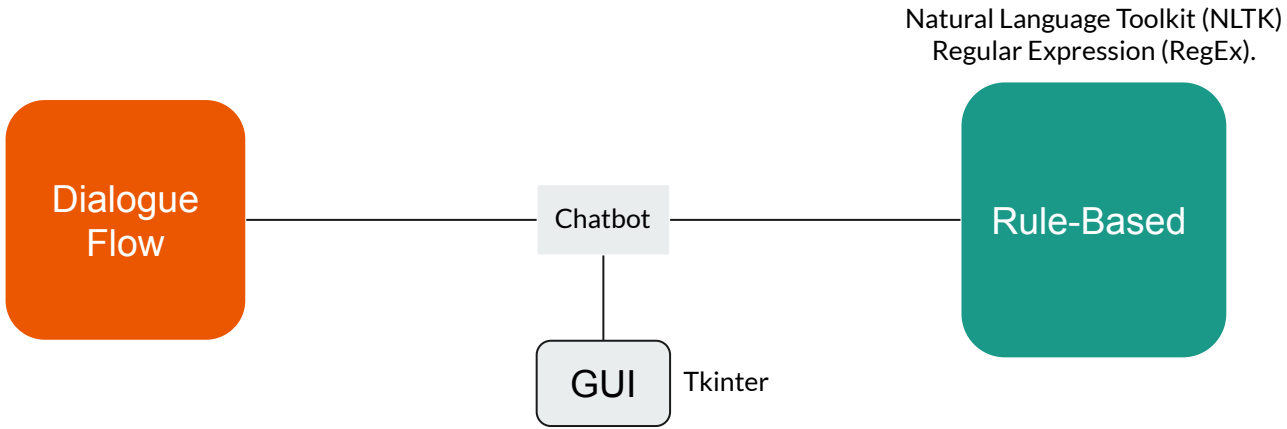
```
# Divide data between training and test data
X = df['Phrase']
y = df['Cognitive Distortion']
X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=0, train_size = .8)
```

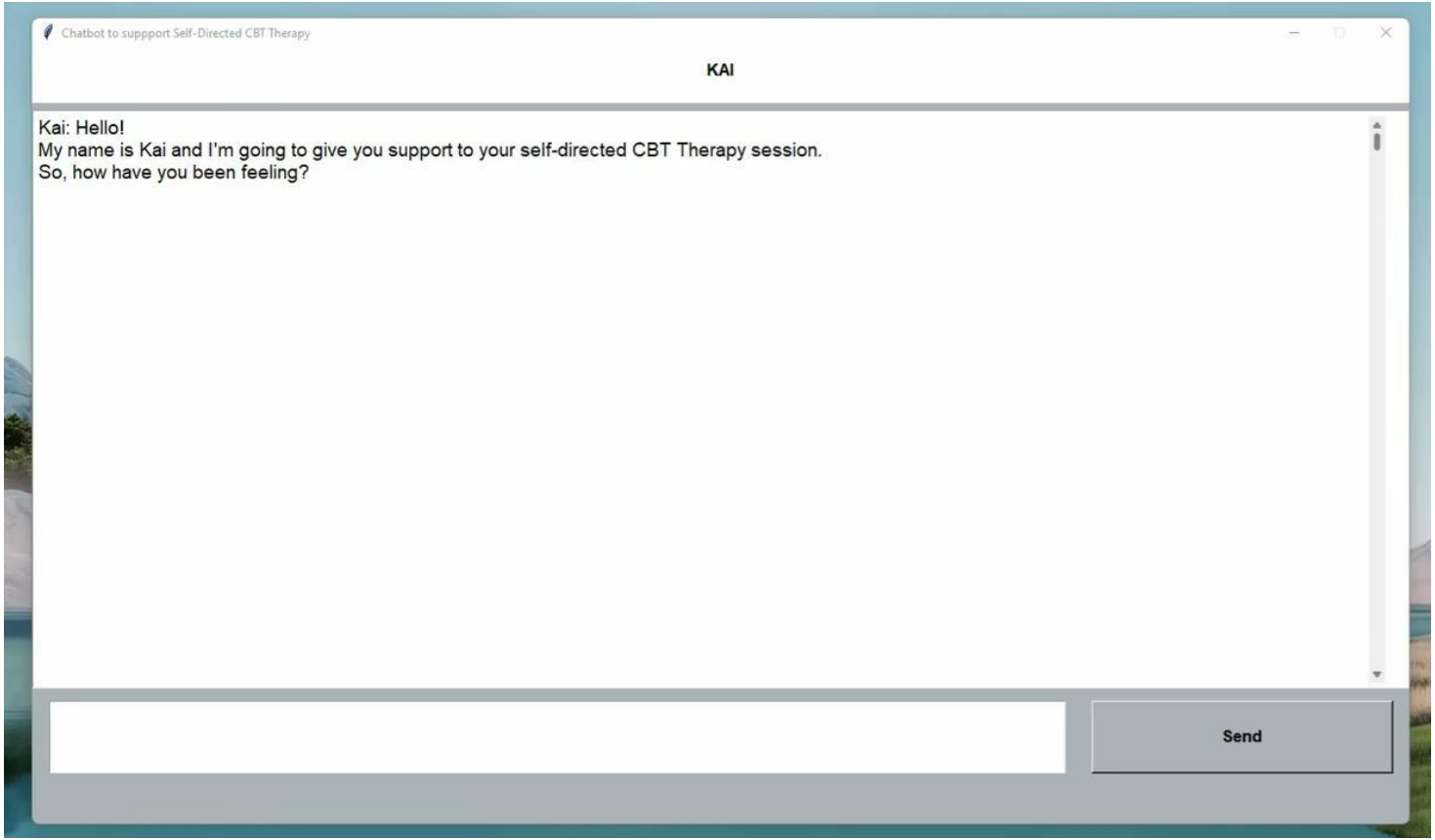
MULTINOMIAL NAIVE BAYES

```
textclassifier = Pipeline([
    ('vect', CountVectorizer()),
    ('tfidf', TfidfTransformer()),
    ('smote', SMOTE(random_state=0)),
    ('mnb', MultinomialNB())
])

# Hyperparameters to tune
params = {'smote__k_neighbors': [2,3,4,5,6,7,8,9,10],
          'mnb__alpha': [0.01, 0.1, 0.3, 0.5, 1.0]
         }

# Hyperprameters tuning
multinomial_nb_grid = GridSearchCV(estimator=textclassifier, param_grid=params, n_jobs=10, cv=10, verbose=5)
multinomial_nb_grid.fit(X_train, y_train)
```

Model Experimentation

IMPLEMENTATION




Chatbot to suppport Self-Directed CBT Therapy
KAI
Kai: Hello!
My name is Kai and I'm going to give you support to your self-directed CBT Therapy session.
So, how have you been feeling?
Send

Demo

CONCLUSIONS

THANK YOU!