

A comprehensive comparison of emotion detection methods

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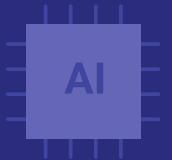




Table of contents

01

Motivation

02

Models

03

**Experimental
setup**

04

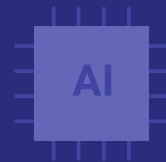
Results



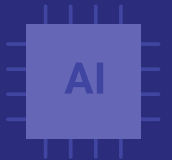


01

Motivation



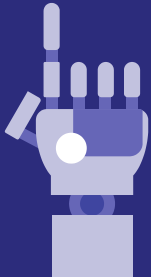
Are the performance improvements of more complex and computationally expensive models worth the cost?





02

Models





Rule Based

Vanilla neural network

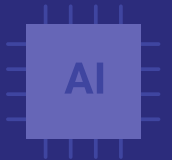
LSTM





03

Experimental setup



Experimental setup



Metrics

Accuracy
Precision
Recall
F1 score
Training time
Inference time



Datasets

dair-ai/emotion

Emotions by Nidula
Elgiriye withana



Hardware

zephyrus g14 laptop
(GA401QM)
AMD Ryzen 9 5900HS
Nvidia RTX 3060



04

Results

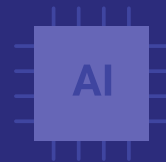


Table 3.1: Accuracy %

Model	dair_ai_emotion	Emotions
rules_based	60.20	65.27
NN_gpu	86.50	83.81
NN	86.05	83.85
LSTM_gpu	89.00	91.30
LSTM	86.95	91.25

Table 3.3: Recall %

Model	dair_ai_emotion	Emotions
rules_based	63.27	70.34
NN_gpu	81.23	78.28
NN	80.76	78.05
LSTM_gpu	86.29	87.86
LSTM	84.39	85.78

Table 3.5: Training time (s)

Model	dair_ai_emotion	Emotions
rules_based	0.08	1.78
NN_gpu	7.71	159.38
NN	20.58	2063.97
LSTM_gpu	25.50	645.32
LSTM	195.69	5413.62

Table 3.2: Precision %

Model	dair_ai_emotion	Emotions
rules_based	60.19	66.15
NN_gpu	84.29	79.26
NN	83.94	79.37
LSTM_gpu	84.94	86.60
LSTM	81.52	87.03

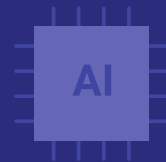
Table 3.4: F1 %

Model	dair_ai_emotion	Emotions
rules_based	55.49	62.38
NN_gpu	82.59	78.75
NN	82.17	78.69
LSTM_gpu	85.58	87.12
LSTM	82.77	86.32

Table 3.6: Inference time [1000] (ms)

Model	dair_ai_emotion	Emotions
rules_based	8.23	7.53
NN_gpu	4.47	4.36
NN	4.06	3.65
LSTM_gpu	19.76	17.29
LSTM	43.54	47.64

How can the performance of emotion detection models be further enhanced, and what impact would these new developments have on training and inference times, particularly in resource-constrained environments?





Thanks!

Do you have any questions?

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