RESEARCH

Predicting Engagement And Boredom in Online Video Lectures

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ABSTRACT

Our study utilizes datasets from Daisee and Kaggle to forecast student interest and boredom in online lectures. We employ CNN for image feature extraction and LSTM for sequential data analysis from video frames. By comparing these techniques across three datasets, we provide insights into their effectiveness in predicting engagement. Our findings offer practical guidance for educators to enhance online teaching strategies, fostering greater student engagement and reducing boredom.We found that CNN was better for all the three dataset.

BACKGROUND INFORMATION

A diverse range of studies explores methods for assessing student engagement in online learning, employing techniques like facial behavior analysis, sentiment analysis from images[1], and deep learning approaches[2]. These studies utilize various datasets and models, including LSTM and CNN[2], to predict engagement levels and analyze facial expressions.Insisghts from these studies highlight the complexity of assessing engagement and offer practical implications for educators to enhance online teaching strategies and improve learning experiences[3].

RESULTS

Dataset 1(Student Engagement from kaggle)

Attributes	actual value	predicted value	TP	TN	FP	FN
engagement	848	109	109	581	0	739
boredom	556	1283	556	873	727	0
confusion	11	0	0	1418	0	11
frustrated	14	0	0	1415	0	14
look away	0	37	0	1429	37	0
drowsy	0	0	0	1429	0	0
Total	1429	1429				

Dataset 2(DAiSEE)

Attributes	actual value	predicted value	TP	TN	FP	FN
engagement	848	1429	848	581	581	0
boredom	556	0	0	873	0	556
confusion	11	0	0	1418	0	11
frustrated	14	0	0	1415	0	14
Total	1429	1429				

Dataset 1 + Dataset 2

Attributes	actual value	predicted value	TP	TN	FP	FN
engagement	873	1429	873	556	556	0
boredom	556	0	0	873	0	556
Total	1429	1429				

Fig. 2 LSTM Result

Dataset 1(Student Engagement from kaggle)

Attributes	actual value	predicted value	TP	TN	FP	FN
engagement	69	69	69	352	0	0
boredom	71	52	52	350	0	19
confusion	73	73	73	348	0	0
frustrated	72	77	72	349	5	0
look away	84	85	84	337	1	0
drowsy	52	65	52	369	13	0
Total	421	421				

Dataset 2(DAiSEE)

Attributes	actual value	predicted value	TP	TN	FP	FN
engagement	1674	1711	1674	110	37	0
boredom	75	48	48	1709	0	27
confusion	18	25	18	1766	7	0
frustrated	17	0	0	1767	0	17
Total	1784	1784				

Dataset 1 + Dataset 2

Attributes	actual value	predicted value	TP	TN	FP	FN
engagement	1674	1403	1403	110	0	271
boredom	110	381	110	1674	271	0
Total	1784	1784				

Fig. 3 CNN Result

Model	Accuracy		
	Dataset 1	*Dataset 2*	*Mixed Dataset*
CNN	0.985	0.988	0.858
LSTM	0.871	0.5045	0.463

Fig. 4 Accuracy Table

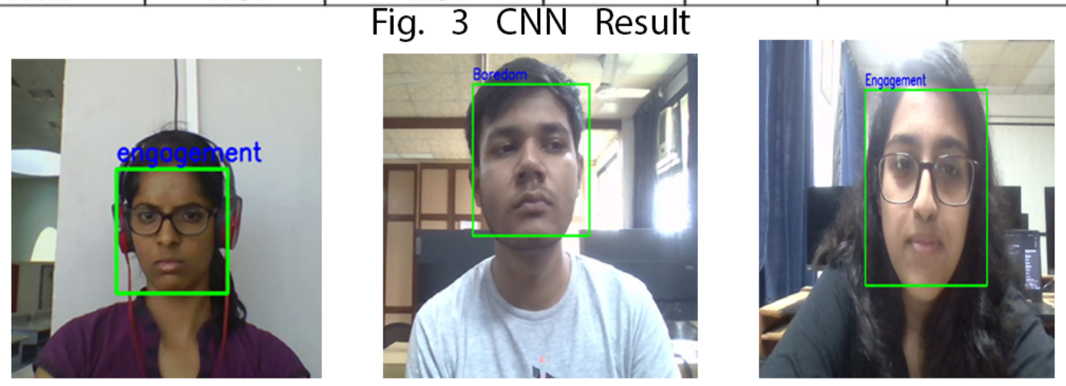

Fig. 5 Output

INTRODUCTION

The lack of reliable tools for assessing student engagement in virtual classes prompts the need for a Video Analyzer for Student Engagement. Our project aims to address this gap by developing an automated system that objectively analyzes engagement and boredom during online lectures. With a focus on real-time feedback and advanced video analysis techniques, the system offers educators valuable insights to tailor teaching methods and enhance learning outcomes in the rapidly evolving landscape of online education.

METHODOLOGY DESIGN

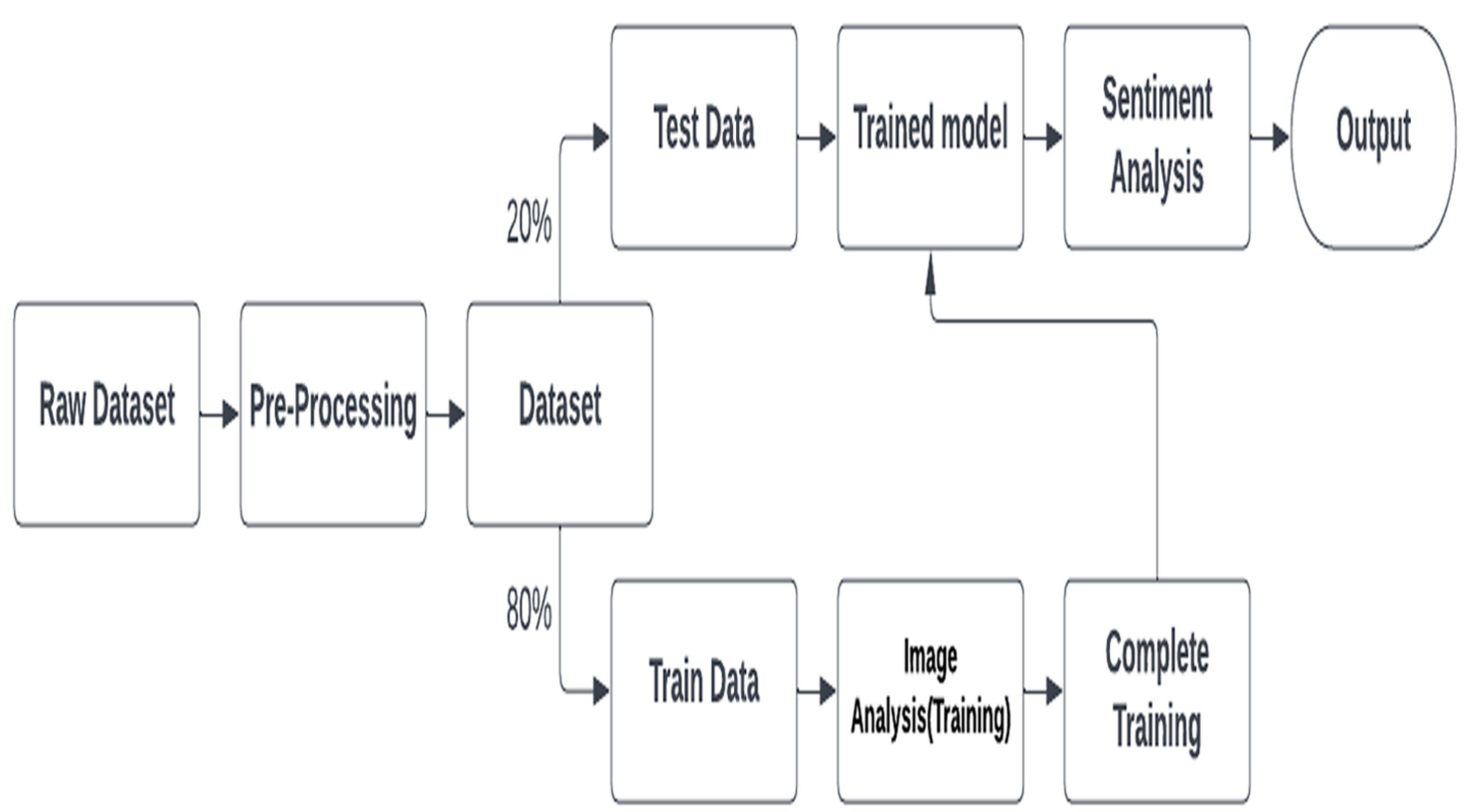

Fig.1 Methodology

CONCLUSION

Our project sheds light on leveraging machine learning and computer vision for predicting engagement in online lectures. While Model 1 excelled across diverse datasets, Model 2 faced challenges, highlighting the importance of understanding model adaptability. Moving forward our, insights pave the way for tailored teaching methods and improved virtual learning experiences, signaling ongoing potential for innovation in online education.

REFERENCES

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[3]C. SAntiago Jr., A.T. Alarcon, et al.(2020). "Sentiment Analysis of Students' Experiences During Online Learning in a State University in thr philippines." Eduction and Information Technologies, 25(5), 3971-3990.

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