National College of Ireland

Project Submission Sheet

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Programme:	MSc in Data Analytics	**Year:**	2023-2024
Module:	Data Governance and Ethics (H9DGE)		
Lecturer:	3rd August 2024		
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I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the references section. Students are encouraged to use the Harvard Referencing Standard supplied by the Library. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action. Students may be required to undergo a viva (oral examination) if there is suspicion about the validity of their submitted work.

Signature: Divyansh Anand

Date: 3rd August 2024

PLEASE READ THE FOLLOWING INSTRUCTIONS:

1. Please attach a completed copy of this sheet to each project (including multiple copies).
2. Projects should be submitted to your Programme Coordinator.
3. **You must ensure that you retain a HARD COPY of ALL projects**, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer. Please do not bind projects or place in covers unless specifically requested.
4. You must ensure that all projects are submitted to your Programme Coordinator on or before the required submission date. **Late submissions will incur penalties.**
5. All projects must be submitted and passed in order to successfully complete the year. **Any project/assignment not submitted will be marked as a fail.**

Office Use Only	
Signature:	
Date:	
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AI Acknowledgement Supplement

[Insert Module Name]

[Insert Title of your assignment]

Your Name/Student Number	Course	Date

This section is a supplement to the main assignment, to be used if AI was used in any capacity in the creation of your assignment; if you have queries about how to do this, please contact your lecturer. For an example of how to fill these sections out, please click here.

AI Acknowledgment

This section acknowledges the AI tools that were utilized in the process of completing this assignment.

Tool Name	Brief Description	Link to tool

Description of AI Usage

This section provides a more detailed description of how the AI tools were used in the assignment. It includes information about the prompts given to the AI tool, the responses received, and how these responses were utilized or modified in the assignment. **One table should be used for each tool used**.

[Insert Tool Name]	
[Insert Description of use]	
[Insert Sample prompt]	[Insert Sample response]

Evidence of AI Usage

This section includes evidence of significant prompts and responses used or generated through the AI tool. It should provide a clear understanding of the extent to which the AI tool was used in the assignment. Evidence may be attached via screenshots or text.

Additional Evidence:

[Place evidence here]

Additional Evidence:

[Place evidence here]

Data Governance and Ethics CA2:

Ethical Concerns for Research in Computing

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Abstract: The goal of speech emotion recognition is to make human-computer interaction more efficient in several areas. This paper provides an in-depth study on speech emotion recognition using a hybrid deep neural network architecture that combines 1-D Convolutional Neural Network (CNN) and BiLSTM-Transformer models. This proposed method is to improve emotion detection by focusing on capturing local patterns, dealing with sequence data, and handling hierarchical structures of audio. Ethical concerns are also highlighted, especially when dealing with publicly accessible datasets such as RAVDESS and CREMA-D obtained from Kaggle. Key ethical concerns include keeping participant identities anonymous, obtaining permission to use their data properly, addressing bias in model training, and considering moral issues with automated decision-making processes, particularly in sectors like healthcare. Post-research considerations include data anonymization, secure storage, and reflecting on the use of findings. By following these ethical guidelines, the work responsibly contributes to the field of speech emotion recognition and the practice of ethical AI technologies.

Keywords: Speech Emotion Recognition, Public Datasets, Ethical Concerns, AI Technologies

I. Introduction

Speech emotion recognition offers tremendous future implications to transform human-computer interfaces, improving sectors like customer service, education, and healthcare services. Therefore, the main goal of this study is to create a high-performance emotion recognition model for real-world application based on the hybrid 1-D CNN, BiLSTM, and Transformer model. This hybrid approach leverages the strengths of each component to capture local patterns in sound, handle sequence data, and manage complex hierarchical structures in audio, thereby improving the robustness and accuracy of emotion detection.

Ethical considerations are crucial in this research, particularly concerning the use of publicly available datasets such as RAVDESS and CREMA-D from Kaggle. Key considerations include patient privacy and confidentiality, control of information, informed consent of the participants, credibility and legitimacy of the data gathered, and potential bias. In line with ethical research standards, this study safeguards participant privacy through confidentiality and ensures voluntary participation by obtaining informed consent. To address ethical research standards, this research has focused on two strategies: maintaining the confidentiality of participants and obtaining informed consent. [1]

Confidentiality ensures that all important information, such as participants' names, contact details, and emotional data, is securely stored and accessed only by authorized personnel. This protects the privacy of individuals whose data is used in the study. Informed consent helps participants understand why the research is conducted, how their information will be used, and any possible gains or losses arising from their contribution. Informed consent is documented from the participants themselves. Responsible and ethical AI in emotion recognition requires careful consideration of these ethical issues to ensure the proper usage of AI for emotion recognition.

II. Evaluation

The ethical concerns in research, can be categorized into three phases: before, during, and after the research. Below are the important concerns that are considered for each phase in the research. [2]

Before the Research

A) Avoid misconduct

To avoid misconduct and conduct research ethically, several questions must be answered before starting the project. The primary issue is informed consent. While the RAVDESS and CREMA-D datasets can be accessed from Kaggle, it is important to ensure that the original data collection processes

complied with ethical practices such as seeking consent from participants. This involves confirming that participants had adequate information about the research's aim and nature, what would happen to their data, and any advantages or drawbacks they might experience, and that they gave their consent willingly. Researchers can only rely on the provided documentation to ensure that ethical practices were followed.

B) Data ownership and usage

Data ownership and usage is another major issue. Researchers must clearly state data ownership and usage terms, arranging data use agreements that outline rights and restrictions. It is also essential to minimize bias in the data collection process to ensure fair and accurate emotion recognition. Collected datasets should represent various demographics to improve the model's ability to generalize.

During the Research

A) Privacy and security

Privacy and security must be preserved throughout the research phase. Restricting data access to unauthorized personnel protects participants' identities and information. Secure encryption and access control methods prevent unauthorized access and breaches. Compliance check-ups should be performed regularly to ensure data handling remains secure.

B) Bias in model information

Bias in model formation requires constant supervision. The training phase can introduce inherent biases, which may affect decision-making. Researchers should periodically check the training process for biases and correct them. Cross-validation with other datasets can help identify and address biases. [3]

C) Ethical Implications

Ethical implications of the emotion recognition system's decisions must also be considered. Wrong classification of emotions, especially in healthcare applications, can have serious consequences. [4] Guidelines for ethical automated decision-making should ensure transparency and accountability. The decision-making process must be understandable, with procedures in place to handle negative outcomes.

After the Research

A) Ethical considerations

After Ethical considerations remain important after completing the research. Data retention and anonymization are critical. Researchers should establish data retention policies that specify how long data will be stored and the anonymization process to protect participants. Data should be stored only as long as necessary, and personal data should be deleted or anonymized.

B) Honesty and transparency

Honesty and responsibility in presenting research findings are essential. Detailed instructions on model creation, training, and evaluation enhance transparency and allow for assessment by other researchers. Academic authors should disclose the full methodologies used and present findings in detail to enable replication and validation. This openness builds confidence and dependability in the research.

C) Impact assessment

Conducting a comprehensive impact assessment of the emotion recognition system is crucial to identify potential societal impacts and address negative consequences. Evaluating the system's effects on various stakeholders and developing strategies to mitigate adverse effects is essential. The study's efficient output and positive knowledge impact provide a framework for ethical AI usage in emotion recognition.

By addressing these ethical issues at each research stage, this study aims to conduct responsible and ethically sound research, contributing positively to the field of speech emotion recognition and ensuring the responsible use of AI technologies.

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III. References

[1] M. Roy, “Cathy O’Neil. Weapons of Math Destruction: How big data increases inequality and threatens democracy. New York: Crown Publishers, 2016. 272p. Hardcover, $26 (ISBN 978-0553418811).,” *College & Research Libraries*, vol. 78, no. 3, p. 403, Apr. 2017, doi: 10.5860/crl.78.3.403. Available: https://doi.org/10.5860/crl.78.3.403

[2] A. F. Wackenhut, “Ethical Considerations and Dilemmas Before, during and after Fieldwork in Less-Democratic Contexts: some Reflections from Post-Uprising Egypt,” The American Sociologist, vol. 49, no. 2, pp. 242–257, Aug. 2017, doi: 10.1007/s12108-017-9363-z. Available: https://doi.org/10.1007/s12108-017-9363-z

[3] N. Mehrabi, F. Morstatter, N. Saxena, K. Lerman, and A. Galstyan, “A survey on Bias and Fairness in Machine Learning,” *ACM Computing Surveys*, vol. 54, no. 6, pp. 1–35, Jul. 2021, doi: 10.1145/3457607. Available: https://doi.org/10.1145/3457607

[4] F. Li, N. Ruijs, and Y. Lu, “Ethics & AI: A Systematic Review on Ethical Concerns and Related Strategies for Designing with AI in Healthcare,” *AI*, vol. 4, no. 1, pp. 28–53, Dec. 2022, doi: 10.3390/ai4010003. Available: https://www.mdpi.com/2673-2688/4/1/3