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Sensing Emotions: Mapping Emotional Experiences of the Visually Impaired

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ABSTRACT: Navigating daily life, a blind person employs tools such as canes, guide dogs, and auditory cues to move independently. Their journeys are marked by an intricate mental map, constructed from a symphony of sounds, textures, and spatial perceptions. the emotional experiences of visually impaired individuals is essential for improving their well-being and designing inclusive support systems. This study focuses on leveraging machine learning (ML) techniques to map emotional experiences within the visually impaired community. Through the utilization of ML algorithms such as k-means clustering, hierarchical clustering, and Gaussian mixture models, emotional data collected through diverse sensory modalities are analyzed to identify distinct emotional clusters. Surveys and interviews tailored for the visually impaired population capture emotional nuances beyond visual cues. Additionally, integrating physiological signals and contextual information enriches the emotional mapping process. The findings contribute to a deeper understanding of the emotional landscape of the visually impaired, facilitating the development of more inclusive technologies and support interventions.

KEYWORDS: Sensing Emotions, Emotional Mapping, Visually Impaired, Machine Learning Techniques.

I. INTRODUCTION

Visual impairment significantly influences individuals' perception and expression of emotions, presenting unique challenges for understanding and addressing their emotional well-being. The ability to accurately assess and map emotional experiences among the visually impaired is essential for developing tailored interventions and support systems that cater to their specific needs. Traditional approaches to studying emotions often rely on visual cues, posing limitations for this population. This study focuses on the application of ML techniques to sense and map emotional experiences within the visually impaired community. By leveraging ML algorithms such as k-means clustering, hierarchical clustering, and Gaussian mixture models, aims to identify distinct emotional patterns and clusters within datasets collected through various sensory modalities. The integration of additional features, such as physiological signals and contextual information, further enriches the emotional mapping process, providing a holistic understanding of emotional experiences among the visually impaired. By mapping emotional experiences using ML techniques, this study contributes to a deeper understanding of the emotional needs and challenges faced by the visually impaired community. The insights gained from this research have the potential to inform the development of more inclusive technologies, interventions, and support systems that empower individuals with visual impairments to navigate and express their emotions more effectively.

II. LITERATURE REVIEW

Prior research literature has not used the combination of key methodological features of this study, i.e., a focus on a national sample of legally blind people who are (or recently have been) employed; time-use methodology; and inclusion of a demographically matched sighted group for comparison. There are, however, **(Solhi et al., 2020)**a few pertinent studies that share this study's central concern with lifestyles of people who are legally blind (though the term

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lifestyle was not used). These areas of focus are viewed in the larger context of legally blind people's life situations. Each study pointed to evidence of diversity in legally blind persons' lifestyles, and the importance of sociodemographic influences that similarly affect the life chances of sighted people**(Asmaa M. Abdelazeem et al., 2022)** Since none of the studies included a sighted sample, they could only suggest that some of the legally blind people demonstrated very similar activity patterns in comparison to sighted people. **N**avigating daily life, a blind person employs tools such as canes, guide dogs, and auditory cues to move independently **(Daniele Leonardis, Claudio Loconsole, Antonio Frisoli et al., 2022)**Their journeys are marked by an intricate mental map, constructed from a symphony of sounds, textures, and spatial perceptions. This reliance on non-visual cues fosters a unique relationship with the environment, fostering creativity and innovation in finding solutions to challenges. The evaluation of assistive technologies based on fourteen key parameters, namely impediment detection, localization, scene details, detection range, speed, security & privacy, field of coverage, functionality, adaptability, portability, real-time evaluation, battery life, cost, and user acceptance**(JyothiMadakeShiripadBhatlawande et al., 2022)**.One may hope and expect that the employment rate among people with disabilities is beginning to improve in response to legislation promoting that aim through access to education, more client control over services, and prohibition of discrimination **(Rao GN et al., 2020)**Pending truly equal employment opportunities and in preparation for it, much is to be learned by close study of today's employed legally blind minority.

III. METHODOLOGY

3.1Data Collection and Preprocessing

Data collection through various sensory modalities, including auditory, tactile, and verbal cues, to accommodate diverse communication methods.Design and development of survey for the visually impaired population to capture emotional experiences.Cleaning and preprocessing of collected data to remove noise and irrelevant information.Feature extraction to represent emotional responses in a suitable format for ML algorithms.

3.2Machine Learning Techniques

Selection of appropriate ML algorithm for emotional mapping, includes K-means clustering, Partitioning data into distinct clusters based on similarity of emotional responses.

3.3Model Training and Evaluation

Train ML models using the preprocessed and engineered features to identify emotional clusters within the dataset.Tuning hyper-parameters and evaluating model performance using appropriate metrics.Analysis of identified emotional clusters to interpret and understand common emotional patterns and nuances within the visually impaired community.Validate the trained models using cross-validation techniques.Evaluate the performance of the clustering algorithms using metrics

3.4 Interpretation and Visualization

Interpret the identified emotional clusters and patterns to gain insights into the emotional landscape of the visually impaired community.Visualize the emotional clusters and their relationships using interactive plots, visualization techniques to interpretation and communication of the results.

IV. GENERAL COMPARISON BETWEEN BLIND AND SIGHTED INDIVIDUALS

The comparison between blind and normally sighted individuals encompasses various aspects, including sensory experiences, daily life, challenges, and compensatory abilities. It's important to note that individuals within these groups can have diverse experiences, and generalizations may not apply to everyone.

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Table 1 CHARACTERISTIC OF BLIND AND SIGHTED INDIVIDUALS

Characteristic	Blind Individuals	Sighted Individuals
Vision	No functional vision	Visual orientation and spatial awareness
Navigation	Reliance on alternative senses and mobility aids	Visual orientation and spatial awareness
Education	Access to Braille and specialized educational resources	Standard visual learning materials
Employment	Face barriers in mainstream job market	More opportunities in various fields
Social Interaction	May rely more on verbal communication and touch	Incorporates visual cues , nonverbal communication

V. SENTIMENTAL ANALYSIS

Sentiment Score = (Σ Emotion_i* Weight_i) / N

Σ Emotion_i * Weight_i refers to the sum of each emotion's score multiplied by its corresponding weight.N is the total number of emotions considered.

Sentiment Score = (0.8 * 0.4 - 0.7 * 0.3 - 0.6 * 0.2 + 0.5 * 0.1) / 4

Sentiment Score = (0.32 - 0.21 - 0.12 + 0.05) / 4

Sentiment Score = 0.04

Tone based analysis

Formula:

Emotional Score = (ΣE_i * C_i) / N

ΣE_i represents the sum of emotional scores for each word or phrase.

C_i is the coefficient associated with each emotional score.

N is the total number of words or phrases in the communication

Table 2

Emotion	Score (Range: -1 to 1)	Weight
Happiness	**0.8**	**0.4**
Sadness	**-0.7**	**0.3**
Anger	**-0.6**	**0.2**
Surprise	**0.5**	**0.1**

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5.1 MOOD SWINGS OF THE BLIND PEOPLE

Table 3

Feelings	Description	Ratings in Sign code
Isolation	A sense of being cut off from others	⠉⠒⠤
Independence	Empowerment in the navigating the world.	⠉⠓⠉⠒⠤
Confidence	Self assuredness in abilities	⠤⠒⠓
Empowerment	Strength and self determination	⠉⠤⠒⠓⠤
Joy	Experiencing happiness and pleasure	⠓⠒⠓
Anxiety	Feelings of worry	⠉⠤⠓

In the fig 1 study was designed, in part, to counter these stereotypes. It reports on a sample of emotions who are legally blind. This study also aims to help improve vocational rehabilitation services by broadening the view of successful rehabilitation beyond that of simply obtaining some kind of employment.

Fig:1

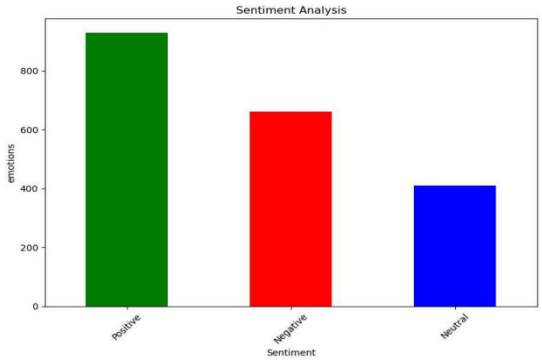
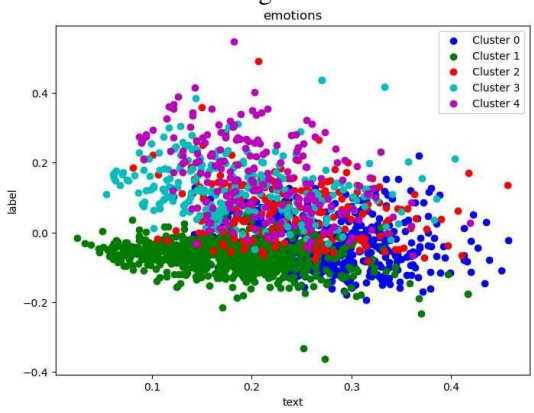


Fig-2:



https://github.com/Saranyahopeai/NLP-survey/blob/main/emot%20cluster.ipynb
https://github.com/Saranyahopeai/NLP-survey/blob/main/sentiment.py.ipynb

VI. CONCLUSION

In conclusion, this study has demonstrated the potential of machine learning (ML) techniques to sense and map emotional experiences among the visually impaired community. By leveraging ML clustering algorithms and

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integrating diverse data sources, including surveys, interviews, physiological signals, and contextual information, we have gained valuable insights into the complex emotional landscape of individuals with visual impairments.This study have implications for the design of more inclusive technologies, interventions, and support systems that cater to the emotional needs of individuals with visual impairments. By developing a deeper understanding of their emotional experiences, we can enhance the effectiveness and accessibility of services aimed at promoting their well-being and fostering greater social inclusion.Moving forward, further research is needed to refine and validate our findings, incorporating feedback from stakeholders within the visually impaired community and exploring new avenues for studying emotions using ML techniques. By continuing to innovate and collaborate, can continue to advance our understanding of emotions in the visually impaired population and work towards creating a more inclusive and empathetic society for all.

REFERENCES

1. Solhi, M., Azar, F.E.F., Abolghasemi, J., Maheri, M., Irandoost,S.F., &Khalili.S(2020). The effect of educational intervention on health promoting lifestyle: Intervention mapping approach. Journal of Education and health promotion.
2. Rao GN. Vision 2020: The Right to Sight. Community Eye Heal available from:https://www.cehjournal.org/wp-content/uploads/download/ ceh_13_35_042.
3. JyothiMadakeShiripadBhatlawande,AnjaliSolanke,andSwatiShilaskar date of publication (2023, June) A Qualitative and Quantitative Analysis of Research in Mobility Technologies for visually impaired.
4. World Health Oraganisation (2021) Blindness and vision impairment available from https://www.who.int/newsroom/fact sheets/detail/blindness- and -visual-impairment. [Last accessed on 2022 feb 5].
5. Minia Scientific Nursing Journal (print ISSN 2537-012X) (Online- ISSN 2785-9797)vol.11 No.(1) June 2020 Healthy Lifestyle Practices among Visually Impaired Adolescent Students at El-Noor School in Minia Governorate Asmaa M. AbdelazeemYosria E. Hossein, Ekhlass M. Eltomy, ManarD.Mohamad
6. Ministry of Statics and Programme Implementation. Sustainable Development Goals and NationalIndicatorFrameworkProgressReport,2020 htpp://www.mospi.gov.in/sites/default/files/publication_reports/SDGProgressReport2020
7. **"NLS"** National Library services For the blind and print disabled library of congress Braille book review March-April 2020.
8. Daniele Leonardis, Claudio Loconsole, Antonio Frisoli A Survey on Innovative Refreshable Braille Display Technologies International Conference on Applied Human Factors and Ergonamics May2022.
9. Bing Liu Sentiment Analysis and Opinion Mining Publication in Springer Series Springer Nature Switzerland AG 2022.
10. Saif M. Mohammad National Research Council Canada Ethics Sheet for Automation Emotion Recognition and Sentiment Analysis 2022.

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