**Predicting Postnatal Depression During the COVID-19 Pandemic**

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Abstract

This is the first section if you're using the ACM proceedings template. After the title, you can add the abstract section, which is brief. It should consist of 1-2 paragraphs, intended as a quick, executive summary. These 1-2 paragraphs should very briefly address what the project is about, the problem you are tackling, the approach you are using, the key work tasks you have accomplished, and the key results. Use one or two sentences for each of these points, then you will have your abstract. This section should be short but provide a good summary because most people start reading a report with the abstract. From the abstract, they should already have a good understanding of the gist of your project and decide whether they want to read more details. Compared to your proposal report or a checkpoint report, your abstract should already have a reasonably good summary of the problem and tasks. When finishing your project, ensure your abstract includes a couple of sentences highlighting your key findings. For example, you might state that you found a strong correlation between A and B or that you developed a model achieving a certain accuracy. Essentially, highlight the most important findings of your project.

This project aims to develop a predictive model for identifying individuals at high risk of postnatal depression using data collected from pregnant individuals during the COVID-19 pandemic. The data includes demographic information, mental health scores, and perceived threat levels. By leveraging data mining techniques, we aim to provide valuable insights that can inform healthcare providers and support timely interventions.

Introduction

Then we'll dive into the introduction section. This section is very important because it sets the stage. You want to convince people that you are working on a significant problem, so make it clear what problem you are addressing and why it is important. By now, you should have a very good understanding of your problem setting. Review the language to refine and polish the text, highlighting the problem, its importance, why previous solutions are insufficient, and the contribution of your work. This contribution could include achievements from your project and potential future impacts. Think broadly about the application scenarios of your findings.

The COVID-19 pandemic has been a significant stressor globally, particularly for pregnant individuals. Increased stress during pregnancy can adversely affect both the mother and the infant, potentially leading to postnatal depression. This project utilizes data from the Pregnancy during the COVID-19 Pandemic (PdP) project to build a model predicting the Edinburgh Postnatal Depression Scale (EPDS) scores. The goal is to identify key factors contributing to postnatal depression and provide a tool for early identification and intervention.

Related Work

Previous studies have highlighted the impact of stress during pregnancy on maternal mental health. Research has shown that higher anxiety and perceived threats can increase the risk of postnatal depression. Various models have been developed to predict postnatal depression, but few have focused on the unique stressors presented by the COVID-19 pandemic. This project builds on existing work by incorporating COVID-19-specific stress factors into the predictive model.

Proposed Work

Then we move to the main section: the proposal work. By now, the proposal work is what you have actually accomplished, but we can use the same section title for now. Ensure you thoroughly review the entire section, as your understanding is probably much deeper and better compared to when you started. Update the information, such as datasets and tools. If you added a new dataset or changed the one you were using, or if you used new tools, update those details.

When discussing the main tasks, some of them were likely included during your checkpoint stage as completed tasks. It's okay to leave those as they are, but if there were any iterations, updates, or changes, revise those parts as well. Add new pieces that you talked about in your proposal or checkpoint, detailing how you accomplished them. Provide specifics on the analysis, modeling, and setup for particular designs.

Include the reasoning behind your actions. Don't just write about what you did and how you did it; explain why you did it this way, why you chose this method over another, and why your particular change improves existing methods. Adding reasoning gives context to your specific tasks.

If there were tasks you didn't get to, move that information to your discussion section. The discussion section is where you address changes or unfinished tasks. It's fine to note if you didn't complete certain parts. Your proposal work section should focus on what you have accomplished, and the discussion section can cover the tasks you didn't get to.

The proposed work involves several key steps:

1. Data Cleaning: Handling missing values and converting categorical variables to numerical form.
2. Exploratory Data Analysis (EDA): Visualizing data relationships and identifying potential correlations.
3. Feature Engineering: Selecting relevant features such as maternal age, household income, education, anxiety scores, and perceived threat levels.
4. Modeling: Training and evaluating regression models (Linear Regression and Random Forest Regressor) to predict EPDS scores.
5. Evaluation: Using Mean Squared Error (MSE) and R-squared (R²) to evaluate model performance.
6. Feature Importance: Identifying key features contributing to postnatal depression using the Random Forest model.

Evaluation Plan

Make sure you thoroughly complete the evaluation section. By the checkpoint report, you should have had a reasonably good evaluation plan, possibly with preliminary results. In your final report, ensure this section is comprehensive, including the setup, metrics, experimental setup, comparisons with other methods, and key results.

Depending on your project, you may have either too few or too many results. Include the most important findings, prioritizing significant results and summarizing less crucial ones. Go beyond merely reporting numbers—interpret what they mean. Explain why one method outperforms another or why certain metrics are better in specific scenarios.

Presentation matters too. Use tables and figures to make results clear and easy to read. Highlight key performance metrics with bold text or colors. Use bar charts, pie charts, temporal charts, and other visual aids to effectively convey your findings.

Evaluation Metrics

Experimental Setup

Methods to Compare

Key Results

Discussion

After covering the main sections, focus on the discussion section. This part monitors the project's progress and what you've learned. Include your timeline, current status, and future tasks or ongoing work. Reflect on the entire process, noting challenges, changes, and lessons learned. This reflection is crucial for understanding how to improve project execution and carrying out data-mining projects more effectively.

Project Timeline

(Potential) Challenges

Alternative Approaches/backip plan

Changes, lessons

Week 3: Data Cleaning and Preparation

Week 4: Exploratory Data Analysis and Feature Engineering

Week 5: Model Training and Initial Evaluation

Week 6: Model Refinement and Feature Importance Analysis

Week 7: Final Evaluation and Report Preparation

Conclusion

Now we get to the conclusion section. Finally, we're wrapping up the report and the whole project. Your summary should provide a comprehensive overview of your project. This is one of the last sections people will read, so ensure it is concise and clear, highlighting key aspects of your project.

When finishing your project, finalize your discussion with your key findings. Identify the most important findings and list them in order, if appropriate. Don't just report results; synthesize them and highlight the key points. This helps readers quickly grasp the most significant aspects of your work without having to sift through all the details. It's your responsibility to identify and present the most important findings of your project.

Project Summary

Key findings

Future work

Other data to incorporate

Other questions to explore

Better method

More experiments

Larger scale

REFERENCES

[1] Gao, W., Jalal, Z., Taylor, B. K., Qian, H., Reichert, A. R., & Blank, P. R. (2023). The impact of COVID-19 pandemic on mental health in pregnant individuals. The Lancet Regional Health – Europe, 24. https://doi.org/10.1016/j.lanepe.2023.100473

[2] Huang, Y., Alvernaz, S., Kim, S. J., Maki, P., Dai, Y., & Peñalver Bernabé, B. (2023). Predicting prenatal depression and assessing model bias using machine learning models. medRxiv. https://doi.org/10.1101/2023.07.17.23292587Conference Name:ACM Woodstock conference

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