ARTICLE REVIEW & CRITIQUE - ETHICS

Article 1: Honesty and transparency are not enough

Summary:

Andrew Gelman critiques the replication crisis, arguing that transparency alone does not ensure research reliability. While open data and honesty are important, many studies still fail to replicate due to hidden data processing steps, statistical noise, and small effect sizes that lead to exaggerated conclusions. He highlights how scientific credibility depends on rigorous methodology and continuous validation, rather than just making datasets publicly available. To address these issues, he proposes reforms such as post-publication review, requiring replication materials, and reducing the emphasis on journal prestige in hiring and promotions.

Critique:

Gelman's emphasis on post-publication review and statistical rigor is highly relevant to climate change and food supply research, where inaccurate models can mislead policymakers into making flawed decisions. His warning about small effect sizes in noisy climate data reinforces the need for careful validation of climate predictions before using them to forecast food production and shortages. However, his argument does not fully consider the barriers to data sharing, as corporate and government restrictions often limit access to climate, economic, and agricultural datasets. Additionally, while he suggests reducing journal prestige bias, implementing this reform is difficult in an academic environment where high-impact publications drive funding and career advancement.

Application to My Research:

Gelman's insights stress the need for transparent, reproducible methodologies in climate and food supply studies, ensuring that research findings can be independently validated and used for effective policymaking. To avoid exaggerated claims, I will focus on documenting data preprocessing, testing model robustness, and encouraging post-publication validation. By integrating these practices, I can enhance the credibility, reliability, and impact of my research on how climate change affects global food security, contributing to more accurate predictions and better-informed policies.

Article 2: Data Rights and Wrong Langkj-r-Bain-2018-Significance

The article "Data Rights and Wrongs" which was written by Robert Langkjaer-Bain is related to the project we are working on "Machine Learning Analysis of Climate Change

Impacts on Global Crop Yields" as the article highlights big data, ethics, transparency, privacy, risk category and innovation which are vital details that should be considered when working on a project.

For the project, we need to mainly focus on collecting the data that is related to it and maintaining ethics. This should be done only from legal sources and websites like government agencies, open-access climate databases, and peer-reviewed research. We should retain transparency on how a model works, its assumptions, and its limitations, especially if the results focus on policy and framing models.

If the project needs to use any data related to the farmers or regional data, then that data should maintain privacy and confidentiality by following data governance and some anonymization techniques where necessary. Unauthorized access or misuse of sensitive agricultural data could have unintended socioeconomic consequences.

Furthermore, innovation plays a crucial role in ensuring that our work leads to real-world benefits. Our goal is not just to analyze the effects of climate change but also to develop actionable insights and practical tools that can aid farmers, researchers, and policymakers. By leveraging machine learning, we can create predictive models that help optimize crop production, mitigate climate risks, and promote sustainable agricultural practices.

By integrating ethical AI principles into our project, we can contribute meaningfully to the global conversation on climate resilience, ensuring that technology serves humanity responsibly and equitably.

Article 3: Ethics in Medical Trials Where Does Statistics

The Article written by Andrew Gelman highlights the lack of ethics and statistics in Medical Trials. The First Scenario showcases the medical trials conducted by SFBC International, a contract research organization conducting unethical drug trials on undocumented immigrants in a motel which is demolished for fire and safety violations when they gained media attention. But SFBC still continued their research and ranked #3 in one of the best small businesses in America by Forbes magazine in 2003. These types of research are performed by contract researchers who do not perform any original research but gain profit by performing unethical research on undocumented immigrants whose well-being is not promised. The Author stresses on need for meta-analysis and data transparency over such trials where the results are marginal.

Second Scenario is about the Avastin drug. This is the cancer drug produced by Genentech which is paid by Medicare for breast cancer treatment. FDA didn't approve Avastin for breast cancer treatment as it is not showing significant results due to lack of

statistical evidence. Even though Medicare is sponsoring the patients this involves politics and economics rather than statistics. This study emphasizes that medical trials should be done ethically prioritizing patients' welfare and transparency in research findings.

Critique:

Gelman's article has done a good job highlighting the importance of ethics and statistics in medical trials. More importantly, it addresses the conflicts of interest when researchers focus on financial profit rather than patients' welfare and statistical misinterpretations that affect policy decisions. Although this article provides valuable insights on improving ethical and statistical standards in clinical trials such as data transparency and meta-analysis but didn't provide any specific solutions. Strict rules are required to maintain ethical and statistical regulations to maintain patients' wellbeing such as imposing penalties on unethical practices.

Relevance to Research:

From the above articles I gained valuable insights for my research on "Machine Learning Analysis of Climate Change impacts on global crop yields" such as performing ethical research using statistical models. Models that will be chosen for Climate Change should use ethical data by avoiding biased data. Main key takeaway is the crucial role of data integrity and transparency in the research. If biased data or corrupt data is used that leads to misleading results for policy makers & stakeholders.