Detecting Misinformation in Fitness Content

Behind the Gains: How Fitness Influencers Harm Body Image and Mental Health Among Gym-Goers

A Thesis Prospectus In STS 4500 Presented to

The Faculty of the School of Engineering and Applied Science

University of Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science in Computer Science

By

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November 8th, 2024

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

In both my technical and STS research paper, I plan to address the negative influence of social media platforms on body image, fitness culture, and mental health. In a generation dominated by social media, fitness culture has grown greatly and become increasingly influential in the lives of teenagers and young adults. Platforms like Instagram, TikTok, and YouTube have given fitness influencers significant power in shaping people's views of fitness, health, and body standards. Many influencers promote unrealistic body ideals and sometimes provide misleading fitness advice, which can lead to mental health issues related to body dysmorphia as well as influence vulnerable gym-goers to adopt unhealthy practices, such as the misuse of performance-enhancing drugs (Cataldo et al., 2021). Young people are highly susceptible to social media influences, so it is important for this issue to continue to be studied and improved on (Marks et al., 2020). To address this issue, my technical report will focus on developing a machine-learning tool to detect misinformation in fitness content. My tool will aim to help gym-goers identify misleading claims, particularly around fitness advice and performance-enhancing drug (PED) usage. PEDs are substances that are used to improve appearance, gain muscle mass, or improve strength (Dandoy & Gereige, 2012). My STS research paper will investigate the broader psychological and sociocultural effects of fitness influencers on body image and mental health. My research will explore how influencers shape body ideals and behavior, focusing on the psychological impacts on young adults and gym-goers who are highly susceptible to media influence. Together, these projects will contribute to a better understanding of how fitness content can be moderated, guiding us as a society toward a more positive and health-oriented fitness culture.

Machine Learning Detection Tool to Address Misinformation in Fitness Culture

The technical problem I am addressing is the rise of misinformation on social media, particularly within the fitness community. Fitness influencers often share advice or promote supplements and PEDs without adequately disclosing their potential health risks. Additionally, they promote unrealistic body standards, and some may hide the use of performance-enhancing drugs (PED). This misinformation can be harmful, especially to younger audiences who may not have a great understanding of how a human's body can look naturally without taking PEDs. PEDs allow gymgoers and bodybuilders to obtain lean muscle mass at a faster rate, which can also lead to big strength gains as well (Coquet et al., 2018). PEDs have many adverse side effects, so it is important for fitness creators to be transparent about their usage and to talk about the side effects of doping (Ostovar et al., 2017). In Mihailidis and Viotty's (2017) research on the misinformation spread in the 2016 election, they were able to pinpoint specific citizen-led narratives that greatly affected public discourse. Similar to the fitness industry, fitness influencers can create harmful body image standards and greatly shape the opinions of gym-goers. Social media is one of the primary sources of fitness information today, and unchecked misinformation can lead to physical health issues, mental health issues, and disillusionment with fitness goals.

To tackle this ongoing issue, I plan to develop a machine-learning model that detects and flags misleading fitness content. Engineers have developed similar models for other misinformation topics, such as fake news detection and health misinformation, using Natural Language Processing (NLP) techniques and supervised machine learning algorithms. The NLP technique will allow me to identify keywords and phrases commonly associated with misleading content. Taherdoost's study on machine learning's role in social media showed that these tools

are currently being used to enhance user engagement and improve content recommendations (Taherdoost, 2023). For my machine learning model, I will start by looking for datasets related to online fitness influencers and their influence. Within these datasets, I will be able to flag posts as misleading if they promote unsafe fitness supplements or extreme body standards, as well as label posts as non-misleading if the content is safe or helpful. Additionally, I will incorporate text data from comments and captions that may signal PED use or unrealistic fitness claims. Each post will be labeled as either “misleading” or “non-misleading” to create a labeled dataset for supervised learning. Using NLP, I will be able to identify the language patterns associated with misleading content, I will use techniques like TF-IDF (Term Frequency-Inverse Document Frequency) to determine the relevance of keywords ("quick gains" or "no side effects"). I will use a logistic regression classifier as a baseline model. I will then create and compare the performance of more complex models such as support vector machines, decision trees, and neural networks. Each model will be trained to classify posts as either misleading or non-misleading based on the extracted features. Once the models are trained, I will evaluate their performance using metrics such as accuracy, precision, recall, and F1 score to determine which model performs best at identifying misleading fitness content. To assist with my model creation, I will research other existing machine-learning models that have detected fake news and spam emails to see if I can incorporate those techniques into my machine-learning model. I hope to create a useful tool that can eventually be integrated with social media platforms to help curb the spread of misinformation in fitness content.

The Role of Social Media in Influencing Body Image and Fitness Culture

The sociotechnical problem my STS research paper addresses is the psychological and social impact of fitness influencers on body image and mental health among gym-goers. Fitness influencers are social media personalities who, through their content, promote specific workout routines, aesthetics, and lifestyles as ideals to aspire to. Fitness influencers focus primarily on showing off their exercises, diet, and physique, often shaping followers' perceptions of what it means to be "fit." These influencers are particularly prevalent on platforms like Instagram and TikTok, where visual content showcasing physique transformations, workout routines, and dietary advice is prominent. The rise of fitness influencers has created a culture where unrealistic body standards are often celebrated, contributing to an increase in body dysmorphia and other mental health concerns (Marks et al., 2020). According to Krzysmowski (2024), forty percent of teens reported that social media content has caused them to worry about their body image. Additionally, this problem is important to address because fitness culture, once primarily about health and well-being, has been transformed by social media into a spectrum where physical appearance often takes precedence over functional fitness and health (Ahrens et al., 2022). My research will explore how fitness influencers shape body image perceptions and mental health outcomes, especially among those new to fitness or young people who are more susceptible to societal norms.

The fitness movement on social media differs from other body image and self-esteem issues in notable ways. While traditional body image concerns often center around thinness, the fitness movement introduces unique pressures by promoting a specific "fit ideal" that focuses on leanness with muscularity. This emphasis on being both thin and muscular introduces unique pressures, encouraging followers to pursue physical goals that require rigorous workout regimes

and dietary restrictions. In contrast to beauty or fashion influencers, who may set aesthetic standards primarily through appearance alone, fitness influencers promote not only a look but also a demanding lifestyle, often portraying fitness as a path to personal improvement and social validation. This expectation can make followers feel inadequate if they cannot achieve similar results despite adopting similar practices. Research has shown that this “fit ideal” can lead to increased body dissatisfaction, anxiety, and, in severe cases, disordered eating (Marks et al., 2020).

The primary research questions guiding my STS paper are: "How do fitness influencers contribute to body image issues and mental health problems among gym-goers?" and "What strategies can be used to combat the negative impacts of influencer-driven fitness culture?" There are a few existing scholarly articles that have already explored the relationship between social media use and body image concerns. However, there are not many existing studies that look deeply into the specific role of fitness influencers in shaping these perceptions. To help with my research, I will incorporate the Health at Every Size (HAES) framework into my analysis, which advocates for self-acceptance, intuitive eating, and health-promoting behaviors irrespective of weight (Marks et al., 2020). This framework will help me critically examine the assumptions underpinning much of the health and fitness content shared on social media through a different lens. For my solution, I would like to look for a more inclusive and evidence-based approach to wellness. Additionally, I plan to use a combination of qualitative interviews and quantitative surveys with gym-goers and fitness influencers to understand the broader trends in fitness culture. By drawing from both of my methods, I hope to contribute to a deeper understanding of how to mitigate the harmful effects of fitness influencer culture. Through a mix of quantitative and qualitative data, my study aims to uncover how fitness influencer culture shapes perceptions

and behaviors and identify potential strategies for reducing these negative impacts. Possible solutions may include advocating for transparency from influencers about PEDs or promoting mental health awareness within fitness communities.

Conclusion

In my technical report, I hope to develop a machine learning tool capable of detecting misleading fitness content on social media, which can serve as a critical tool in combatting misinformation in the fitness community. Meanwhile, my STS research paper will explore the sociocultural implications of fitness influencers on body image and mental health, focusing on the negative psychological effects of unrealistic body standards and misinformation. Together, these projects will contribute to a greater understanding of how social media can impact fitness culture in a positive way and offer practical solutions to improve the well-being of gym-goers and promote accurate fitness advice.

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