A Universal Health Tracker: How People can Gain Big Picture Health Insights on Atomic Data (Technical Topic)

Lenient Ingredients: Why America Needs Stricter Legislation for Products (STS Topic)

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By
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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

The world has a pressing need for strict regulation and comprehensive information about products and their health respectively. Several stakeholders in this industry challenge each other against and in favor of motives balancing between health improvement and financial profit. On the health improvement end, extensive regulation around the Americas, Europe, and Asia are utilized to authorize or forbid 'novel foods' sold to consumers (Knezevic et al., 2021). Diving deeper into health, consumers are also taking more personal accountability for their own health. 60% of U.S adults track their weight, diet, or fitness and 33% monitor variables such as blood sugar and sleep patterns (Swan 2013). While these processes and changes are beneficial, more effort needs to take place for stricter legislation to prevent companies exploiting consumers.

My technical project's aims to address the inconsistencies and problems of digital health tracking with an app that can sync to every digital health tracker to produce a wellness score. This wellness score depends on health metrics synced from other apps such as total sleep, vitamin intakes from meals, and more. I hope this app provides users trends and suggestions, giving them more responsibility and power over their own health. The STS topic examines governments' roles in creating laws to protect consumers from harmful products. The two investigations cover systems affecting consumers' health at the micro and macro level.

Technical Topic

How much does sleep, diet, exercise, socialization, and other activities affect our well-being? How can we understand the synergistic effects of these variables? These important questions have not been getting enough attention from lawmakers as demonstrated by the poor health of many American citizens - 50.9% of American adults have at least one chronic health

condition from lower respiratory diseases to high cholesterol (Bauer et al. 2014). Although some variables cannot be controlled, many can. Key factors that contribute to this statistic include lifestyle choices and our response to social factors. Another insight highlighted by Bauer's study is the emphasis public health systems often focuses more on acute problems and delivery of care rather than long term chronic disease prevention. The app solution I propose seeks to address this gap by focusing efforts into lifestyle choices on the individual level. Although the interaction of every single variable affecting one's health is not well understood, a current bleeding edge approach of providing insights and connections to every empirically logged variable on one universal app platform can solve this problem. By understanding factors on the atomic level and having users label each day as negative, positive, or neutral, the app will have enough information to predict the user's wellbeing after several weeks of logged data. Not only will the app predict the user's behavior, but the user can observe patterns through the data they've logged as many mood-tracking apps do as demonstrated in the analysis of mood tracking apps within this study (Caldeira et al., 2018). Providing people with this trough of information gives them an ability to pivot and make corrections towards bad habits previously unknown without diverse collected data ranging from weather to sleep. The problem is that all of this data is atomic, that is they lie in separate systems. For instance, sleep tracking and diet apps work well independently, but how would people know that their raspberry tart drink they consumed one day provided a solution to their insomnia unless both metrics were tracked under one system (Pigeon et al., 2010)? Although a rather simple example, it demonstrates clearly that tracking and blending multiple metrics together provides insights that cannot be uncovered using apps tracking only one metric. The app will do this not by reinventing the wheel but rather with an open-source API that will link to existing popular apps such as Apple Health, FitBit, and Strava. This API will

request and gain permission data users provide to the health tracker to connect. It will also be updated continuously to ensure that old formats from third party apps are not deprecated and continue to sync in with the health tracker.

This app intends to harness the power of many users. Assuming millions of users are on the app, billions of metrics can be gathered through the syncing of multiple apps from multiple users. Users may opt out of having their data collected for prediction algorithms to alleviate privacy concerns. This is a concern for the app as misprediction can be caused by insufficient amounts of data collected from users. A possible solution would be to not provide users diagnosis unless certain amounts of metric data thresholds are met. Users would therefore still receive proper diagnosis, but may need to wait longer if they do not opt into their data being collected.

An app alone will not solve the behavior built up by years of bad habits. However, this universal health tracker will provide concrete suggestions and solutions for insights that a normal user could not have seen without observing trends in all of their tracked metrics. This app can be viewed more as part of the solution to people who want to live their best life optimally, specifically at the micro level.

STS Topic

Developments for regulation around substances in consumer products, namely food drugs, cosmetics, and other products have been around since the mid to late twentieth century around the Americas, European Union, and Asia (Knezevic et al., 2021). Many products go through several iterative stages and require months to be approved. Although extensive, many problems are present within the product approval process. Flaws in the process are required to be

taken seriously as products that humans utilize for consumption and skin-contact can permanently affect us. Information is power and in this case, a tool to potentially save a person's life in the future. These problems cannot be ignored as our present day lives involve using a multitude of products.

When using the lens of Actor-Network theory to understand how stakeholders affect ingredients in product regulation, it becomes clear that this problem is not so black and white. Actor-network theory is an STS theory that encapsulates actors (any object, living or nonliving) in networks of relationships and postulates that all of them should be held in the same terms (Law 1992). Actor-network theory best encapsulates the relationship between the multiple stakeholders jostling to maintain their wants and needs. Specifically in this case, companies, non-profits, governments, and consumers are actors in this industry, each fighting to meet more of their own needs which also are actors influencing these relationships. The area of the network where most of the problems need to be solved (between consumers and companies) can be seen visually in figure 1. Individual consumers buy products, specifically foods, based on the actors of motivation which include different perceptions, ethical concerns, and wellbeing (Knezevic et al., 2021). Many companies identify these consumer expectations and build products aligned with these goals to reach profitability. Governments and nonprofits play a role in balancing the needs of companies incentivized to generate revenue with consumers being safe. Yet, as these concerns are identified, the process by which they "meet" consumer requirements can be biased and unreliable. In the United States, businesses can have in-house employees or hired consultants to evaluate GRAS (Generally Recognized As Safe) status of a substance in a product (Knezevic et., 2021). Unsurprisingly, of the 3941 food additives with GRAS status in 2018, only 263 had reproductive toxicology data, a large concern for consumers' expected protection (Transande et

al., 2018). Misinformation also represents another problem in the consumer product industry. In certain cases, package labels with information as "natural substances only" are plastered onto products to entice consumers, when in reality, many of these substances could be classified as hazardous carcinogens, mutagens, and toxic to human reproduction (Klaschka, 2016). Even with companies selling explicitly harmful products such as cigarettes, vague labels and warnings such as "may be hazardous to your health" still exist to confuse and make consumers doubt themselves (Noar et al., 2016). Finally, the lack of uniformity across worldwide laws regarding additives, along with conflicting results of studies contributes to more confusion. Molecules and compounds added into products that may be legal in the European Union are allowed in the United States and vice versa (Carocho et al., 2014).

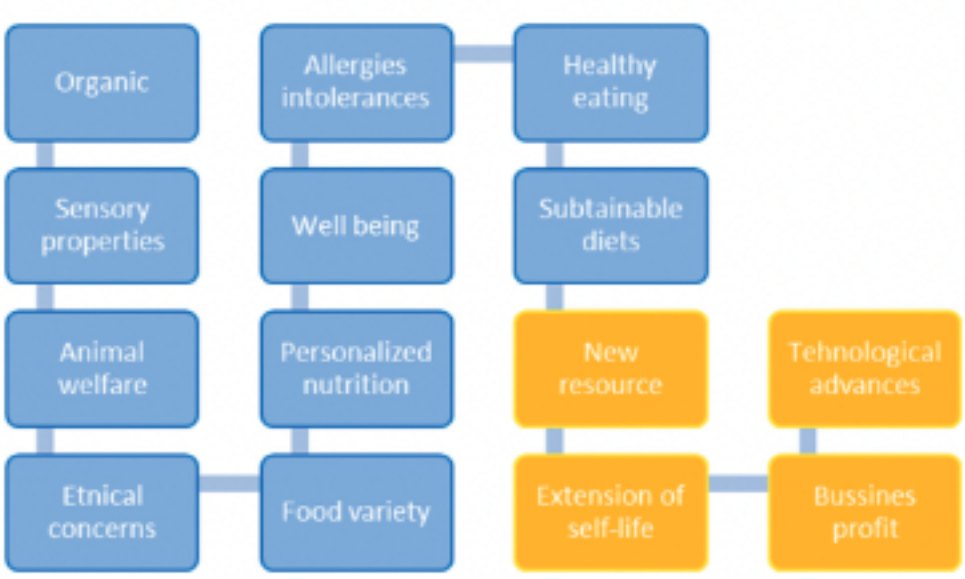

Figure 1. Motives for the development of novel foods from the perspective of the consumer (in blue) and the industry (in yellow) (Source: Knezevic et., 2021)

This topic will utilize various scientific studies, meta-studies and social experimental studies studying the problems in our products' substances and additives. This aggregated

research will allow potential future readers to realize the pressing need for more stringent legislation surrounding the food industry. Negative additives and compounds companies add into products affect everyone and no one is immune to consequences, particularly products disguised as helpful.

Conclusion

The amount of health benefits provided by these two analyses can potentially change how society and individuals can utilize regulations and tools respectively for humans to live healthier lives. An app solution that could universally track many types of factors would help people predict and pivot into healthier lifestyles. Protection against harmful ingredients provided by regulations from the government would also fuel the goal of allowing people to live longer, happier, and healthier. Both legislation and personal accountability solutions such as this app must coexist as legislation alone will not help those who do not have knowledge on their lifestyle choices and vice-versa. As shown in the topics, when people wield knowledge and access to safe products, they can act and choose accordingly.

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