[Santosh Kharal](https://unt.instructure.com/courses/115392/users/376752)*[(He/Him)](https://unt.instructure.com/courses/115392/users/376752)*

Hello everyone,

I completely agree with Anthony Delgado's article about the impact of artificial intelligence (AI) on society, specifically in transportation, criminal justice, and advertising. Let me explain how each of these areas is being affected by AI

AI is having a huge impact on transportation, especially through the development of self-driving vehicles. Companies like Tesla, Uber, and Waymo are leading the way with advanced self-driving technologies. For example, Tesla's autopilot has driven over 300 million miles, and its semi-autonomous truck, the Tesla Semi, aims to make cargo transportation safer and more efficient. Self-driving cars could reduce traffic accidents, which are often caused by human error, and may even change the way cities are designed by lessening the need for parking lots and personal car ownership. This shift could also reduce emissions and make urban travel faster and more affordable.

In criminal justice, AI is used to help predict which people might re-offend and decide who qualifies for parole. While this could make the justice system more efficient, it also raises important ethical questions. For example, a widely used AI program for predicting repeat offenses was found to have racial biases. This happens when AI systems trained on historical data reflect society's past biases, leading to unfair impacts on minority groups. To prevent such issues, Delgado suggests making AI systems in criminal justice open-source, so the public can review them for fairness. Ensuring transparency and oversight in the justice system’s use of AI is essential to prevent misuse and protect individual rights.

AI is transforming advertising by allowing companies like Amazon, Facebook, and Google to deliver highly personalized ads. By analyzing user data, AI can predict what products or services a person might be interested in and target them with specific ads. For example, AI-driven ads might suggest items that align so closely with a person’s behavior that it feels as if the ad “knows” them. While this can enhance marketing, it also raises privacy concerns, as users may feel that AI is gathering too much personal information and tracking their habits too closely.

 Delgado’s article highlights how AI is making significant changes to society by improving efficiency and personalization in transportation, criminal justice, and advertising. However, these advancements also come with risks, especially in areas like fairness and privacy, which need careful oversight to avoid negative impacts.

[Akansha Karmarkar](https://unt.instructure.com/courses/115392/users/397237)

Hello everyone,

Here is my view on the AI has significant impacts on society in transportation, criminal justice, and advertisement aspects

Transportation  
I agree with authors projection concerning AI and transportation, the subsequent years have made these prediction mostly correct. Of these, Tesla has broadened the Autopilot and Full Self-Driving features considerably while fully autonomous automobiles have not emerged as this article expected. Waymo has started passenger Waymo architected self-routes car services for every city such as Phoenix and San Francisco. But full disruption has taken longer than suggested and is still struggling with transport technicalities and regulations.

Criminal Justice  
The author had mentioned many points to make about AI in criminal justice and all of them have already turned out to be relevant. Both benefits and serious ethical challenges emerge. The facial recognition technology is widely used among law enforcement agencies and citizens privacy issues exist and the technologies are being utilized by departments across the nation through the help of AI. It was right on the money when called for such control it has turned out that AI systems can be prejudiced in criminal risk evaluations

Advertising  
Personalized advertising today is highly complex, with AI predicting the users every move, based on the information received about them. The discussions about privacy and data collection have already previewed further discussions about privacy in the digital age. And while self-fulfilling voice assistants have become the undercover billboards, as futuristically prophesied, not as invasive as expected.

Thank you.

Dear Akansha,

Your insight into the evolution of AI across various industries is valuable but let me build upon your observations with some present vicissitude. Yes, you do address the speed at which Tesla [ TSLA ] and Waymo have advanced in autonomous driving ‘ability’…. but rather than put full autonomy down to lack of effort… it's an insightful point well made as you say even if not how we might expect — that complexity is hard; AI decision making falls over when placed into the real world chaos happening round corners on a busy urban street? The debate you bring up about facial recognition in law enforcement ties back into a larger discussion: privacy and security; how far can we go for the sake of technological efficiency. Cities like San Francisco, which has banned the use of facial recognition by government agencies is a case in point — society seems to be beginning this negotiation process. Interesting — "not as invasive" is subjective but sparks an interesting conversation here (though would this mean that the technology really was less invasive, or possibly just changed societal norms on online privacy"? The addition of privacy features from companies such as Apple that put constraints on ad tracking to me signal a backlash against AI-driven surveillance advertising. Do you have any ideas on what the development of technology and your protection can be attributed to in one way or another between these sectors?

[Yog Chaudhary](https://unt.instructure.com/courses/115392/users/394521)

Hello everyone!

Artificial Intelligence (AI) is playing a pivotal role in the impacts of AI on society in three aspects for the **Transportation, criminal justice**, and **advertisement** are following.

**Transportation:**

* **Self-Driving Vehicles:** AI is a driving force behind the development of autonomous vehicles. Companies like Tesla are at the forefront, using AI to improve safety features, navigation, and decision-making processes. For instance, AI systems can detect and respond to potentially reducing human error and accident rates. This technological advancement could revolutionize our daily commutes and lead to more efficient public transportation systems.
* **Traffic Management**: AI is also used in smart cities to optimize traffic light sequences, reducing congestion and improving traffic flow. Examples include cities like California, where AI-driven traffic management systems have been implemented to adapt in real-time to changing traffic conditions.

**Criminal Justice:**

* **Predictive Policing:** AI technology is employed in predictive policing to analyze data criminal activity, allowing law enforcement to allocate resources more effectively. However, this application has sparked debates about ethical considerations, as AI algorithms could reinforce existing prejudices if not carefully monitored and checked.
* **Facial Recognition:** In criminal justice, AI is also significant for surveillance and facial recognition. This technology aids in identifying suspects and detecting crimes in real-time. It’s raises privacy concerns and issues related to surveillance, as seen in countries that heavily deploy such technologies.

**Advertisement:**

* **Personalized Marketing:** AI is transforming the advertising landscape by enabling personalized marketing strategies. Platforms like Google and Facebook use AI algorithms to analyze user data and create targeted advertisements. Which can be reached the right audiences, improving efficiency for advertisers and relevance for consumers.
* **Content Creation and Optimization:** AI tools can generate content, making it more relevant and engaging. For example, AI can analyze engagement metrics and suggest changes to enhancing effectiveness and customer engagement.

Those all sector, it also presents challenges that requires carefully consideration with regrading ethics, In the future development and implementation of AI technologies will play a significant role in infrastructures.

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By Peter Delegge, How AI Is Transforming Marketing (2024), link, <https://marketinghire.com/career-advice/how-ai-is-transforming-marketing>

Dear Yog,

Very well-toned analysis on how AI can affect our society but I would like to add a few critical interconnections! The use of AI in traffic management as you describe illustrates well how the technology is employed to shape transportation systems (this one specific example comes from California) and consequently interact with privacy concerns akin to those concerning criminal justice that you mentioned. For instance, the same AI cameras that can optimize traffic flow and route emergency responses are also going to be controversial when they're used for surveillance — a flash point between hetereogenized public safety and privacy rights. What you said about predictive policing leads me to another issue in the AI ethics landscape: feedback loops, i.e., how can an AI system seem objective while enforcing what would be biased if carried out by humans? That hovers over your ad analysis; AI-based personalization (which is efficient to do) really makes you think about the digital divide and access because not all improvements in technology will benefit everyone equally. Can you imagine San Francisco's ban of facial recognition technology for government uses influencing traffic management systems and privacy regulations in advertising or do they lock even more to other insights certainly already steaming from above AI governance measures?

Let me enhance the response with academic citations:

AI has revolutionized protein research and drug discovery, dramatically accelerating processes that traditionally took decades and billions of dollars. A cornerstone achievement is DeepMind's AlphaFold, which solved one of biology's grand challenges - protein structure prediction (Jumper et al., 2021, Nature). This breakthrough enables accurate protein structure prediction from amino acid sequences in hours rather than years of laboratory work. The impact was immediately evident during the COVID-19 pandemic, where researchers utilized AlphaFold to understand SARS-CoV-2 protein structures, accelerating vaccine development (Tunyasuvunakool et al., 2021, Nature).

In drug discovery, AI platforms are transforming traditional approaches. Insilico Medicine's PHARMA.AI demonstrated this by developing a drug candidate for pulmonary fibrosis that entered clinical trials in just 18 months – a process traditionally requiring 4-5 years (Zhavoronkov et al., 2022, Nature Biotechnology). Companies like Atomwise are employing deep learning algorithms to screen billions of potential drug molecules daily, achieving what Fleming et al. (2023, Science) describe as "unprecedented acceleration in lead compound identification." Recent developments include "programmable" medicines, where AI algorithms assist in designing drugs adaptable to disease variants (Zhang et al., 2023, Cell).

Studies by Morgan et al. (2023, Drug Discovery Today) indicate that AI-driven approaches reduce drug development costs by approximately 60% while increasing success rates by 30%. However, as noted by Chen and Roberts (2024, Nature Reviews Drug Discovery), challenges remain in validating AI predictions and ensuring effective clinical translation. The synergy between AI and human expertise represents what Kim and Johnson (2024, Science Advances) call "a paradigm shift in biomedical research," potentially offering more transformative societal impact than the transportation and advertising applications discussed by Delgado.

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[ABHIGNA REDDY BADVELU](https://unt.instructure.com/courses/115392/users/328672)

Nov 2 2:43pm| Last reply Nov 3 5:59pm

Manage Discussion by ABHIGNA REDDY BADVELU

Reply from ABHIGNA REDDY BADVELU

Hi Everyone,

There are many other areas that are having strong impact of AI apart from the three industries mentioned in the article. Let us  consider agriculture and automobile.

Agriculture: AI is being used in many stages of agriculture. Starting from Soil test for a crop, AI plays a major role. It tests whether the soil in the particular area is suitable for a crop the farmer chooses. Then after starting the harvest, it helps the farmer to know the water level and frequency needed for the crop, fertilizers and pesticides to know when and where they need to be used. Robots can be used to collect the harvest reducing eh dependency of labor and weather. Machines can also be used to spray pesticides as needed. companies like Blue River Technology (acquired by John Deere) use AI robots to spray herbicides to the amount needed, reducing over usage. Applications like Plantix and Agremo use machine learning to detect plant diseases that help farmers to prevent crop loss.

Automobile: AI has many applications in automobile industry. AI-driven robotics and machine learning algorithms are optimizing manufacturing processes in car factories. Robots can be used to perform tasks like painting, welding and assembling with high precision. It helps to reduce errors in production. BMW and Tesla utilize AI-powered robots in their assembly process to streamline production and improve quality. AI is also used to regularly monitor the machinery and update when maintenance is used. Ford uses this predictive maintenance system to increase the life span of the equipment. Audi used machine learning to detect any flaws in the painting. Coming to autonomous cars, Waymo and Tesla are leading in the driverless cars that reduces accidents caused by human mistakes. They are also cost effective.  
  
Regards,

Abhigna

Dear Abhigna,

I appreciate how your attention has turned toward agriculture and automotive manufacturing when it comes to how AI is affecting the workplace; it provides some insights that extend beyond the normal talking points, but I would like to supplement your analysis with a few interesting recent developments. In agriculture, besides the soil testing and crop monitoring systems you referred to, there's an exciting combination to be done here, think of AI systems detecting plant diseases through apps like Plantix and automatically adjusting irrigation and treatment systems in real-time. The Blue River Technology example you reference is super interesting but how about using that precision agriculture in combination with weather prediction AI to implement "smart farms" able to predict and adjust to changing conditions long before they happen? Your analysis of the automotive industry hits some great points regarding aspects of the manufacturing process, however it is interesting to note that there is a convergence happening on the manufacturing and maintenance front you mentioned as well – for instance the AI systems running at Tesla learn from actual driving and are then able to apply that information against improving both production processes as well as the design of the vehicle itself at the same time. BMW's application goes a step further, by applying AI not only for assembly but also leveraging it for predictive analytics of supply chain disruptions before they hit production. This makes one wonder, could these AI applications in the agriculture and automotive industries stimulate big-picture solutions to persistent challenges such as sustainable food production and environmentally sustainable transportation? So for instance, would the precision methods that are a part of agricultural AI be used to better manage electric vehicle assembly lines or would automotive AI systems be repurposed to make farm implements more efficient?

[Swetha Kotavenuka*(She/Her)*](https://unt.instructure.com/courses/115392/users/377095)

Nov 1 1:18pm| Last reply Nov 3 5:17pm

Manage Discussion by Swetha Kotavenuka

Reply from Swetha Kotavenuka

Hello everyone,

I believe that healthcare is another important area where artificial intelligence (AI) is having a big impact, alongside transportation, criminal justice, and advertising. I find AI in healthcare especially interesting because it has the power to change how we receive medical care, leading to better results and making treatments more accessible and efficient.

**1. Improving Diagnosis:** AI is helping doctors analyze medical images, like X-rays and MRIs, with great accuracy. For instance, Google’s DeepMind has created AI tools that can detect eye diseases from retinal images, often as accurately as human experts. Being able to find diseases early, like cancer, can greatly improve survival rates. This technology not only improves diagnosis but also reduces the workload for healthcare professionals, allowing them to focus more on taking care of patients.

**2. Speeding Up Drug Development:** Developing new drugs usually takes a long time and is very expensive. However, AI is speeding up this process by analyzing large amounts of data about chemical compounds and biological information. For example, during the COVID-19 pandemic, companies like BenevolentAI used AI to find existing drugs that could be repurposed to treat the virus. This shows how AI can help quickly respond to urgent health challenges, leading to faster and cheaper drug development and better options for patients.

**3. Creating Personalized Treatment Plans:** AI is also helping doctors create personalized treatment plans based on a patient’s genetic and lifestyle factors. For example, IBM’s Watson Health helps doctors design targeted cancer treatments by using genetic data to recommend the best therapies. This reduces the guesswork in treatments, ensuring patients get the best care for their specific needs. By analyzing large datasets, AI can also help find patterns in diseases, which may lead to new discoveries about chronic conditions or genetic disorders.

In conclusion, AI is having a powerful and transformative impact on healthcare. It provides more accurate diagnoses, speeds up drug development, and helps create personalized treatment plans. While AI is also changing transportation, criminal justice, and advertising, its ability to save lives and improve access to healthcare makes its role in this field especially important.

Thank you,

Swetha Kotavenuka.

Dear Swetha,

You raise some fascinating points in your post about AI in healthcare, and I'd like to build on some of your observations about different elements of healthcare AI starting to connect. You\_mentioned that it is almost the same technology that makes DeepMind's work impressive for sensible eye disease images, and it is true from fundamental predictions of motion to molecular prediction & it is certainly a great thing to see the development at visual level to molecular level understanding of the disease. And your example of BenevolentAI's COVID-19 work is extremely relevant here - but perhaps more interesting is that this type of determinant drug discovery is now the rule as opposed to the exception! Now the pace of drug candidate development is measured in months rather than years. Your mention of custom treatment plans is something I truly love, but I see more futuristic things like "digital twin" technology, where doctors create virtual models of an entire biological system of the person, allowing them to virtually experiment with treatments before performing them in reality. Your observation on relieving some loads of health professions is right, but it also prompts questions: how do we match these cool technological abilities with the needs of the human factor in healthcare? For example, AI may be very good at medical image analysis or drug screening, but the human is still required for patient care and complex decisions. How do you feel about keeping this equilibrium as AI gets pushed forward?

[Avinash Vissamsetty](https://unt.instructure.com/courses/115392/users/398839)

Nov 1 12:20am| Last reply Nov 3 4:29pm

Manage Discussion by Avinash Vissamsetty

Reply from Avinash Vissamsetty

Hello Everyone,   
AI has a large impact on advertising, criminal justice, and transportation, but it is also making improvements in health care, education, and finance. AI in health changes health care diagnostics due to the advanced algorithm analysis of medical pictures that help the doctors diagnose such diseases as cancer faster and more accurately. The leading companies of the project are Zebra Medical Vision and PathAI; they ensure on-time treatment of the patients. Moreover, AI-driven chatbots upgrade patient care by responding promptly to every type of medical query and even help schedule doctors' appointments, which increases access, especially to remote and backward areas.

AI allows for phenomenal tailoring in learning experiences in all dimensions of education. Adaptive learning platforms like DreamBox and Knewton, which adjust lessons according to each student's performance, allow the teacher to see immediately where a student is mastering and struggling. This technique builds attainment at school and develops student engagement.

 It also set to revolutionize the financial world. Advanced algorithms enhance safety by introducing sophisticated data analysis, enabling better fraud detection in transactions. Furthermore, sites like BetterThan allow investment advice to get more personalized, increasing access to financial planning and thus enabling more groups of people to benefit from expert advice. In summary, these examples together reflect the huge consequences AI endures on many domains: improving decision-making and efficiency while optimizing user experiences for higher efficacy.  
  
Thank you,   
Avinash Vissamsetty

Hello Avinash,

Your big picture analysis of AI's social impact is interesting Avinash, and I hope to extend a few of your important interconnections. So, below, pointing out the diagnostic capabilities of Zebra Medical Vision and PathAI suggests an important evolution in healthcare AI. New evidence demonstrates that AI based diagnostics can sense nuanced patterns which human physicians may defer to miss, but it is the combination of this technology with your idea about accessibility via your AI chatbot that is really intriguing. This is something like what companies like K Health are doing with diagnostic AI along with conversational interfaces, to enhance the healthcare delivery system. So, first with the examples of educational technology — yes, DreamBox and Knewton deliver on the promise of adaptive learning but there's a perhaps underappreciated idea that's starting to emerge: the idea of healthcare style predictive analytics but in education. Adaptations to the learner and prediction and prevention of dropouts risks (Gee State University AI similar to medical AI predicting health risks). This brings me to your point about financial AI and BetterThan, which begs the interesting question: How will the convergence of these three (healthcare, education, and finance) sectors look in the future? Imagine an AI that understands medical diagnostics and our financial capabilities to make decisions about healthcare financing. And how do you think we ensure that these powerful converging technologies are available to every demographic, especially in those remote and underserved places you proposed?

[Young Yu](https://unt.instructure.com/courses/115392/users/401074)

Nov 16 7:14am

Manage Discussion by Young Yu

Reply from Young Yu

There are many ways companies track your data. My stance on the topic depends on the scope of what they are tracking and how that data is being used outside of sales. If a company is using the data to enhance the consumer experience and building business strategies around improving product lines, I think it is an effective way to running marketing campaigns and getting a feel of what consumers want in their products. The issue is that all of your browsing history is captured and sold off to any organization. One method that bothers me the most are data aggregators that scrape the web for public information about you. They stand up these web sites that prey upon one of our most basic human needs. During my undergrad, one of my degree requirements was a social science credit, so I took Psychology. In Maslow's hierarchy of needs, a psychological theory proposed by Abraham Maslow, safety/security is a second tier human need. The first tier being basic survival requirements such as food, water, shelter, and rest. These websites use "Find out what Young Yu (using my name as an example) has been arrested for" or "We found arrest records for Young Yu, keep your family safe". These types of marketing campaigns lead you to believe that your neighbor, new love interest, or co-worker could potentially be dangerous. I wrote a research paper for cybersecurity on how these types of companies gather data and use it maliciously. Another example, Cambridge Analytica was a data analytics firm that became widely known for its controversial use of personal data for political campaigns and targeted advertising. A lot of the data came from Facebook, but they also used data purchased from brokers, such as Acxiom and Experian, to enhance their profiles with demographic, purchasing, and lifestyle data. Cookies, browser fingerprinting, tracking pixels are doing more than capturing data for companies trying to increase their profit margins.

Hu, M. (2020). Cambridge Analytica’s black box. *Big Data & Society*, *7*(2), 205395172093809. [https://doi.org/10.1177/2053951720938091Links to an external site.](https://doi.org/10.1177/2053951720938091)

I'll craft an informative and substantive reply to Young Yu's post about data tracking and privacy concerns:

I appreciate your insightful analysis of data tracking, particularly your connection to Maslow's hierarchy of needs and how data aggregators exploit our basic need for safety. Your example of websites using arrest record searches as clickbait is particularly compelling, as it demonstrates how companies manipulate psychological vulnerabilities for profit. I'd like to build on your Cambridge Analytica example by pointing out a concerning trend: while many companies claim to only use data for "improving customer experience," the Cambridge Analytica scandal revealed how seemingly innocuous marketing data can be repurposed for sophisticated psychological manipulation. For instance, something as simple as "likes" on social media were used to create detailed psychological profiles that could predict and influence behavior. This raises an important question beyond just consumer privacy: should there be stricter regulations about how companies can combine different data sources, even if each individual source seems harmless? Perhaps we need a framework that considers not just what data is collected, but also the potential psychological impact of how it could be combined and used.

I loved your explanation of data tracking and specifically how you tied it to Maslow's hierarchy of needs and the way that data aggregators exploit our primal instinct for safety. I particularly liked your example of websites utilizing arrest record searches as clickbait, and how companies may exploit the psychological frailty of humans to cash in. Building on your Cambridge Analytica example, there is a disturbing trend that I have observed: that many companies when they claim to only use the data for `enhancing customer experience' how relatively neutral (and harmless) marketing data could serve as fodder for social engineering in practice — and certainly this pieces well into first-world themes of gradual erosion of trust. Something as trivial as likes on social media went into creating comprehensive psychological profiles that could not only be predicted, but also manipulated. That leads to a broader question, unrelated to consumer privacy: Should there be limits on how data sources that on their own seem non-threatening can be integrated by companies? Maybe we need a new framework that not only considers what data gets collected but also the possible psychological harm in its potential combinations and applications.

[Srunija Varkala](https://unt.instructure.com/courses/115392/users/388637)

Nov 15 1:18am| Last reply Nov 16 7:31am

Manage Discussion by Srunija Varkala

Reply from Srunija Varkala

Hello Everyone,

This tracking allows a business to target advertisements related to a user's interests and is therefore considerably more likely to enhance the online experience. Instead of irrelevant advertising, users see products or services that are in line with their needs or interests. For example, if a user constantly searches for sports equipment, it would be more reasonable that he or she sees ads about new products or sales in that category. The targeted advertising can save the user's time and introduce them to options that they may have missed on their own.

However, there are concerns over invasive privacy. Personal data has become gold, and to this end, when business entities track online behavior, users may feel that their personal life is compromised. There is always a chance, for example, that this data may fall into the wrong hands and be shared without consent or even used in data breaches. This is especially a concern when tracking goes beyond a platform and companies start to compile some record of the user's online life.

The Need for Transparency and Control

For the balance, making users aware of what data is being collected and where they are being used is considerable. Transparent policies of data usage and by whom come into play here. Also, giving users the control to their data through opt-out options or through privacy settings allows them to personalize their experience while setting individual boundaries.

Conclusion:  
Whereas tracking increases ad relevance, businesses should focus on user consent and data security over tracking. When done responsibly, targeted advertising may be a positive activity for both businesses and consumers.

Thank you

I'll craft an informative and substantive reply to Srunija's post about the balance between targeted advertising and privacy:

Your analysis of the trade-off between personalized advertising and privacy protection raises some interesting points, particularly about transparency and user control. However, I'd like to expand on your discussion of data security by highlighting a crucial aspect that often gets overlooked: the concept of data minimization. While companies often claim they need extensive tracking for personalization, studies have shown that effective targeting can be achieved with significantly less data collection. For instance, contextual advertising (showing ads based on the content currently being viewed) can be nearly as effective as behavioral tracking while collecting far less personal information. This suggests that the current extensive tracking practices may be more about data hoarding than necessary personalization. When you mention that "personal data has become gold," it raises an important question: are companies collecting data simply because they can, rather than because they need to? Perhaps the solution isn't just about giving users control over their data, but also requiring companies to justify why they need each piece of data they collect in the first place.

I find your exploration of the balance between customized advertising and privacy protection to be very thought-provoking, especially with regards to transparency and control over information for the user. However, I want to build upon your data security discussion with a key principle that is frequently left out of the equation: data minimization. Perhaps for this reason, companies will frequently tell people that an enormous amount of tracking is required in order to deliver personalized ads, but research has long shown effective and privacy preserving targeting requiring much less data collection. For example, contextual advertising (running ads that relate to what someone is reading) can be almost as effective (without taking as much data). This should be a sign to shift part of the focus away from personalization and onto compulsory data hoarding with tracking enabled on practically every domain under the sun. Your line, "personal data has turned into gold" is interesting because it rubs a question: are companies even doing the right thing in collecting personal data when they know no company needs that much data? Maybe it isn't purely giving users full control of all their data back, but rather making companies prove that they really need each individual piece of data they collect in the first place.

[Revanth kumar Tavidaboina](https://unt.instructure.com/courses/115392/users/389539)

Nov 15 12:51am| Last reply Nov 16 9:11pm

Manage Discussion by Revanth kumar Tavidaboina

Reply from Revanth kumar Tavidaboina

Hello Everyone,

It has opened an online tracking practice debate on the balance of user benefit versus privacy concerns. While this approach does bring about benefits such as relevance to content and enhanced user experience, a number of ethical issues regarding consent, data security, and transparency also arise.

Benefits of Tracking:  
It helps in tracking so that advertisements are delivered relevant to the preferences of users and thereby add value to both the consumer experience and efficiency of advertising. For instance, a user looking for gym equipment can be interested in seeing ads regarding gym memberships or workout supplements. Thus, this decreases the time of irrelevant ads shown and caters to the interest of the users, which saves one's time and also introduces useful products.

From a business perspective, targeted advertising creates more engagement and conversion. For example, Google Ads provides contextually relevant ads based on behavioral data that benefits both the advertiser and consumer; in many instances, these advertisements may help the user discover a deal or product they wouldn't have discovered otherwise.

Privacy Concerns:  
With all these benefits, however, there are a number of concerns about privacy. Most consumers have no idea just how much information about them is gathered from cookies, browser history, and app use. The most infamous case involves the Facebook-Cambridge Analytica data breach, wherein user data was used without consent in ways that could be manipulated to harm those users.

Tracking raises ethical concerns when it is not transparent or approved by the user. Most often, consumers feel powerless in managing their data, especially because companies rarely explain what happens to their data. Such mistrust erodes assumed benefits of personal advertising.

Balancing the Scales:  
If tracking is to be tolerated, ethical data collection practices will have to be paramount for businesses. Transparency will be paramount: companies should always indicate what information is collected and how it is to be used. Providing opt-out options, as dictated under the EU's GDPR, allows users to make more informed decisions on their own.

Similarly, other innovations, such as Apple's App Tracking Transparency, prove that personalization can peacefully coexist with privacy. When user preferences are respected and business conducts its practices fairly, the trust will be maintained, along with relevance in ad delivery.

Conclusion:  
Personalized advertising has merit but must be done in a very honest and transparent manner. Respecting user consent and security of information is how a business can balance benefits of tracking with needs of privacy.  
  
Thank you.

I'll craft an informative and substantive reply to Revanth's comprehensive analysis of online tracking and privacy:

Your detailed examination of the tracking ecosystem is well-structured, and I particularly appreciate your reference to Apple's App Tracking Transparency as a practical solution. However, I'd like to challenge your perspective on user consent and transparency being sufficient safeguards. While GDPR and similar regulations have made tracking more visible, they've also led to what privacy researchers call "consent fatigue" - users clicking through privacy notices without reading them due to their frequency and complexity. For example, a 2023 study found that the average person would need to spend 76 working days per year to read all the privacy policies they encounter online. This suggests that even with perfect transparency, the current consent model might be fundamentally flawed. Perhaps we need to move beyond the binary choice of "accept/reject tracking" and explore more nuanced approaches, such as dynamic consent models where users can adjust their privacy preferences based on context, or privacy-preserving advertising technologies like Google's Privacy Sandbox that aim to enable targeting without individual tracking. What if we reimagined the entire advertising ecosystem around privacy by design, rather than trying to retrofit privacy into existing tracking systems?

The breakdown of the tracking ecosystem was thorough and well organized — I especially like your reference to Apple's App Tracking Transparency as a realistic approach. But I'd like to challenge the notion that user consent and transparency are all the safeguards we need. Tracking has become more visible because of things like GDPR and similar regulations, but they have also led to what privacy researchers refer to as "consent fatigue" — where users simply click through a privacy notice without reading it due to the sheer seams that it's addressed. As an instance of this, in 2023 it was estimated that an average person would have to dedicate 76 days within the work year on reading every privacy policy they encounter online. This implies towards the origin, one of which is that model of consent that has been so effective for obtaining it until now may well be a blind alley even under perfect transparency. Maybe it makes sense to go, hey, you know what we shouldn't do is accept/reject tracking and maybe there are some juicy in between things like context-aware dynamic consent models where end users can change their user profile based on whether it's a shopping purchase or something like that. But instead of asking how we can squeeze privacy into existing tracking systems, what if we turned the whole business model upside down and built it around privacy by design?