

INTENSEYE ETHICS EVALUATION

1. PURPOSE OF THE EVALUATION

This evaluation's purpose is to assess the ethics of the design and use of Intenseye technology for workplace safety. In this evaluation, we focus on the following questions:

1. From the ethical perspective, how does Intenseye's technology impact individuals, society, and the industry?
2. How does Intenseye compare ethically to the traditional manual workplace safety inspection?
3. How does Intenseye fare in ethical design?
4. What are the overall ethical strengths and weaknesses of Intenseye?
5. What design features or user agreement safeguards are needed to minimize ethics risks that Intenseye poses?

2. METHOD + RESULT

Method:

For this ethics evaluation, we used the documents and technical information that are publicly available or provided by Intenseye. We did not have direct access to Intenseye tools and did not engage in independent analysis of technical aspects of Intenseye technology.

In our ethical analysis of Intenseye technology, we utilize *the Box*—a technology assessment tool by AI Ethics Lab that systematizes relevant ethical principles and values. *The Box*'s structure is similar to but, in our view, superior to the European Commission's *Ethics Guidelines for Trustworthy AI*.

We evaluate the Intenseye technology for their protection and promotion of 3 core values using 18 principles with respect to all stakeholders.

| Harm-Benefit | Autonomy | Justice |
|--|--|--|
| <ul style="list-style-type: none"> ○ accuracy/reliability ○ security ○ safety ○ well-being ○ impact ○ efficiency | <ul style="list-style-type: none"> ○ human control/oversight ○ transparency ○ explainability ○ information ○ agency ○ consent ○ privacy | <ul style="list-style-type: none"> ○ distribution of burdens & benefits ○ equality/non-discrimination ○ protecting the vulnerable ○ accountability ○ contestability |

Result:

In its current design and intended use, relative to traditional inspection methods, the Intenseye technology for workplace safety is expected to reduce harm, increase benefits, add to the protection and promotion of autonomy, and further social justice for all stakeholders.

Intenseye could incur potential ethics risks in its unintended use and further development. These ethics risks are primarily in relation to **privacy** and **bias** (page 7-9). As elaborated in relevant sections, Intenseye currently mitigates these risks through design choices and user agreements. To avoid such risks in further development and use, Intenseye system must ensure that *by design* its technology cannot be re-purposed for unjustified surveillance on workers, commit never to collect and share personal data on workers, and ensure that the system does not reflect or result in unfair bias. Additionally, Intenseye should employ user agreement tools to prevent misuse of the tool by the employer and ensure that the employer is aware of their responsibility for informing workers about the system. Finally, being an innovative and ethically conscious company, Intenseye can further explore design tools to empower workers and thereby add another ethically valuable dimension to their system.

The overall ethical assessment of the Intenseye technology is highly favorable: The system’s design, its end goals, its structure to reach these end goals, its expected outcomes, its treatment of those who are subject to the system, and its impact on all stakeholders are ethically justifiable. The system does not engage in or encourage any unethical actions.

3. SYSTEM OVERVIEW

This section provides a brief summary of the Intenseye system as reported by the company.

Goal:

Intenseye's reported goal is to prevent workplace incidents and increase workplace safety. According to the ILO statistics, around 340 million occupational accidents occur annually around the world, resulting in mortality, morbidity, and loss of income and productivity.¹ Using an AI-powered video analytics platform, Intenseye reportedly aims to detect unsafe conditions and acts in real-time, enable preventive control measures before an incident occurs, allow rapid response to an incident or emergency, and help accurately documenting and analyzing unsafe acts and conditions to take further precautions.

During the COVID-19 pandemic, Intenseye states that it also aims to support monitoring compliance with the required or recommended pandemic control measures such as social distancing and face mask.

Workings:

Intenseye informs us that the system utilizes existing cameras, analyzing the footage streamed from the cameras using the Intenseye software. Trained to recognize and analyze danger zones, vehicles, and personal protective equipment, the system detects violations in real time, 24/7, and simultaneously from all available cameras. As a result, the system serves triple purpose for workplace safety: prevention of accidents, rapid response in the event of an incident and emergency, and proper understanding of unsafe acts and conditions in the workplaces.

As stated by Intenseye, the data from cameras is not stored in hardware but only in secure memory. They are deleted within seconds after analysis. Output is anonymized and aggregated. Internal and external communication is encrypted. The system does not rely on bodily cues and therefore does not use facial recognition or biometrics. It does, however, keep screenshots of safety violations with individuals' faces blurred.

¹ https://www.ilo.org/moscow/areas-of-work/occupational-safety-and-health/WCMS_249278/lang-en/index.htm

4. ETHICAL EVALUATION OF THE SYSTEM

Deployment of the Intenseye technology would affect various stakeholders such as business owners, health and safety inspectors, insurance companies, and the public at large. But the most direct and high impact will be on workers. For this reason, this report will primarily and extensively focus on the workers while also taking into account other stakeholders.

HARM-BENEFIT

Accuracy and reliability:

Traditionally, workplace safety measures rely on manual on-site inspections by health and safety officers who do routine walkarounds.² In recent years, manual inspection has been complemented with monitoring of CCTV cameras.³ In addition to requiring significant manpower, neither the inspector visits nor the camera monitoring can provide 24/7 real-time assessment of risks. By using the existing cameras that capture various angles in real-time for 24/7, Intenseye aims to be significantly more accurate and reliable in detecting safety violations. Intenseye's own research with customer validation suggests that their system is 98% accurate. The system is reportedly designed for continuous improving, learning from collected data, and continuous measurement for accuracy and reliability.

Further evaluation of Intenseye's accuracy and reliability would benefit from documented, publicly available, and verified data which includes data on system failures and false positive and false negative rates.

Security & Safety:

Intenseye's security measures reportedly include using encrypted data, not storing identifiable data, and security audits for penetration.

The goal of the Intenseye technology is to increase worker safety by reducing the number of accidents and injuries, and during the pandemic, by preventing the spread of COVID-19. By

² https://www.osha.gov/OshDoc/data_General_Facts/factsheet-inspections.pdf

³ <https://www.sciencedirect.com/science/article/abs/pii/S0925753515003343>

providing 24/7 safety control, Intenseye system aims to contribute to worker safety around the clock. This is especially relevant during night shifts when workers are particularly tired and susceptible to make errors which escape traditional safety inspection.

Additionally, since the system is not autonomous, it does not pose a direct safety threat to individuals by triggering an autonomous reaction.

Further evaluation of security and safety of the system would benefit from documented, publicly available, and verified data of continued use of Intenseye system.

Well-being:

Intenseye's goal of making the workplace safer directly contributes to worker well-being. In fact, higher workplace safety would also increase the well-being of workers' families and potential workers. Let us unpack this point.

Workplace injuries are significant threats to workers' health, quality of life in terms of morbidity, and lifespan.⁴ Since workers' ability to continue their work is dependent on their physical ability to perform, these injuries also affect workers' livelihoods and as a result their quality of life in terms of income, savings, and physical and mental health.⁵ Therefore, any system that effectively reduces the workplace injuries makes workers better-off physically, mentally, and financially. Workers' physical and mental well-being do not only affect their own financial status but also their ability to financially contribute to their families.

During the COVID-19 pandemic, there is an added risk to workers within factories and warehouses. If workers fail to follow recommended measures such as social distancing and mask wearing, they are at risk of catching the disease and transmitting it to their families and beyond. A system that supports pandemic control measures would benefit the well-being of everyone in the workplace, their families, their communities, and the world at large.

And finally, we must take into account those individuals who are in need of work but find themselves having to choose between high risk jobs and financial difficulties. By making the workplace safer, Intenseye could contribute to the well-being of potential workers by making their

⁴ <https://www.osha.gov/data/commonstats>; <https://ilostat.ilo.org/topics/safety-and-health-at-work/>;
<https://www.bls.gov/opub/ted/injuries-illnesses-and-fatalities.htm>

⁵ <https://www.apa.org/pi/ses/resources/indicator/2012/04/unemployment>;
<https://www.iwh.on.ca/summaries/issue-briefing/unemployment-and-mental-health>.

available options better.⁶

Impact:

As described above, Intenseye's well-being effects go beyond the workers and impact worker families and potential workers. Safer workplace with fewer injuries would also result in lower business cost and healthcare spending. In fact, by reducing injuries and accidents, Intenseye could increase productivity and efficiency while decreasing the business cost through reducing the cost of new or substitute employees, insurance, repair of damaged goods and equipment, and accident investigation. In short, by making workplace safer, Intenseye could save resources and benefit the society.

Impact assessment must also take into account the environmental impact of the technology and evaluate it in relation to other methods. Intenseye reports that they take measures to minimize their environmental cost by using cloud computing and transfer learning. The remaining environmental cost needs to be evaluated against the other alternatives, such as the environmental cost of each inspector driving to each manual inspection. Reducing the environmental cost of technology should be seen as an integral and ongoing aspect of technology innovation and adoption. Going forward, Intenseye should continuously demonstrate their methods and efforts to that end.

Efficiency:

Intenseye's system is expected to be significantly more efficient when compared to the current manual workplace safety inspections. It offers drastic changes to the traditional method: From limited observances to continuous and simultaneous camera feeds, from limited hours of inspection per day to 24/7, from after-the-fact analysis to real-time analysis, and from manpower in detection to automation.

⁶ Here, it is important to note that overall Intenseye technology does not add cost (in fact, it reduces the cost, as explained below). Therefore, it does not limit workplace options by making it harder for the businesses to sustain.

AUTONOMY

Human control and oversight:

Intenseye does not trigger an autonomous reaction. It provides the information through an interactive dashboard that allows the human officer to observe, understand, and react to the unsafe acts and conditions. By doing so, one could say that it empowers both business owners and inspectors. It allows business owners to customize the system by giving them the control to ensure that their own risk assessment is integrated into the analysis. And it provides the inspectors with screenshots of the unsafe acts and conditions for their further evaluation. The system is under human control at all times.

Transparency & Explainability:

Intenseye provides information regarding its system's capabilities (detecting unsafe acts and conditions), its limitations (relying on the camera angles and feed and limited to the rules defined by Intenseye and the customer), its effect on individual decision-making (providing a screenshot of safety violations for further action by the human officer), and its procedure in reaching its decisions (defining how an act is categorized as a safety threat). While this does not imply that the human officers or business owners understand every method that the system employs and every step it takes, this does however ensure that the system is transparent and explainable in its function.

Information & Agency:

By providing more comprehensive information regarding safety violations, the system allows more accurate and relevant information for individuals (that is, inspectors and customers) to make informed decisions. In addition, by automating the repetitive and mundane aspect of the safety and health inspection, Intenseye system enables safety inspectors and customers to utilize their skills for problem solving while providing them with the relevant information regarding the problems.

In its current design, Intenseye system does not directly engage with the workers and it does provide them with information regarding their own and/or their workplace's safety violations. One might argue that a constant check on their safety reduces worker agency in terms of their personal responsibility. Integrating design tools that achieve worker engagement would integrate worker's

agency to the Intenseye system and enhance the system’s overall impact on information flow and individual agency.

Consent:

It is important to note that the practice of individual informed consent is often unrealistic for a workplace policy. Individuals might lack options or feel pressured to provide consent. Instead of individual consent, a more realistic approach is to provide the necessary information clearly to all workers, engage with worker groups and unions, and ensure responsible and justifiable use of technology.

Manual workplace safety inspections and measures also do not require worker consent. Instead, their ethical legitimacy relies on them being structured carefully and deployed responsibly to reach their ethically justifiable goal of making workplaces safer. Once this is ensured, worker’s decision to take the job could be considered as an implicit agreement to the workplace policy.

Intenseye’s system itself cannot engage in the abovementioned deployment practices—it can only provide a responsible design. However, Intenseye could utilize the user agreement to require its users—i.e., the employers—to deploy their technology responsibly, clearly informing workers and limiting their use of technology to its intended and justified goals.⁷

Privacy:

To evaluate Intenseye’s privacy risks, we need to first clarify what privacy demands in a workplace. Privacy in general demands being free from observation, attention, and interruption. There is also privacy in the sense of data protection, which require one to be able to control one’s personal data. The scope of privacy demands differs according to the setting. While one can demand being free from observance in one’s own home, one cannot make the same demand in a public space. A workplace is arguably neither a fully public nor a private space. Therefore, privacy demands in workplace would differ depending on the context. For example, while one can demand privacy in some of their workplace interaction and behavior (such as private chats with colleagues or one’s behavior during breaks), one cannot demand that their job performance is kept private from their

⁷ Related resource: https://edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-32019-processing-personal-data-through-video_en

manager or their adherence to codes of conduct remains private.

To ensure worker privacy, Intenseye, by design, does not collect or use any personal or biometric data. By design, the system does not allow tracking of identifiable individuals. It also does not store any non-incident data and provides the employer only with aggregates and analyses. In the case of a safety violation, however, the system takes a screenshot that documents this violation. In order to protect worker privacy, the system blurs the face of the individuals prior to making the image available on the dashboard. While this protects individual identity within the Intenseye system, individuals are re-identifiable by matching the screenshot with the original camera feed.

While re-identification could be considered as a privacy problem, a closer look reveals that it arguably does not constitute a severe violation of “personal” space or data. The re-identification issue appears only when the system captures a safety violation in marked zones. In other words, by design, the screenshot does not aim to capture individuals during their personal interactions and personal time. It also does not track worker performance in general. Yet, of course, one could pose a safety risk during their break or a screenshot could capture other interactions in the background. While such images could include private information, these would be extremely limited cases with minimal information as well as occurring in a non-private sphere in the first place.

It must be noted that Intenseye is significantly different and better in terms of privacy protection than all-purpose video surveillance since Intenseye focuses only on safety violations without collecting video stream. Furthermore, Intenseye’s potential threat to privacy must be compared with the traditional manual inspection: Any personally identifiable information that is attained by using the Intenseye system is significantly more limited than what a human inspector observes during their walkarounds. Any such information is limited to specific instances of safety violations and the system does not readily provide personal data through the Intenseye system alone.

An evaluation of privacy must also take into account what might be lost in the name of providing further privacy. As it will become clearer in the coming section, accountability and contestability require that there is a mechanism for re-identification. In other words, a mechanism for re-identification is also beneficial for the worker. To ensure that its benefits outweigh its risks, this mechanism should be subject to clear safeguards to protect workers from retaliation—which is a risk present in manual inspection as well. For that, Intenseye might not be able to build in design features but it can and should utilize the user agreement to make demands from its customers for

ethical use of their system.

To safeguard privacy going forward, Intenseye technology must ensure that *by design* it cannot be repurposed for general surveillance and “spying” on workers. It also must commit not to use personal data and biometrics in their further development and not to share identifiable data beyond safety violations.

JUSTICE

Distribution of burdens and benefits & Protecting the vulnerable:

The Intenseye system does not directly affect distribution of resources within the society. However, by making the workplace safer, it could help protect the vulnerable groups who often are the ones that take risky jobs. Thereby, the system could contribute to the betterment of distribution of burdens within the society.

Workplace safety problem affects individuals from lower socio-economic backgrounds.⁸ It is not a risk that is equally distributed within the society—rather it is concentrated on those who come from lower socio-economic backgrounds and who lack better options. Workers who accept higher risks in their workplace often do so out of desperation. Implementing safety measures for workers helps reduce the disparities within the society. Intenseye serves this function.

Equality and non-discrimination:

Discrimination and unfair biases often stem from unconscious behavior. As such, racism and sexism continue to be perpetuated even by people who do not intend to do so. Unlike a human inspector, a system that is indifferent to individual’s race, sex, ethnicity, age, and disabilities but rather only focuses on risk factors could minimize and even eliminate bias and discrimination. By automating the observation and detection of unsafe act and conditions, Intenseye technology could potentially eliminate the implicit biases that might be present in manual inspection.

Having said that, it is extremely important that the Intenseye system is trained with representative data and understanding the biases within the data. To serve all workers equally well, its error rate

⁸ <https://academic.oup.com/eurpub/article/23/4/693/429974>

should be approximately the same for recognizing different skin tones, body shapes, and genders. For example, the system must recognize protective gear and face masks equally well on different skin tones to avoid putting certain groups at risk.⁹ As the system improves and builds new features (such as ergonomics), it is also crucial to ensure that the system recognizes different body types and movements and the built-in biases in workplace safety. For example, as many studies show, safety gear is often not customized for women, leaving them susceptible to more injuries.¹⁰ To prevent the perpetuation of this type of discriminatory safety issues, the system should ensure that it does not base its learning on male movements and bodily features. In fact, Intenseye could potentially help address the existing discrimination in workplace safety by drawing attention to possible reasons for female injuries.

Accountability & Contestability:

The Intenseye technology can be evaluated for two types of accountability: (1) How does the Intenseye system ensure accountability for *its own* outcome, and (2) how does the system *contribute to the accountability* structure within the workplace.

Intenseye technology provides a screenshot of each unsafe act and condition that it detects. These screenshots are presented on the dashboard to the human officers for evaluation. This ensures that the system's outcome is verified by a human, that Intenseye can be held accountable for its outcome, and the outcome is contestable.

In addition, by having a much wider and more accurate coverage of the workplace, the Intenseye system contributes to uphold the accountability mechanisms for safety violations. By providing a screenshot, the system helps the accurate placement of responsibility and rightful mechanisms for accountability. While information provided by the Intenseye system could help determine if the worker in the scene was at fault, if need be, further information can also be attained through re-identification of individuals by combining the information that Intenseye provides with other data (such as video stream or worker logs).

Here, we must also note that, both for contestability and for accountability reasons, re-identifiability

⁹ This case was mentioned by the company as an example about their effort to eliminate bias.

¹⁰ <https://news.bloomberglaw.com/safety/employers-exposed-when-womens-safety-equipment-doesnt-fit>;
<https://www.unison.org.uk/content/uploads/2016/07/23965.pdf>

of individuals is useful. If and when a serious accident occurs, it is crucial to ensure that individuals are not blamed wrongfully. To contest an accusation and to hold the right agents accountable, it might be necessary to re-identify those who were present during a safety violation. By de-identifying its own feed but leaving the option of re-identification possible, Intenseye strikes a balance between privacy and accountability: It reduces privacy concerns while still contributing to the accountability and contestability mechanisms.

5. OVERALL ASSESSMENT

Ethics risks: The Intenseye technology in its current design does not contain any significant ethics problems. The most important ethics risks that it must focus on in further development and deployment is **privacy** and **non-discrimination**, as elaborated above.

Ethics benefits: Intenseye's most important and direct ethics benefit is its expected significant positive impact on well-being of workers, their families and communities. It is also expected to help ensure workers' safety, increase efficiency in workplace safety, enable accurate information flow, protect vulnerable groups within the society, and ensure accountability. While the system poses some risks related to privacy and discrimination in the absolute sense, when compared to traditional methods of workplace safety, it is likely to better protect privacy and reduce discrimination, as elaborated above. Given these ethics benefits, we conclude that the system is **ethically justifiable**. In fact, Intenseye system is ethically stronger in comparison to the traditional manual model. And furthermore, Intenseye technology holds significant ethics opportunities for further betterment of workplace safety.

This ethics evaluation is conducted using solely the documents and information provided by Intenseye. AI Ethics Lab did not have access to any further material.
This ethics evaluation does not constitute a formal ethics review or legal advice.