

Ethical Decision Making in AI System

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Abstract

Artificial Intelligence is becoming a part of the way we make decisions all around the world. The problem is that we do not really understand how Artificial Intelligence makes these decisions. This has created an issue where nobody is really responsible for what Artificial Intelligence does. This paper is going to look closely at the ethical issues that come up when we use Artificial Intelligence and other systems that can work on their own. We will be focusing on the problem of making Artificial Intelligence work quickly and efficiently while also making sure that it does what is right and fair. Artificial Intelligence has to be able to make decisions but it also has to be accountable, for what it does. The Black Box problem is central to this study. This problem is about the Large Language Models and the way they make decisions. These Large Language Models are very complicated. It is hard to understand why they make certain decisions. This is an issue in important areas, like healthcare and criminal justice and financial services. The Large Language Models are used to make decisions in these areas but it is not clear why they make these decisions. [3] This study looks at what has been written about "Fairness, Accountability and Transparency" frameworks far. It also suggests a way to check if these frameworks are ethical. We think that algorithms can be biased because the data used to train them reflects the prejudices of the past. The study also looks at the problem of trying to make predictions that're both accurate and fair to all people. It shows that trying to make predictions accurate can mean that some groups of people are treated unfairly. The idea that math can be completely neutral is not true because the data it is based on is not neutral. This research evaluates how well "Fairness, Accountability and Transparency" frameworks are working. [1] One big problem with Artificial Intelligence is that it can be unfair. This happens when the data we use to train Artificial Intelligence is not fair. For example, if the data is mostly one type of person Artificial Intelligence might not work well for other types of people. To fix this we use something called "Fairness by Design". We make sure that the data is fair before we use it. We also add rules to the Artificial Intelligence system to make sure it is fair. We check the results to make sure they are fair. Artificial Intelligence systems also need to be accountable. This means that people need to be involved in the decision-making process. We call this "Human-in-the-loop". Artificial Intelligence can process a lot of data. People need to make sure that the choices it makes are good. As Artificial Intelligence gets better we want to make sure that it works well with people. We need to balance how well Artificial Intelligence works with how fair it's. We want Artificial Intelligence to make choices that are good for everyone. We need to keep working on this to make sure that Artificial Intelligence is good for society. Artificial Intelligence has to make choices that're good for people and we need to be able to trust it. We are trying to make Artificial Intelligence that's fair and good and that works well with people. This is a challenge but it is very important. We need

to make sure that Artificial Intelligence is used in a way that's good, for everyone and that it does not hurt anyone [13].

KEYWORDS: *Artificial Intelligence, Ethics, Machine Learning, Algorithmic Bias, Transparency, Accountability, Deontological Frameworks, Algorithmic Bias (or Bias Mitigation), Explainable AI (XAI), Transparency and Traceability, Robustness and Reliability, Fairness-Aware Machine Learning, Human-in-the-Loop (HITL), Corporate Digital Responsibility, Regulatory Compliance.*

1. Introduction

The Algorithmic Revolution is really changing things. It has been, ten years and Artificial Intelligence has gone from just being used for looking at data to being a big part of our daily lives. Artificial Intelligence is used for the things we see on media to helping decide if someone is guilty of a crime or if they are sick. As Artificial Intelligence systems get better they are being asked to make decisions that people used to make on their own like what's right and wrong. Artificial Intelligence is moving from doing simple tasks to being able to do things on its own and that means it has to make tough choices that people used to make. This change is going to make things a lot more efficient and fair. At the same time it also creates a big problem with ethics. The main issue here is that artificial intelligence systems can look at information fast and handle a lot of it but they do not have the same sense of right and wrong that people do. Artificial intelligence systems lack the ability to understand how people feel and they are not accountable for their actions in the same way that people are and this is what makes human justice work. Artificial intelligence systems just do not have the moral intuition as people and they do not have the same ability to understand the context of a situation and this is a problem, for artificial intelligence systems[8].

The main problem with machine learning is that it is like a "Black Box". This is especially true for learning and neural networks. Regular computer programs do what people tell them to do step by step. Machine learning is different. It looks at a lot of data. Finds patterns on its own. This means that when it makes a decision it does not always follow a path. The people who made these systems often do not even understand how they work. Machine learning is the reason, for this. It is what makes these systems so hard to understand. Machine learning and its "Black Box" nature are the issues here. When an artificial intelligence system says no to a loan. Thinks someone from a certain group is very likely to get in trouble [6]again it is a problem that the system cannot give a good reason that people can understand. This is called the "Explainability Crisis". It goes against what's fair and being open[3]. The European Union's AI Act and other international approaches that focus on rights are being adopted quickly around the world. This is a

deal for our society. It shows that people's ideas about what's important are changing. We are leaving behind the time when people thought it was okay to do things and worry about the problems later. Now we are entering a time when people think it is important to make things in a responsible way. There is still a problem. The European Union's AI Act and these international rights-based approaches want us to do things in a way that's fair and good for people [3].

At the time people also want computers and technology to work very well and do things quickly. The European Union's AI Act is about finding a balance between these two things: making sure technology works well and making sure it is fair and good, for people. To make a Moral Machine we need to do more than just update the code. We need to think hard about what is fair, in the digital world. What does fairness mean to us? However, as these systems start making decisions on their own we have a problem. The problem is not just about whether Artificial Intelligence can think, but about whether it can be fair. This project is about making sure that Artificial Intelligence systems make decisions. If we look back, Artificial Intelligence was initially about making things work faster and better. People did not think much about the data they used. As Artificial Intelligence started being used in important areas like banking and policing it became clear that data is not neutral. Data can be unfair. When we train Artificial Intelligence with data it learns these biases and makes them worse. This is a problem because it can lead to discrimination. So studying Artificial Intelligence ethics is not about philosophy; it is also about making sure that Artificial Intelligence systems are fair and just.

One of the problems with Artificial Intelligence is that we do not always understand how it makes decisions. This is called the "Black Box" problem. Some Artificial Intelligence systems like Convolutional Neural Networks and Transformers are so complex that we cannot understand how they work. Imagine a bank's Artificial Intelligence system denying a loan application without explaining why. This is not fair. It is not transparent. Our project says that transparency is essential

for Artificial Intelligence. We need to make sure that Artificial Intelligence systems can explain their decisions so that we can trust them. Moreover, Ethical Decision-Making in AI Systems is not about technology; it is also about philosophy. There is no one way to make ethical decisions. For example, should a self-driving car prioritize the safety of its passengers or the safety of pedestrians? These are not questions to answer. Our research is about how to make Artificial Intelligence systems that can make decisions based on different philosophical theories. We want to make sure that Artificial Intelligence systems are fair, respect people's privacy, and do not harm anyone. The importance of this research is highlighted by the laws and regulations around Artificial Intelligence. Companies are now responsible for making sure that their Artificial Intelligence systems are fair and transparent. Our project is about how to design Artificial Intelligence systems that're fair from the start. We are exploring ways to remove biases from data and make sure that Artificial Intelligence systems are transparent and accountable. In addition to fairness and transparency, our project also looks at the social impact of Artificial Intelligence. We need to make sure that Artificial Intelligence systems are sustainable and do not harm the environment. An ethical Artificial Intelligence system is one that is fair, transparent, and sustainable. As students of computer science, we need to think about how to make Artificial Intelligence systems that serve humanity, not systems that work. Ultimately, our goal is to make Artificial Intelligence systems that people can trust. Trust is not something that we can add to a system later; it needs to be part of the system from the beginning. By studying the intersection of computer science, sociology, and ethics, we can make Artificial Intelligence systems that're fair, transparent, and sustainable. We believe that Artificial Intelligence has the potential to solve many of the world's problems, but only if it is designed with ethics in mind. This introduction is the foundation for an exploration of the tools, algorithms, and policies that will shape the future of responsible Artificial Intelligence.

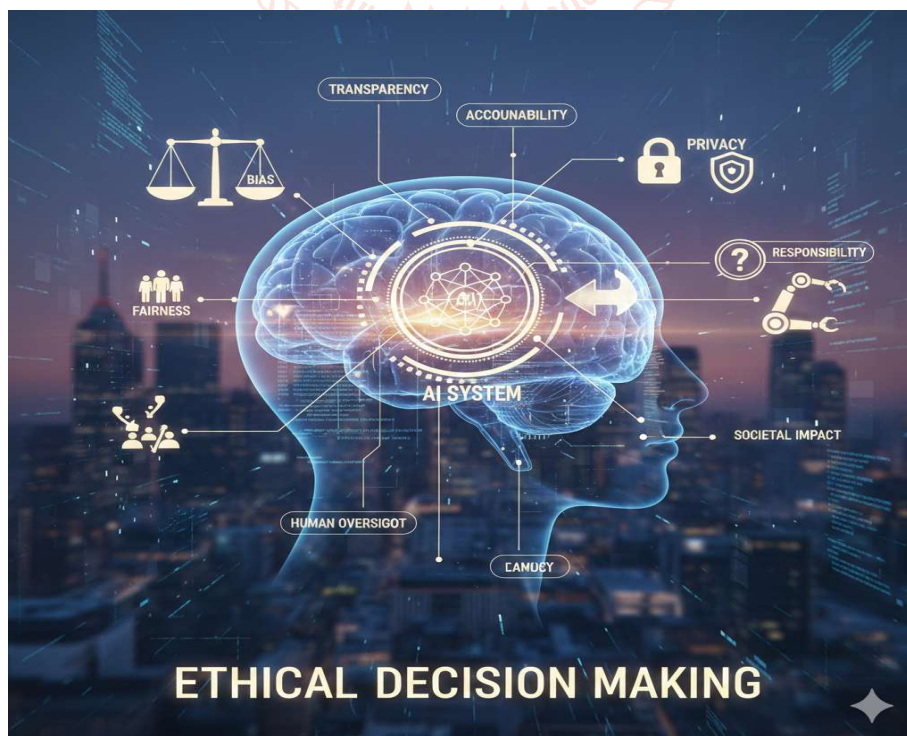


Figure 1: Ethical Decision making

2. Literature Review

The ethical discourse in AI is rooted in classical moral philosophy, primarily involving utilitarianism, deontology, and virtue ethics. Early scholars in the field, such as Bostrom (2014), focused on the long-term existential risks of Superintelligence, but recent scholarship has pivoted toward "narrow AI" and immediate harms. [9] The talk about making decisions in Artificial Intelligence is really old and comes from classic ideas about what is right and wrong. People like Bostrom and Yudkowsky started this conversation a while back by talking about "Value Alignment". Which's the problem of making sure a super smart Artificial Intelligence would have the same values as humans. [7] As Artificial Intelligence moved from just being an idea to actually being used people started to worry more about the bad things that could happen right now because of the way the algorithms work. [13] Nowadays people writing about this topic are looking at two ways of thinking: one is about following rules, which is called Deontological ethics and the other is about looking at the results, which is called Utilitarianism and Artificial Intelligence is a big part of this discussion, about ethics and Artificial Intelligence. For example Floridi and other people (2018) came up with a set of rules that includes five main ideas: doing good not doing harm giving people control being fair and being clear. These rules are the foundation for modern Artificial Intelligence ethics guidelines. Artificial Intelligence ethics guidelines are, like a guide that helps people who make Artificial Intelligence systems especially when they are working with Artificial Intelligence systems that are hard to understand. [3]

In the few years a lot of people who study and work with artificial intelligence have started to use the FATE framework to look at AI systems. The FATE framework is really important for evaluating AI systems. Some researchers, like Noble did a study in 2018 called Algorithms of Oppression. O'neil wrote a book in 2016 called Weapons of Math Destruction. These people showed that the rules that computers follow are not always fair. They found out that some computer systems, like the ones used by search engines and insurance companies can treat people unfairly because of their race or gender. These systems are sometimes called "Black Box" systems because we do not know how they work. After these studies people have been talking about the "Transparency Paradox" in the 2020s. Wachter and some other people have written about this. The FATE framework is still really important, for evaluating AI systems. In the year 2023 Artificial Intelligence systems are getting better at doing their job for example Deep Learning. At the same time they are becoming harder to understand [9]. This has led to an area of study called Explainable Artificial Intelligence. People who study this like Adadi and Berrada who wrote about it in 2018 and Akinsiku who will write about it in 2025 are trying to find ways to explain how Artificial Intelligence systems make decisions. They are using things like Local Interpretable Model-Explanations, which is also known as LIME and SHAP which was made by Lundberg and Lee to help people understand what Artificial Intelligence systems are doing. They want to make it easier for people to understand how Artificial Intelligence systems work by explaining things in a way that's easy to understand after the Artificial Intelligence system has already made a decision, which is called a post-hoc explanation. This will help to close the gap, between how complicated Artificial Intelligence systems are how well people can understand them, which is a problem that

Explainable Artificial Intelligence is trying to solve. [12] A big change happened in the literature when formal legal frameworks were introduced. The European Unions AI Act is an example of this. It started in August 2024. Will be fully in place by August 2026. This new rule changed the way people think about AI. Now it is not about doing the right thing but also about following the rules. The European Unions AI Act is a part of this change. People like Hauer, who wrote about it in 2022 and the people at ACM SIGAI, who updated their information in 2026 have taken a look, at the Act. They point out that the European Unions AI Act uses a system to figure out which AI systems are risky. The European Unions AI Act is important because it helps us understand how to deal with AI in a way. There are a lot of rules now for things like biometrics and critical infrastructure and recruitment. These areas are considered risk. Now people in charge have to be very open and honest about what they're doing with the information they collect. This is a change. Before companies just wanted to be seen as doing the thing with Artificial Intelligence. Now they have to do it. They can not be in business. Because of this people are doing a lot of research on things, like Regulatory Sandboxes and how to watch Artificial Intelligence in time to make sure it is being used in a good way. Artificial Intelligence is a part of this. [1]

The new research that came out from 2024 to 2026 says that Artificial Intelligence ethics is not about math it is about people and technology together. Some people like Dignum in 2019 and Crawford in 2021 think that the place where we get our data, which they call the "Data Ecology" is not fair. So just trying to fix the data to make it less biased is not enough. Now people are saying we should have Humans involved when we work with Artificial Intelligence this is called Human-in-the-Loop and Human-, on-the-Loop it means people are working with Artificial Intelligence. These models ensure that for high-stakes decisions, a human agent remains the ultimate moral arbiter. Literature by Rama and Prinsloo (2025) suggests that the future of ethical AI lies in "Continuous Logic Programming" and "Reinforcement Learning for Moral Alignment," where agents learn ethical policies through iterative feedback rather than rigid, static rules. [11]

3. Research Methodology

Artificial Intelligence has to make choices. This is a problem that involves many different subjects. We want Artificial Intelligence to be good for people, not about math. The problem is that we do not really know how Artificial Intelligence makes its decisions. This is called the "Black Box" problem. To fix this we use something called Explainable AI. This helps us understand why Artificial Intelligence makes choices. This is very important in areas like healthcare and law. If Artificial Intelligence makes a choice it can hurt people. So we need to make sure that Artificial Intelligence can explain its choices. We want to be able to trust Artificial Intelligence. We want to be able to prove that it is trustworthy. One big problem with Artificial Intelligence is that it can be unfair [12]. This happens when the data we use to train Artificial Intelligence is not fair. For example, if the data is mostly one type of person Artificial Intelligence might not work well for other types of people. To fix this we use something called "Fairness by Design". We make sure that the data is fair before we use it. We also add rules to the Artificial Intelligence system to make sure it is fair. We check the results to make sure they are fair. Artificial Intelligence systems also need to be accountable. This means

that people need to be involved in the decision-making process. We call this "Human-in-the-loop". Artificial Intelligence can process a lot of data. People need to make sure that the choices it makes are good. As Artificial Intelligence gets better we want to make sure that it works well with people. We need to balance how well Artificial Intelligence works with how fair it's. We want Artificial Intelligence to make choices that are good for everyone[6]. We need to keep working on this to make sure that Artificial Intelligence is good for society. Artificial Intelligence has to make choices that're good for people and we need to be able to trust it. We are trying to make Artificial Intelligence that's fair and good and that works well with people. This is a challenge but it is very important. We need to make sure that Artificial Intelligence is used in a way that's good, for everyone and that it does not hurt anyone. The way we make Artificial Intelligence systems follow rules is a process with many steps. It involves being very precise with the technology and also thinking deeply about what's right and wrong. As Artificial Intelligence systems start to control things and deal with sensitive human information we need to have a clear plan for how to make ethical decisions. This plan starts with looking at who's affected by the decisions made by the Artificial Intelligence system. We need to think about the people who use the system directly and also those who might be affected indirectly like communities that could be treated unfairly because of biases in the algorithms[4].

We have to figure out what is important to these groups of people and what values we want the Artificial Intelligence system to follow, like being fair, accountable and transparent. By deciding on these values on we can make sure that the technical parts of the system are designed with people in mind so we do not end up with a system that makes decisions without considering human values. After we have defined these values we move on to making sure the data used to train the Artificial Intelligence system is good and fair. This is a step because the system can only be as good as the data it is trained on. We have to check the data for any biases or problems that could lead to unfair decisions. We might need to add data to make sure everything is balanced and we have to be careful about how we collect and use peoples personal information. The next step is to design the Artificial Intelligence system in a way that ensures it makes decisions. This involves using rules to make sure the system treats everyone equally. We also need to be able to understand how the system makes its decisions so we can check if it is being fair. This is where we use techniques like Explainable Artificial Intelligence to look inside the systems decision-making process. Then we test the Artificial Intelligence system to see if it can make decisions in different situations. We try to provoke the system into making decisions to see how it reacts. This testing is like a safety net to catch any problems before the system is used in life. After the system is up and running we need to keep an eye on it to make sure it continues to make ethical decisions. We set up monitoring systems to check for any biases or problems and to make sure the system is still following the values we defined. If anything goes wrong we have a record of all the decisions the system made so we can go back. See what happened. Finally we need to be able to update the Artificial Intelligence system as norms and laws change. We have to listen to feedback from people who are using the system and make changes as needed. This way the system can continue to evolve and improve making sure it

always follows rules and serves people well[12]. By doing all these steps we can create Artificial Intelligence systems that're not only smart but also wise and trustworthy. The Artificial Intelligence system is a tool that can help people. It has to be used responsibly. We have to make sure that the Artificial Intelligence system is fair, transparent and accountable. The Artificial Intelligence system has to be designed and used in a way that respects people's rights and values. By following these steps we can create Artificial Intelligence systems that serve people well and make the world a better place. The Artificial Intelligence system has to be a partner, in human progress. The Artificial Intelligence system has to be wise and trustworthy. The Artificial Intelligence system has to follow rules and make decisions that are fair and just. The Artificial Intelligence system has to be a tool that helps people, not a tool that harms them[13]. The Artificial Intelligence system has to be designed and used with care and responsibility.

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The way we make Artificial Intelligence systems follow rules is a process with many steps. It involves being very precise with the technology and also thinking deeply about what's right and wrong. As Artificial Intelligence systems start to control things and deal with sensitive human information we need to have a clear plan for how to make ethical decisions. This is a step because the system can only be as good as the data it is trained on. We have to check the data for any biases or problems that could lead to unfair decisions. We might need to add data to make sure everything is balanced and we have to be careful about how we collect and use peoples personal information. The next step is to design the Artificial Intelligence system in a way that ensures it makes decisions. This involves using rules to make sure the system treats everyone equally. This is where we use techniques like Explainable Artificial Intelligence to look inside the systems decision-making process. Then we test the Artificial Intelligence system to see if it can make decisions in different situations. We try to provoke the system into making decisions to see how it reacts. This testing is like a safety net to catch any problems before the system is used in life. This is a challenge but it is very important. We need to make sure that Artificial Intelligence is used in a way that's good, for

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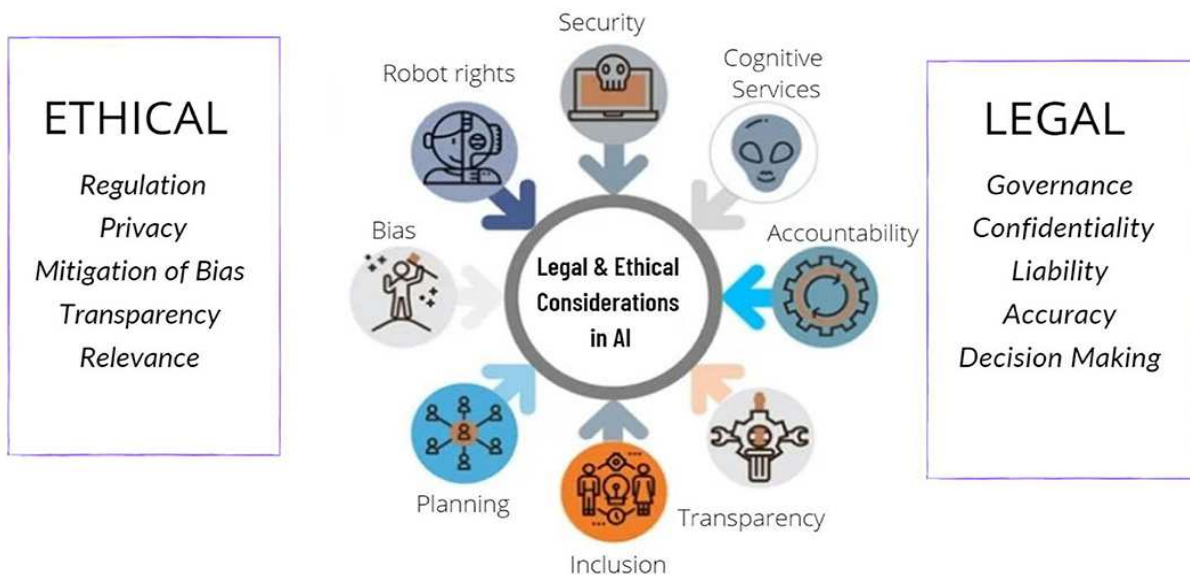


Figure 2: Ethical decision making considerations

4. Result

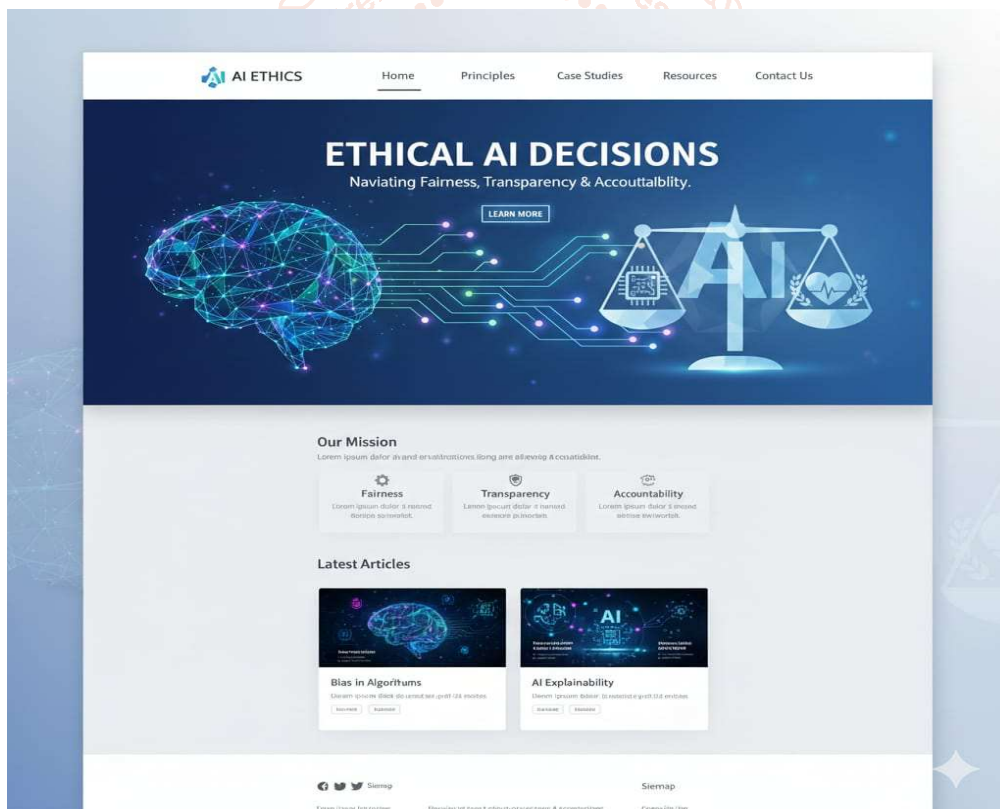


Figure 3. Ethical AI Governance Interface

5. Conclusion

The way we think about ethics and Artificial Intelligence has changed a lot. Artificial Intelligence used to be something that a few academics thought about but now it is a necessary part of our digital world. This research has shown that making decisions is very complicated and cannot be solved just by using technology or just by thinking about philosophy. The fact that we do not really understand how deep learning works it is, like a "Black Box" means we need

to change the way we check if software is working correctly. We need to use a way that looks at both the technology and the people, a socio-technical auditing process to make sure everything is working properly with Artificial Intelligence[13]. The findings show that even though it is not possible to make algorithms completely neutral we can still make autonomous systems better by being transparent about how they work, by trying to reduce bias and by having humans involved in the decision making process of systems.

This can help to reduce the difference that exists between what autonomous systems can do and what people are responsible for in autonomous systems. The implementation of transparency protocols and bias mitigation strategies, in systems can really help to make autonomous systems more responsible[10]. The future is going to be really exciting for Artificial Intelligence. The next ten years of Artificial Intelligence research will probably focus on Neuro- AI. Neuro-symbolic AI is a way to bring together the learning ability of neural networks and the logical thinking of symbolic Artificial Intelligence. This new way of doing things promises to make machines that think about what's right and wrong, from the very beginning. With Neuro- AI moral rules are a big part of how the machine thinks, not just something we add later to make sure it does the right thing. Furthermore, the burgeoning field of Automated Moral Reasoning will continue to evolve, enabling AI agents to navigate complex, real-time dilemmas with greater cultural sensitivity[2]. As AI becomes more agentic, the development of a "digital constitutionalism" will be paramount to ensure that as machines become more intelligent, they remain fundamentally aligned with human rights and justice.

The Internet of Things based patient monitoring system with real-time fall detection and edge analytics is a step forward in helping older people and dealing with the lack of healthcare professionals. As the World Health Organization says, the number of people over 60 years old will double by 2050 so we really need systems that can monitor patients without being too intrusive. This research shows that using edge computing with the Internet of Things framework solves the problems of cloud-based systems like high latency and bandwidth constraints. The system works by processing sensor data like heart rate, blood oxygen levels and body temperature directly on the device. This means that alerts for things like falls or heart attacks can be sent quickly which is crucial for helping patients recover. The system uses an architecture that combines the clouds big storage with the fast response of edge nodes. This approach also helps keep data private and makes the system more reliable[5]. When the internet is down the system keeps working because it processes data locally on the patients device. The research also used friendly ideas like virtualizing servers and buying energy-efficient hardware. The system can tell the difference between falls and normal daily activities, which reduces false alarms. The future of this research is very promising. Could lead to a more holistic approach to patient care. Of just detecting falls the system could predict when a patient is likely to fall. This would allow caregivers to step in before an injury happens. The system could also use 5G and 6G telecommunications to create a network of sensors in the home making it safer, for patients. Another area of research is "Federated Learning" which would allow the systems AI models to learn from data without moving the sensitive data from local devices. This would make the models more accurate. Keep patient data secure[12]. The system could also be used to monitor health by analyzing sleep patterns and vocal biomarkers. The goal of this research is to change the way healthcare works from treating patients in hospitals to providing care at home in time. By using edge intelligence and cloud analytics we can create a system that supports the dignity and autonomy of people. The Internet of Things edge analytics and ethical AI will keep pushing the boundaries of what's possible making healthcare more accessible and human-centric[15].

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