1.A EcoDrive

1. B Long-Term Vision

1.B.1 Goals

With EcoDrive, we strive to improve people's driving experience while pushing for a healthier environment with fewer emissions. By tailoring a car's performance to individual driving patterns, our AI system learns how to optimize the vehicle, resulting in reduced fuel consumption, extended vehicle lifespan, and lower emissions. We collaborate with car manufacturers and environmental agencies to ensure our technology contributes to emissions reductions and improves industry standards. EcoDrive is committed to creating intelligent, greener driving goals for both individuals and the planet.

1.B.2 Idea Organization

The idea for EcoDrive came from reading about the Volkswagen dieselgate scandal, which showed how car companies could manipulate emissions data and the serious impact that has on the environment and public trust. At the same time, I was taking AI courses that focused on real-world applications, and it made me think about how AI could be used to actually make a positive impact instead of hiding problems. We realized that if AI could adapt to individual driving behavior in real time, it could help reduce emissions in a more honest and effective way. That connection between real accountability and emerging tech is what sparked the idea. It felt like a way to use what we were learning in class to build something practical and responsible.

1.B.3 Purpose/Values/Mission

Here at EcoDrive, we strive to achieve many values and goals every day. One of these goals is to make cars more emissions-efficient, safe, and cheaper. The reason this is one of the most important goals of our company is because we care. We strive to create a world that has more cars on the road that factor more than just the driver, with our help cars can both help the driver and others around them. Our mission is to help as much as we can, we do that by helping make cars more efficient and safe. We also believe in using AI responsibly, not just for performance, but to create a positive impact on the environment and society. At our core, we value fairness, privacy, transparency, and security, as we aim to build trust with our users by always putting their safety and privacy first.

1.B.4 Key Questions

1. How we will continuously maintain our users' trust to fine-tune our AI systems based on their driving habits while also ensuring privacy?

2. How can we maintain trust with car manufacturers and environmental agencies so they recognize EcoDrive as the industry standard?

1. C Strategy with Ethical Impacts AND Ethical Safeguards

1.C.1.1 Objective and Key Result

Our primary objective at EcoDrive is to achieve seamless integration of our AI system into our users' vehicles to improve driving quality, overall car lifespan, fuel economy, and reducing emissions. This goal presents several challenges, especially for car manufacturers, due to the variety of software systems across different vehicle brands. To address this, EcoDrive will collaborate with the top 10 most popular car brands in the U.S., ensuring our app and plugin are flexible enough to be used with a broad range of vehicle operating systems. This partnership will help standardize our integration process, making it easier for manufacturers to adapt to our technology. Car manufacturers will continuously experience the effects of our system as drivers actively use their vehicles. While this constant adjustment could present difficulties, such as operation changes within the vehicle company itself, it also offers valuable insights. Manufacturers can gain incredibly important data on their vehicles' performance limits, helping them improve their hardware and software systems over time. Our company aims to provide car manufacturers with impactful data that identifies at least 15% more performance inefficiencies compared to standard diagnostic tools within the first year of experimentation.
Environmental agencies, such as the EPA, are another important stakeholder. Since our system directly influences vehicle emissions and efficiency, these agencies must monitor our data to ensure compliance with industry standards. By securely sharing anonymized data with these agencies, we can help them stay informed about evolving vehicle trends, allowing them to develop improved and updated environmental policies. We aim to reduce emissions in EcoDrive-enabled vehicles by at least 10% compared to non-EcoDrive vehicles within the first year.

Users, as major stakeholders, are the core of our objective of our product's integration. To ensure a positive user experience, our app will feature an intuitive interface that simplifies data presentation for easy understanding with written explanations if the user needs it. We aim to make our service accessible to anyone with a smartphone and a vehicle, regardless of income, race, or gender, in the U.S. To support this goal, our app will operate on a minimal subscription fee of $40 per month, which covers costs for local fine-tuning and cloud storage. Additionally, our app and plugin will include reports of changes being made as frequently as the driver wants, with accessibility features such as a speech bot for hearing-impaired and visually-impaired individuals, ensuring inclusivity for all eligible drivers across various age groups. As users use our system, EcoDrive's AI system will begin fine-tuning their vehicle's performance to fit their driving style. This will provide smoother rides, improved vehicle lifespan, better fuel economy, and a reduced environmental footprint. To ensure user safety, our AI system will exclude risky or unpredictable data when fine-tuning, and discarding outlier data points that could hinder a vehicle's performance or driver security. To respect user privacy, EcoDrive will offer the choice to keep data strictly local or to share it with us. For those who opt to share data, we will provide incentives such as reduced subscription costs and early access to new features. Our goal is to improve user satisfaction by at least 20% within the first year of integrating EcoDrive into their vehicles, compared to their prior driving experience without our system.

1.C.1.2 Metric(s) with Experiment(s)

To measure the success of EcoDrive's integration, we will look into our stakeholders to evaluate our progress and observe our findings. Starting with car manufacturers, we will begin by working with the top 10 vehicle companies in the U.S. to conduct extensive stress tests on their cars. Our goal is to identify at least 15% more inefficiencies compared to existing diagnostic tools. To achieve this, we will design a thorough set of experiments that include:

* Performance Testing: Comparing vehicle efficiency with and without EcoDrive to track improvements in fuel economy, emissions, and overall performance.
* Dynamic Tests: Evaluating EcoDrive's ability to adjust in various road and weather conditions to tackle different environments in the U.S.
* Crash Simulations: Running simulations on our base AI model to identify potential safety risks and improve system responses in dangerous situations.
* Driving Behavior Analysis: Simulate both aggressive and defensive driving patterns to understand vehicle limitations and improve EcoDrive's adaptability.
* Data Excess Tests: Overload the vehicle plugin with excessive data to identify and filter out unessential or risky information, ensuring our system stays efficient and stable.

To assess the 15% improvement mark, we will use the data from these experiments to help advance the performance of car manufacturers. For example, if we notice that during performance testing, certain car parts lasted longer with the use of our app and plugin, this implies an improvement in that area.

To track our goal of reducing emissions by at least 10% in EcoDrive-equipped vehicles compared to standard cars, we will prioritize transparency with environmental agencies. Our detailed testing data from car manufacturers will be shared with agencies like the EPA. As more users use EcoDrive, we will anonymize and aggregate real-world data to create yearly reports that show our system's environmental impact. To assess the 10% reduction in emissions, we will compare the vehicle's emissions before and after using the app. To further demonstrate the credibility of our data, we will collaborate with car manufacturers and third-party testers to validate our findings. Additionally, partnering with the EPA could allow us to test new industry technologies and contribute valuable insights for future policies. To assess the 10% reduction in emissions, we will compare the vehicle's emissions before and after using the app. If the vehicle shows improved fuel efficiency over time, we will consider this evidence that emissions are being lowered since the more fuel-efficient a vehicle is, the fewer emissions it spits out into the environment.

Additionally, to ensure our system meets user expectations, we will distribute customer surveys designed to provide detailed feedback. Survey participants will be selected based on location, climate, driving habits, and length of EcoDrive use to gather diverse insights. Questions will include:

* How long have you been using EcoDrive?

* On a scale of 1 to 10, how improved is your driving experience? (1 = no change, 10 = major improvement)
* How has your vehicle's fuel economy changed since using EcoDrive?
* What features would you like to see added in the future?
* Would you recommend EcoDrive to others?
* If you could improve one feature, what would it be?

This feedback will guide our improvements during our first year, helping us achieve our goal of a 20% increase in user satisfaction among EcoDrive users. This percentage of satisfaction will be assessed based on the scores given by the users. If we see high ratings for improved experience and fuel economy, we can consider that as an increased user experience and satisfaction.

Finally, to promote engagement and financial accessibility, we will introduce incentive programs for both new and existing users. This will include referral codes, social media campaigns, and interactive app features such as performance reports and usage milestones. Users may receive rewards like free subscription months, early access to new features, or discounts for sharing anonymized data that improves EcoDrive's performance. By combining these efforts, we aim to maintain strong customer engagement and demonstrate consistent improvements in vehicle performance, emissions reduction, and user satisfaction.

1.C.1.3 Ethical Impact(s)/Issues(s)

Stakeholder	Financial Risk	Privacy Risk	Conflicting Interest Risk
Users	Mid	High	Mid
Environmental Agencies	Low	Low	Mid
Car Manufacturers	High	Mid	Low

Users: As stakeholders, users face a moderate financial risk since the $40 monthly subscription fee could pose a burden for some individuals over time. While this fee may seem manageable, it could still limit accessibility for those with tighter budgets. Privacy risks for users are high since our system actively monitors driving patterns. While we don't track extremely personal data, fine-tuning driving habits still requires consistent observation. As for conflicting interests, users fall in the middle. Users mostly prefer stability and safety over rapid feature updates. Some may also prioritize privacy, which could limit EcoDrive's ability to improve its system or add certain features. Ensuring privacy concerns are being handled and keeping intuitive systems will reduce users' mistrust.

Environmental Agencies: Environmental agencies such as the EPA face minimal financial risk since they are not required to invest heavily to monitor EcoDrive's product. EcoDrive will provide transparent reports and support third-party testing to ensure data integrity. This transparency stems from past cases like the [1], where Volkswagen manipulated data to mislead regulators, resulting in a major scandal that affects the company's reputation until today.

Privacy risk is also low since these agencies mainly rely on anonymized data rather than personal information. However, conflicting interests are moderate, environmental agencies might push for stricter data transparency standards, which could increase EcoDrive's workload and slow product updates. Still, partnering with these agencies will allow us to develop better environmental policies in the long run.

Car Manufacturers: Manufacturers face the highest financial risk since their vehicles are constantly modified in real-time with EcoDrive's system. This creates potential operational costs, especially if unexpected performance issues arise. However, in the long term, the data we provide could help manufacturers improve their hardware and software designs, potentially reducing costs tied to recalls or inefficiencies. Privacy risks for car manufacturers sit at a moderate level since performance data may unintentionally reveal internal design flaws or proprietary technology. As for conflicting interests, the risk is low because manufacturers benefit from EcoDrive's insights, which help improve their vehicle efficiency, aligning with their goals and strengthening their product overall.

1.C.1.4 Ethical Safeguards

To tackle accessibility to our product regardless of age, gender, or income, we use our inspiration from services like Amazon Prime. As mentioned in [2], Prime users get benefits like early access to products and faster shipping, we'll offer incentives to reduce subscription costs. These will be based on referral links used, the amount of data shared with us, and filling out surveys. Users who stay for the long run will also have the option to get early access to features as a way of rewarding their contribution.

In terms of usability, we'll hire a team of designers to make sure the app's interface is intuitive and clean. We want the majority of our users to easily navigate through reports and services without confusion. For those with special needs, we'll make sure to add text-to-speech commands or an auto-reader bot so that everyone can benefit from the app. When incentivizing with surveys, we'll make sure to avoid bias. Our user demographics will be cautiously stratified, ensuring we're not favoring one group over another. Since driving experiences can vary based on location, vehicle type, and road conditions, we'll organize users by geography and car type to make sure our data stays accurate. For instance, users in mountain regions will get specific questions tailored to their driving conditions.

For privacy, we want users to have complete control over their personal information. They can choose to keep their data private or share it with us, with full transparency about how it will be used, whether for immediate changes or long-term improvements. To safeguard against any data breaches, all shared information will be securely stored locally, and if users decide to share, it will be anonymized in a cloud database, making it untraceable to any individual. To be more precise, anonymity means that there will be no name or specific driving routes the user has driven. We will store functional habits, period of being a member, general geography, and car type. Alongside this, we prioritize clear and informed consent. Users will be fully aware of what data is being collected and how it will be utilized, and they can withdraw consent at any

time without disrupting their experience. As data privacy is an important ethical issue, we would minimize the amount of data collected to only the necessary amount to make changes that benefit the users.

1.C.2.1 Objective and Key Result

One main objective of our company is to help companies follow environmental and regulatory practices. One way we would like to make sure that happens is to have seamless integration of our system in both the manufacturing and when it goes to the customer they also have the system in their car. The second way will be working heavily with the EPA and other government agencies. The main reason this will help is because as we compare different designs of different vehicles, we can see what makes certain cars more efficient and what makes other vehicles obsolete. This can help our programmers make our app pick up on these differences to help make our system more accurate.

1.C.2.2 Metric(s) with Experiment(s)

To ensure that manufacturers are staying within guidelines we will submit all findings of our testing. Some of the tests we will run are having the cars run without systems to keep track of all of the emissions of each car that is being manipulated. We will work with the top 10 car manufacturer in the U.S. to test their cars and see what they can handle. Our goal is to catch upwards of 20-30% of the difference compared to other current ways of measuring emissions. Some of our tests will include

Running test: We will have multiple vehicles and multiple stages of testing on the same motor while it's running
Randomized batch checks; for every 500 units that have our unit will receive an additional set of screenings to ensure quality

Materials testing: we will test different materials that different manufacturers use to attempt to find the most fuel and emissions-efficient way to build vehicles

Cohabiting evidence: we will strive to share all our data with government agencies to help make sure that every party involved is staying within regulations. For every 20 tests we complete they will be sent to government servers.

Driver patterns and usage; When a customer receives a car that has one of our plug-ins we will offer a consent form to collect their driving patterns. To see different variables that will hopefully give our app more range on what it can do If they don't consent we will collect their information.

To get to our goals of ensuring car manufacturers are following environmental and regulatory practices we must extensively test cars. We will work heavily with the EPA or other government agencies. To encourage car manufacturers to work with us more, the EPA can offer tax reductions. As we conduct all of our testing and work alongside the manufacturer all the data we collect will be shared with the EPA or any other government agency. We want to work closely

with the EPA to ensure that all rules and regulations are being followed as closely as they can be. We also want to have our customers become a good source of information. We plan to have different cars run with and without our systems to see if we can see a visible difference in efficiency if there is we want to collect that data to see where we went right. If no or did worse we would also collect that data to see where it was wrong to fix and correct any issues. As we test more and more we will see a difference in the quality and efficiency of different motors we also on top of the emissions data will collect data about the materials used to make the cars to see if they are better to code and to see what makes them better. We want to see if the material plays in major role in how much emissions a vehicle releases. Once it comes onto the show floor and a customer purchases a vehicle with our plugin we will present a consent form if they consent we will collect driver information. The reason we are doing this is to see how effective the plug-in is. We want to provide different variables to create more range based on different exercises.

1.C.2.3 Ethical Impact(s)/Issues(s)

Stakeholder	Financial Risk	Privacy Risk	Conflicting Interest
Car Manufacturers	Medium	High	High
Customers	Low	Medium	Low
Engineers	Low	Low	High

To ensure we are staying within the environmental safety requirements we will submit our data and research to the U.S. entity that influences emissions and any agencies that also regulate safe data every three months with the hope that if we make any accidents they can be fixed. Another way we will try to follow the government is going to be an energy allotment for our server rooms. In many industries that require many servers to thrive, they also use a lot of power. Our company wants to follow every rule that has to do with the environment. So we will also make sure to use more energy-efficient servers. The table above shows the affected parties due to this plug-in.

Car Manufacturers: For starters, car manufacturers will be taking over all the biggest risks due to two reasons one being that if this app shows they aren't following regulations that can cost them lots of money and possibly fines. Second would be the fact that we would have engineering information that can be considered trade secrets if we are testing on cars that have yet to be released.

Customers; Another affected party will be the customers themselves. The main concern for the customer will be privacy, If somehow a data leak happened this would reveal many people's driving records and driving patterns. The damage would be minimal and wouldn't affect their day-to-day life at all.

Engineers. The last affected would be engineers due to this app they would have a high conflicting interest due to them having to make more carbon-efficient cars. Which can put more pressure on them to make newer cleaner systems,

1.C.2.4 Ethical Safeguards

One of the biggest safeguards this company will have is legal compliance as this company will be heavily involved with government agencies such as the EPA. We will also enact informed consent forms from every affected party. To ensure that these practices are both respected and followed we will have quality reports to the EPA, and enact a see-something-something policy in which if any misuse of the company is seen there can and will be any relation for reporters.

1.C.3.1 Objective and Key Result

Objective:
Enhance real-time emissions tracking and ensure compliance with environmental regulations.

Key Results:
• Develop an AI-powered emissions tracking system with 95% accuracy in detecting real- time emission levels.
• Implement a self-monitoring feature that flags regulatory violations and generates compliance reports for automakers and government agencies.
• Reduce carbon emissions by 20% among vehicles using EcoDrive technology within the first year.
• Secure 30% manufacturer adoption within the first two years through strategic industry partnerships.

1.C.3.2 Metric(s) with Experiment(s)

To measure the effectiveness of EcoDrive's system, we will conduct a series of testing and evaluation experiments:
• Accuracy Testing: Compare EcoDrive's real-time emissions data with lab-grade measurement tools to maintain a 95% accuracy rate.
• Manufacturer Adoption Rate: Monitor the number of automakers integrating EcoDrive into their vehicles through quarterly reports.
• Customer Feedback Surveys: Conduct quarterly surveys to gauge user satisfaction and ease of adoption.
• Regulatory Compliance Monitoring: Submit emissions data to environmental regulatory agencies biannually to ensure adherence to policies.
• AI Model Refinement: Continuously train EcoDrive's machine learning models with real-world driving data to improve efficiency.

1.C.3.3 Ethical Impact(s)/Issues(s)

While EcoDrive promotes sustainability, it also introduces potential ethical challenges that must be addressed.
Main Ethical Concerns:
• Data Privacy Risks: The system tracks real-time driving data, raising concerns about user surveillance and data protection.
• AI Bias and Fairness: If not properly trained, the AI may be less effective for certain vehicle models, creating an accuracy disparity.
• Automaker Compliance Resistance: Some manufacturers may attempt to manipulate emissions data to avoid regulatory penalties.
• Consumer Trust Issues: Drivers may be concerned about how their data is stored and shared with third parties.

Ethical Impact Risk Table
Stakeholder	Financial Risk	Privacy Risk	Conflicting Interest Risk
Automakers	High	Low	High
Vehicle Owners	Low	High	Mid
Regulatory Bodies	Low	Low	Mid

1.C.3.4 Ethical Safeguards
To mitigate these risks, EcoDrive will implement the following safeguards:
• Strong Data Security Measures: All emissions data will be encrypted and anonymized to protect user privacy.
• Transparent Data-Sharing Policies: Automakers must sign clear data-use agreements to prevent data manipulation.
• AI Bias Audits: Conduct third-party reviews of EcoDrive's AI models to ensure fair and unbiased emissions tracking.
• User Data Control: Vehicle owners will have the option to opt-in or opt-out of sharing their emissions data with third parties.
By implementing these safeguards, EcoDrive ensures a responsible, fair, and effective emissions monitoring system for all stakeholders

2: Cultural Policy
2.A. Core Values
At EcoDrive, we want to be known as a company that truly cares about people, the planet, and progress. We believe in intelligent, ethical innovation that doesn't sacrifice environmental responsibility or user trust. Our core values are sustainability, transparency, inclusivity, and long-term impact. We strive to be recognized as an ethical tech leader in the automotive industry, one that car manufacturers, drivers, and environmental organizations can rely on without hesitation.

Sustainability is at the heart of our mission. Every line of code, every AI refinement, and every partnership is developed to reduce vehicle emissions and promote a cleaner future. We are committed to contributing to a healthier planet by lowering the environmental footprint of every EcoDrive-enabled vehicle. Transparency is another pillar we ensure users understand what data is collected, how it is used, and offer them control over their participation. This also extends to our collaboration with regulators like the EPA and car manufacturers, where honesty and openness are non-negotiable.
Inclusivity means that our technology is accessible and usable by everyone, regardless of income, age, gender, or ability. From speech-based interfaces for the visually impaired to affordable pricing options, we prioritize equity. Lastly, long-term impact means we are not just building a product—we're helping shape the future of transportation. We aim to push the industry toward smarter, greener vehicles while protecting individual privacy and public trust. These values shape every decision we make, and we work daily to embody them in our culture and our technology.

2.B. Motivation

What drives us at EcoDrive is a love for innovation that improves lives. We are passionate about using artificial intelligence not just for efficiency, but for a greater purpose: reducing environmental harm, enhancing road safety, and making every drive smarter and smoother. We love the challenge of solving real-world problems, optimizing fuel use, extending the life of a vehicle, or helping regulators design better policies based on trustworthy data. We are inspired by a vision of a world where technology and sustainability go hand-in-hand, and we wake up every day motivated to bring that vision to life.
But we also have fears that shape our company culture in meaningful ways. We fear compromising user trust by failing to protect their data or falling short on ethical transparency. We fear becoming just another tech company chasing profits instead of prioritizing people and the planet. And we fear that without proactive innovation and strong safeguards, well-meaning technology can cause harm. These fears don't paralyze us they keep us grounded. They push us to build robust ethical frameworks, maintain accountability, and remain vigilant against mission drift. Our love for meaningful impact and our fear of misuse form a balanced, responsible foundation for our cultural identity.

2.C. Summary

Smart, Ethical, Green, Transparent and Inclusive.

3. B Long-Term Vision

3.A. Core Items

1. Fairness and Non-Discrimination:

At EcoDrive, we're serious about making sure our AI systems treat everyone fairly. That means checking how our tech works for people from all kinds of backgrounds - different ages, genders, income levels, and locations. We are always making sure it performs well across different car

types. We'll have outside experts check our systems for bias every few months, and if something's off, we'll fix it and post what we're doing to stay transparent and build trust.

2. Privacy and Data Protection:

We know driving data is personal, so we only collect what we need to help optimize your experience in real time, like basic car data and anonymous performance info. We never take names, addresses, or trip histories off your device unless you say it's okay (and you can change your mind anytime). Your data is locked down with strong encryption, and we run regular security checks to keep everything safe.

3. Transparency and Explainability:

We want you to know what our AI is doing and why. That's why our app includes a simple dashboard that explains every suggestion it makes, using clear language and showing which data points influenced the decision. Every quarter, we'll release a report on how the system's doing, what updates were made, and any ethical issues we ran into, along with a glossary so anyone can understand the details.

4. Security and Resilience:

Your safety and your vehicle's security come first. We design everything with cybersecurity in mind right from the start. Before we release any update, outside security professionals will test it for weaknesses. If there's ever a serious issue, we'll let you know within 72 hours and tell you exactly what steps to take to stay protected.

3.B. Board

1. Jensen Huang

The co-founder and CEO of NVIDIA, a leader in AI hardware. Under his leadership, NVIDIA changed GPUs into the backbone of modern AI. His in-depth knowledge of how hardware and software work together will help EcoDrive build strong partnerships with chipmakers and make sure our technology runs smoothly on the next generation of in-car computing systems.

2. Dr. Ardalan Vahidi

Dr. Ardalan Vahidi is a prominent mechanical engineering professor at Clemson University, celebrated for his groundbreaking contributions to optimal control, energy-efficient transportation, and connected automated vehicles. His research is centered on creating sophisticated control and estimation algorithms that greatly improve vehicle energy efficiency. His partnerships with leading manufacturers such as BMW, Ford, and Cummins have resulted in practical demonstrations that achieve energy savings of up to 30% in vehicles. Dr. Vahidi's knowledge is perfectly aligned with EcoDrive's goals, providing essential insights into the application of AI-driven optimization methods to enhance fuel efficiency and minimize emissions. His background in real-time optimization and vehicle connectivity can inform the advancement of EcoDrive's adaptive systems, ensuring they provide significant environmental advantages.

3. Dr. Hanan Al Haddi

Dr. Hanan Al Haddi serves as a Research Professor at New York University, where he specializes in artificial intelligence and robotics. His primary focus is on the application of AI to practical engineering challenges, especially within the automotive industry. Dr. Al Haddi has participated in numerous projects that investigate the convergence of AI and automotive technologies, with an emphasis on improving vehicle performance and efficiency through smart systems. His research plays a significant role in creating innovative solutions that tackle issues in the automotive sector, in line with EcoDrive's goal of enhancing vehicle performance and minimizing emissions.

5. References

1. U.S. Department of Justice, "U.S. v. Volkswagen", U.S. Department of Justice, November, 2016.

2. U.S. EPA, “Volkswagen Clean Air Act Civil Settlement”, U.S. EPA, February 2019.

3. J. Chu, “Study quantifies US health impacts of Volkswagen emissions defeat devices”, MIT, June 2024.

4. Association for Computing Machinery (ACM), “ACM Code of Ethics and Professional Conduct”, ACM, June,2018.

5. U.S. Department of Justice, “IAV GmbH to Pay $35 Million Criminal Fine in Guilty Plea for Its Role in Volkswagen AG Emissions Fraud”, U.S. Department of Justice, December 2018.

6. Vahidi, A., "Ardalan Vahidi", Clemson University, April 23, 2025.

7. Al Haddi, H., "Dr. Hanan Al Haddi", New York University, April 23, 2025.