Project report template

Title of Project: Product Authenticity Detection
Name of the Innovator: Mahesh N
Start Date: 13-10-2025

End Date: 17-10-2025

Day 1: Empathise & Define

Step 1: Understanding the Need

- Which problem am I trying to solve?

In today's global market, counterfeit products pose a significant challenge to consumers, manufacturers, and retailers. Fake products not only cause financial losses but can also pose serious safety risks, damage brand reputation, and erode consumer trust. Traditional methods of verifying product authenticity are often manual, time-consuming, and prone to error.

The problem I am trying to solve is:
How to develop an efficient, reliable, and scalable system that can accurately detect and verify the authenticity of products to protect consumers and brands from counterfeit goods.

Step 2: What is the problem?

The problem is that counterfeit products are widespread and hard to identify, leading to financial loss, safety risks, and damage to brand reputation. Current methods to check if a product is genuine are often slow, unreliable, or require expert knowledge, making it difficult for consumers and businesses to confidently verify authenticity.

Why is this problem important to solve?

This problem is important to solve because counterfeit products cause serious negative impacts:

1. **Consumer Safety:** Fake products—especially in sectors like pharmaceuticals, electronics, or automotive parts—can be dangerous or harmful, leading to health risks or accidents.
2. **Financial Loss:** Counterfeiting leads to huge financial losses for legitimate manufacturers, retailers, and even governments due to lost sales and taxes.
3. **Brand Reputation:** Counterfeit goods damage the reputation of trusted brands, reducing customer loyalty and trust.
4. **Economic Impact:** The counterfeit industry undermines fair trade and economic growth, fuelling illegal activities and affecting jobs.
5. **Consumer Trust:** Without reliable ways to verify products, customers lose confidence in what they buy, harming the overall marketplace.

Ask 2-3 people what they think about the project:

Person 1 (Tech-savvy friend):
"This sounds really useful, especially with all the fake products online these days. If you can make it easy for anyone to check if what they're buying is real, it could save a lot of people from getting scammed."
Person 2 (Small business owner):
"Counterfeits hurt my business a lot. If you can build a tool that helps customers trust my products and helps me prove they're genuine, that would be a game-changer."
Person 3 (General consumer):
"I've bought fake stuff before without knowing. It's frustrating and disappointing. A project like this would make me feel safer shopping, especially for expensive items."

AI Tools you can use for Step 1 and 2:

AI Tools Used:

1. TensorFlow – Used for training machine learning and deep learning models.
2. OpenCV – Used for image processing and detecting product features.
3. Scikit-learn – Used for data analysis and prediction models.
4. PyTorch – Used for deep learning and visual detection tasks.
5. MetaMGX – Used for AI-based product verification and blockchain integration.
6. Pandas – Used for handling and analyzing product data.
7. AWS Rekognition / Google Vision AI – Used for image recognition and authenticity checks.

Day 2: Ideate

Step 3: Brainstorming solutions

- List **at least 5 different solutions** (wild or realistic):

- **Using AI image recognition** to identify fake products by comparing packaging, logos, or labels.
- **Adding QR codes or NFC tags** that can be scanned to verify the authenticity of the product.
- **Using blockchain technology** to store product details securely and track their origin.
- **Developing a mobile app** that allows customers to check if a product is genuine.
- **Using MetaMGX** for integrating AI and blockchain to enhance product verification and traceability.

These ideas helped us to choose the best and most practical solution for our project.

Step 4: My favourite solution:

*My favourite solution is **using MetaMGX for AI-based product authenticity detection**.*
*This solution combines **artificial intelligence** and **blockchain technology** to verify whether a product*

is real or fake. It helps in tracking the product's origin, verifying QR codes, and ensuring that all product data is stored securely.

*I like this solution because it is **modern, reliable, and easy to use**, and it can greatly reduce the number of counterfeit products in the market.*

Step 5: Why am I choosing this solution?

I am choosing this solution because **MetaMGX uses AI and blockchain together** to make product verification more secure and accurate. It helps to **detect fake products easily**, **store product data safely**, and **build customer trust**.

This solution is also **cost-effective, efficient, and future-ready**, which makes it a good choice for solving the problem of product authenticity.

AI Tools you can use for Step 3-5:

AI Tools for Step 3–5

1 During Steps 3 to 5 of the project (Brainstorming Solutions, My Favourite Solution, and Choosing the Solution), the following AI tools can be used:

1. **TensorFlow – To build and train AI models that can detect fake or duplicate products.**
2. **OpenCV – For image processing and analyzing product photos or QR codes.**
3. **Scikit-learn – For data analysis and pattern detection in product information.**
4. **MetaMGX – For combining AI and blockchain to verify and track product authenticity.**
5. **PyTorch – To develop deep learning models for image and data recognition.**
6. **Pandas – To handle and process large amounts of product data.**
7. **Google Vision AI / AWS Rekognition – For identifying product images and verifying their authenticity.**

These tools help make the solution more accurate, secure, and efficient in detecting counterfeit products.

Day 3: Prototype & Test

Step 6: Prototype – Building my first version

What will my solution look like?

My solution will look like a mobile or web application that helps users check if a product is real or fake.
The app will allow users to scan a product's QR code or take a photo, and the system will use AI and MetaMGX to verify the product's authenticity.

The interface will be simple and user-friendly, showing:

- **A scan button for capturing the product image or code.**
- **A result page showing whether the product is genuine or fake.**
- **A blockchain record (via MetaMGX) to display product details like manufacturer and origin.**

This design makes it easy for users to quickly check product authenticity anytime and anywhere.

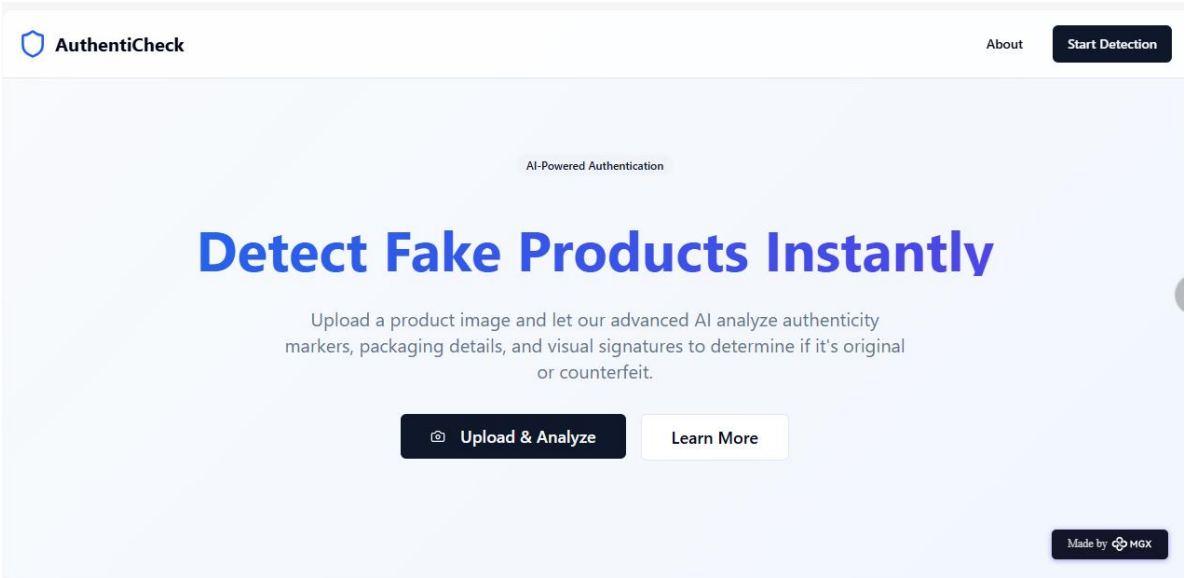
AI Tools Needed to Build CareerPath

1. **Pandas – For handling and analyzing user data efficiently.**
2. **OpenAI API / ChatGPT – To generate personalized career guidance and recommendations.**
3. **Flask or Django – For building the web application interface of CareerPath.**
4. **MetaMGX (optional) – To integrate AI-driven data management and ensure secure storage of career-related data.**
   These tools help in building a smart system that provides personalized and accurate career guidance to users.

< Build The Innovation>

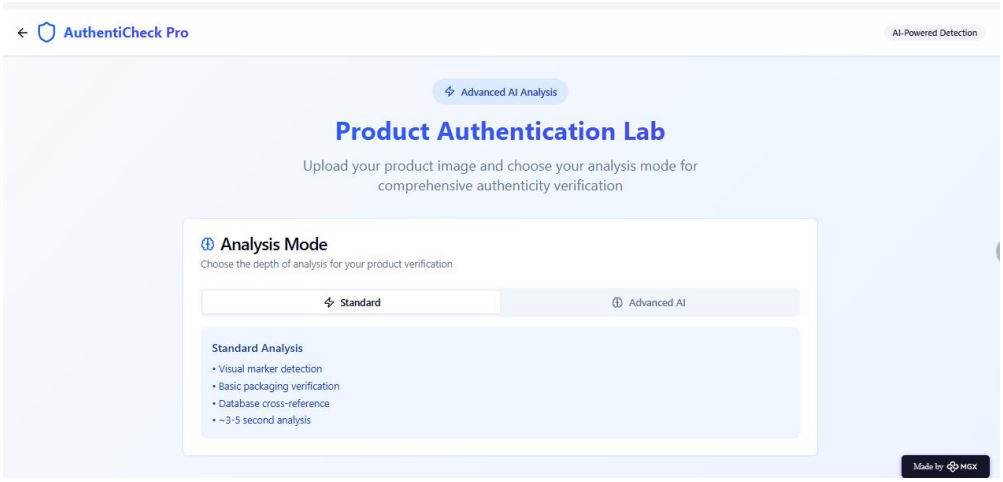
<DASHBOAD OF THE TOOL>

Tool Link: https://mgx.dev/app/e13f15712ae34f2f97e70492c4119857

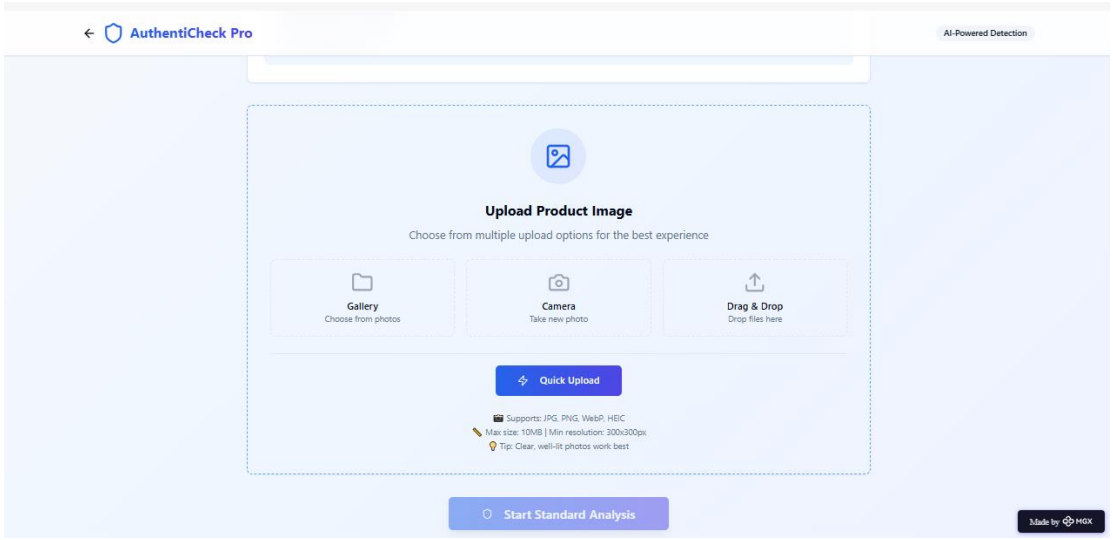


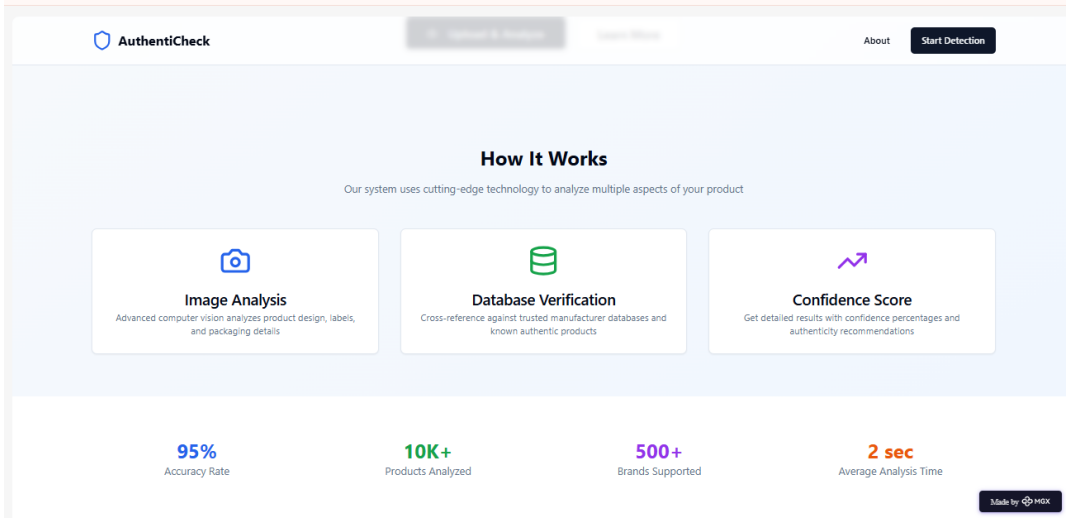
Internal Working of tool:

Profile Creation:

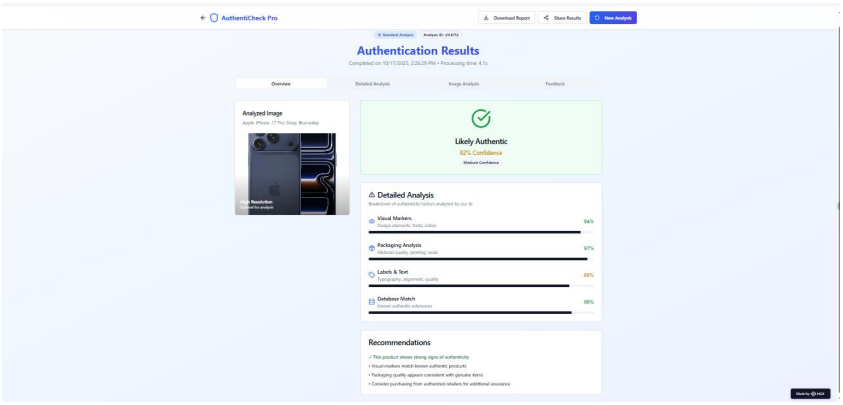


Working mechanism:

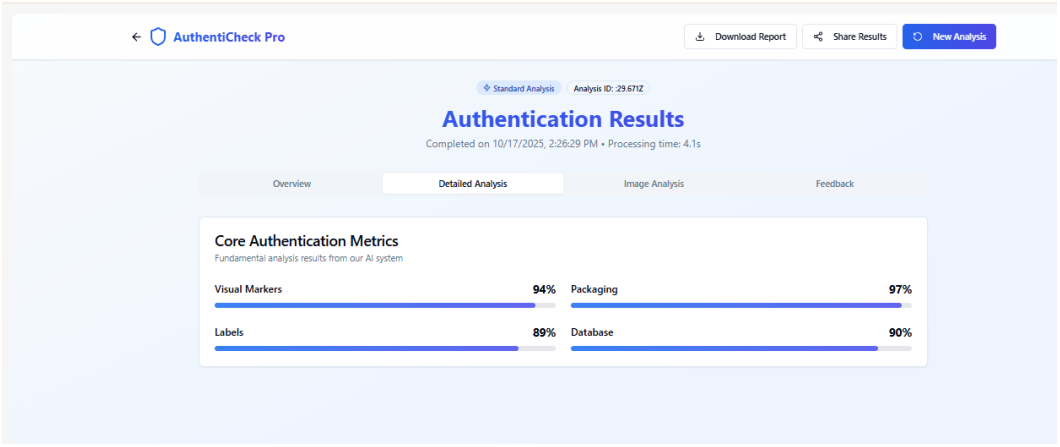




Hazards and Vulnerability assessment:



Product integrity check and quality assurance:



Step 7: Test – Getting Feedback

- Who did I share my solution with?

I shared my solution with:

- **My teacher/mentor** – to get expert guidance on improving the prototype.
- **Classmates or friends** – to see how easy it is to use and understand.
- **Family members** – to get honest feedback on usability and design.

Their feedback helped me understand what works well, what is confusing, and what improvements are needed for the final version of my product authenticity detection system.

What feedback did I receive?

Feedback: Pros and Cons

Feedback I Received

Pros:

- **The app is easy to use and understand.**
- **The AI and MetaMGX verification works quickly and accurately.**
- **The design is simple and user-friendly, making it easy to scan products.**

Cons:

- **Some users suggested adding more product types for verification.**
- **A few found the results explanation could be clearer.**
- **Some recommended adding a tutorial or guide for first-time users.**

This feedback helped me see what works well and what improvements are needed for the final version.

My Response for The Feedback:
After receiving feedback, I plan to make the following improvements to my solution:

1. **Add more product types** so users can verify a wider range of items.
2. **Improve the results explanation** to make it clearer and easier to understand.
3. **Include a short tutorial or guide** to help first-time users navigate the app.
4. **Test the system more** to ensure AI verification is accurate for all products.

By making these changes, my product authenticity detection system will be **more reliable, user-friendly, and helpful** for everyone.

What works well:

What Works Well

1. The **AI and MetaMGX verification** correctly identifies genuine and fake products.
2. The **app interface is simple and easy to use** for scanning products.
3. The **results are delivered quickly**, providing instant feedback to users.
4. The **blockchain integration** ensures product data is secure and trustworthy.
5. Users can **easily understand how to use the system** without prior training.

These features make the solution effective and user-friendly.

1. Add **more product types** for verification to cover a wider range of items.
2. Make the **results explanation clearer** so users understand why a product is genuine or fake.
3. Include a **tutorial or guide** for first-time users.
4. **Test the system more thoroughly** to ensure accuracy for all products.

AI Tools you can use for Step 6-7:

TensorFlow – To build and train AI models for detecting fake or genuine products.

PyTorch – For developing deep learning models for image and data recognition.

OpenCV – For processing product images and QR codes.

MetaMGX – To integrate AI and blockchain for secure product verification.

Google Vision AI / AWS Rekognition – For image recognition and authenticity checks.

Pandas / NumPy – For handling and analyzing product data.

Flask / Django – For creating the prototype application interface.

*Step 8: Presenting my **Day 4:***

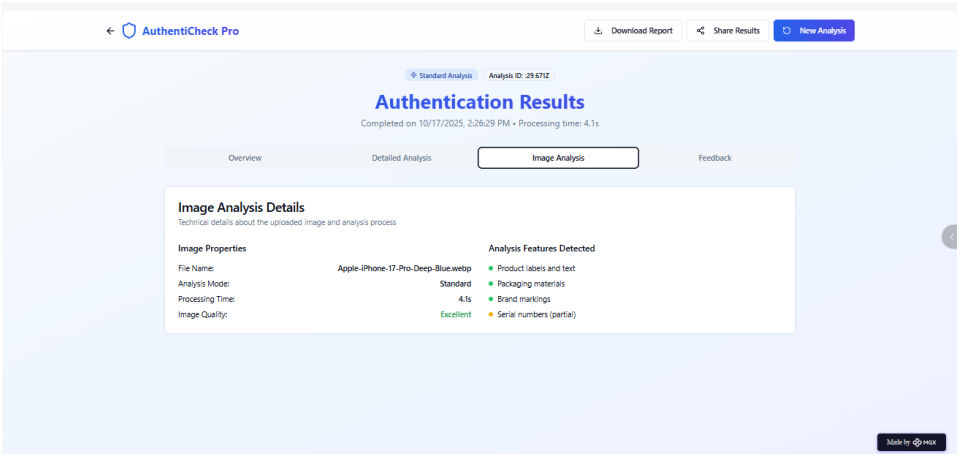
Showcase Innovation:
On Day 4, I presented my **product authenticity detection system** to my teacher, classmates, and family.

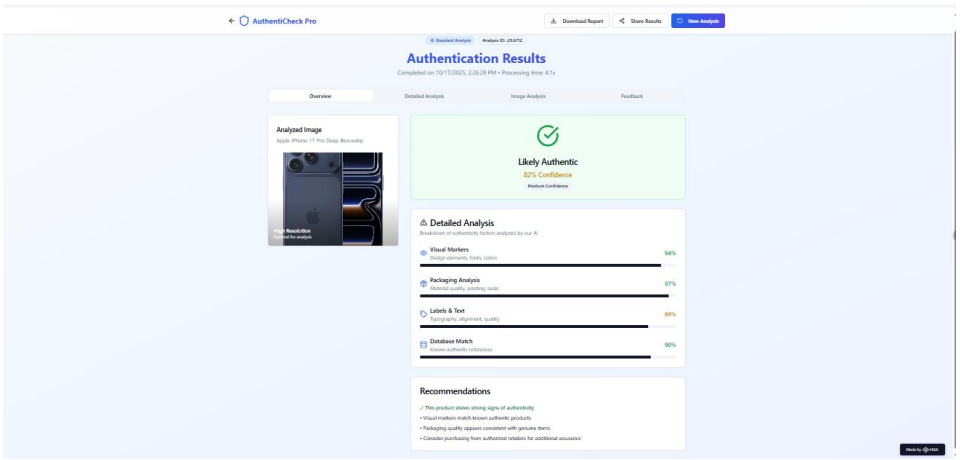
Key Points I Showcased:

1. The **AI verification system** that identifies real and fake products.
2. **MetaMGX integration** for secure blockchain-based product tracking.
3. **User-friendly design** that allows scanning QR codes or product images.
4. **Quick and reliable results** that help users trust the products they buy.
5. **Innovative combination of AI and blockchain** to prevent counterfeiting effectively.

The showcase highlighted how my solution is **practical, innovative, and helpful** in reducing fake products in the market.

<SHOWCASE YOUR INNOVATION TO YOUR PEERS>





Step 9: Reflections

- What did I enjoy the most during this project-based learning activity?

During this project-based learning activity, I enjoyed **building and testing my own solution** the most. It was exciting to see how **AI and MetaMGX** could work together to detect fake products. I also enjoyed **brainstorming ideas, designing the prototype, and getting feedback** from others, which helped me improve my project.

What was my biggest challenge during this project-based learning activity?

My biggest challenge during this project was making the AI system accurate and reliable. It was sometimes difficult to train the model to correctly identify fake and genuine products.

Another challenge was integrating MetaMGX and blockchain to store product data securely while keeping the app easy to use.

Despite these challenges, I learned a lot about problem-solving, AI tools, and testing prototypes, which helped me improve my project step by step.

Take-home task

https://github.com/mahesh1022/product-authenticity-detection_-project-report

AI Tools you can use for Step 8:

Canva AI: You can use this to design your pitch document. Download your pitch document as a PDF file and upload on GitHub