



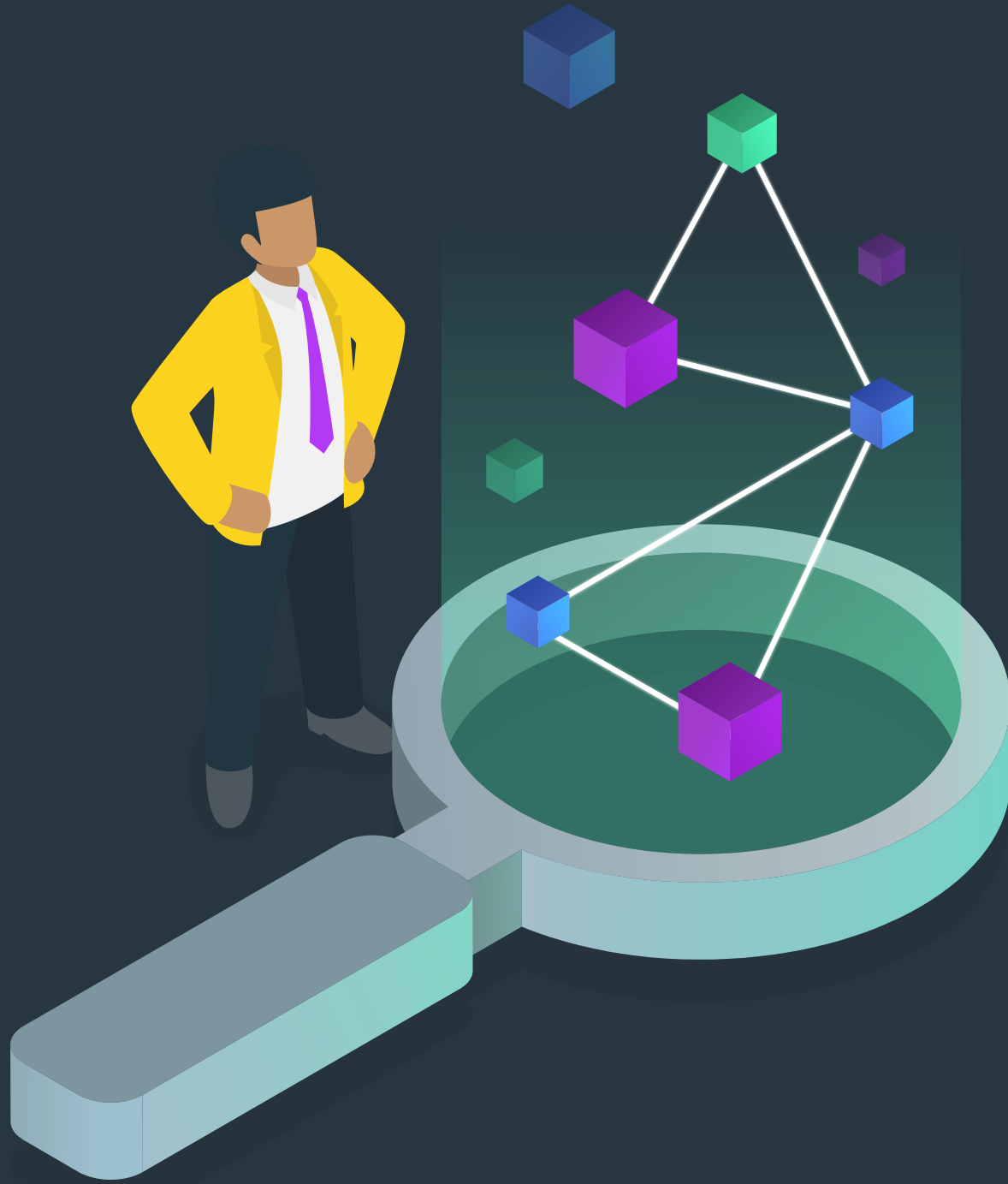
**INTELYGENZ**  
A VASS COMPANY

# AI PLAYBOOK

A GUIDE TO ARTIFICIAL INTELLIGENCE IMPLEMENTATIONS

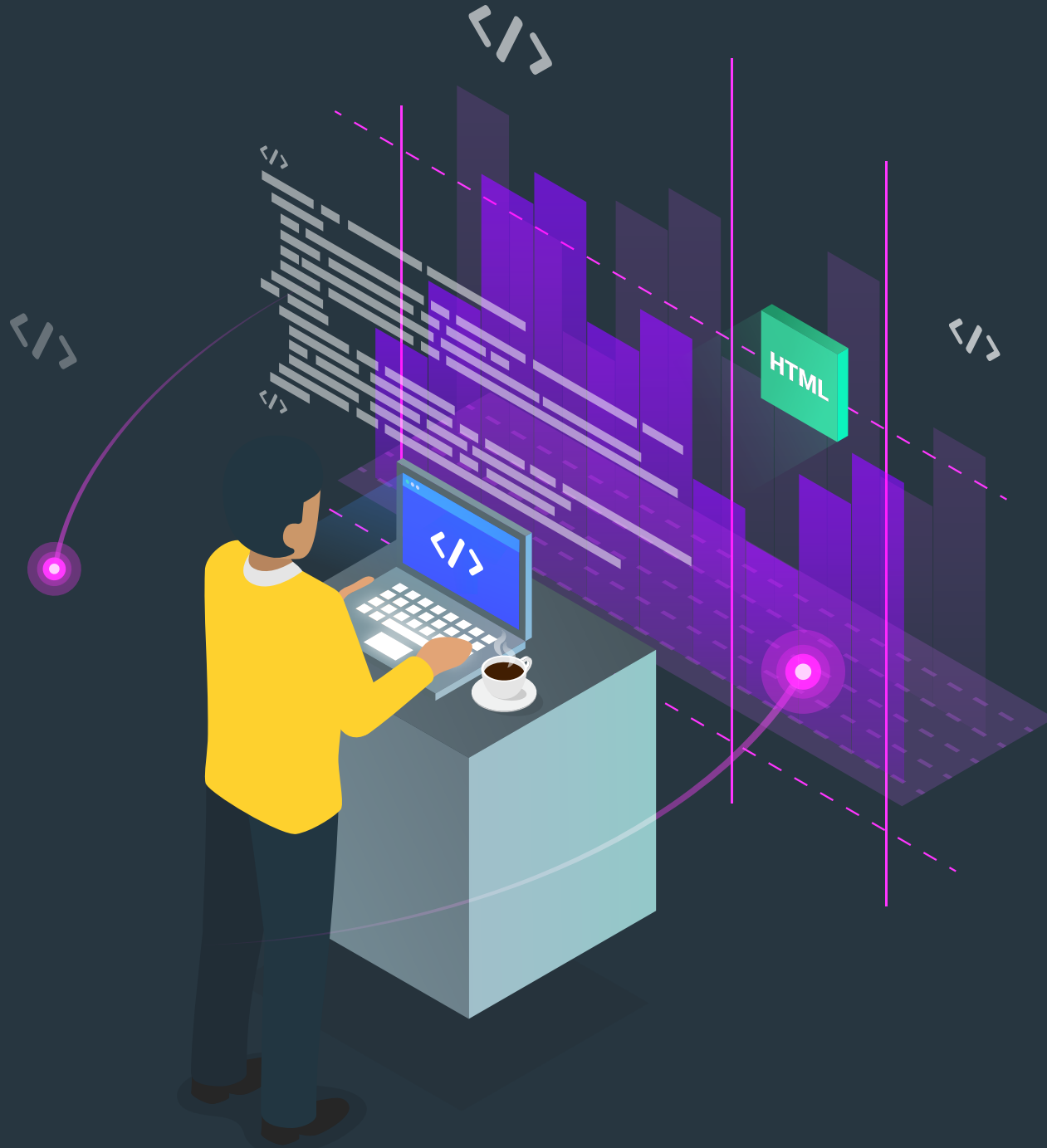
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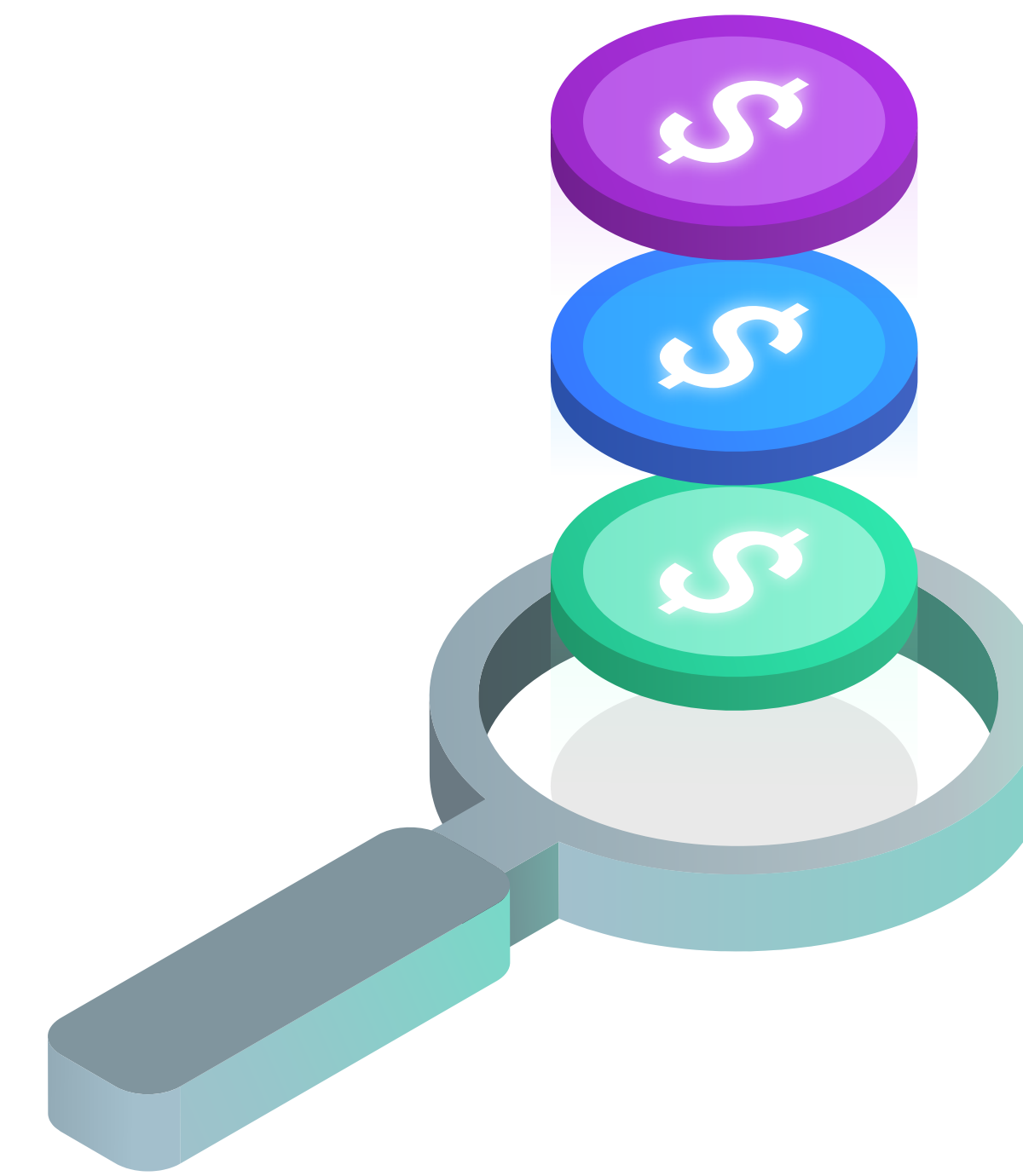
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AI DEFINED

# The value of AI

When implemented effectively, Artificial intelligence enables businesses to achieve new levels of efficiency and unlock further value.

Artificial intelligence allows businesses to:



## REDUCE COSTS

By increasing efficiency, optimizing back-office operations, and decreasing processing times, Artificial intelligence can drastically reduce costs.



## INCREASE CAPACITY

When even the most complex and time-consuming tasks are fully automated, businesses are able to scale up their overall output without increasing the sizes of their teams.



## IMPROVE QUALITY

Artificial intelligence can vastly improve the quality of outputs by removing the scope for human error, and ensuring tasks are executed with absolute consistency.

## AI DEFINED

# ROI amplified with AI

Intelygenz delivers business value through the implementation of deep tech and AI, specializing in supporting organizations of any maturity level in managing and extracting value from data and AI.

With over two decades of expertise, our methodologies, toolset, and skills ensure we enhance operational efficiency, elevate customer engagement and provide business value in production – reducing time to value and risk from Day Zero.

Aligning AI capabilities with strategic business outcomes, our unrivalled methodology knows no limits, tackling projects of any scope and scale to deliver measurable returns on investment in weeks, not months or years. Transforming your initial challenges into competitive advantages.



## DID YOU KNOW?

Companies have used AI to automate 50-70% of tasks, with ROI percentages reaching triple digits.<sup>1</sup>

<sup>1</sup><https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/intelligent-process-automation-the-engine-at-the-core-of-the-next-generation-operating-model>

# The Intelygenz difference

As a full end-to-end expert AI Implementation Services provider, we collaborate closely with our clients' internal teams to conceptualize, develop, integrate, deploy, and maintain custom solutions. Our approach ensures delivery of business value and rapid ROI.



# Intelygenz engagement model



## CONCEPTUALIZE: IDENTIFYING OPPORTUNITIES

### OBJECTIVE:

Identify opportunities for AI to solve business problems, optimize and automate processes, and increase or accelerate revenue.

### ACTIVITY:

Scoping Session

### TIMELINE:

4 – 6 hours workshop



## DEVELOP: PROPOSING SOLUTIONS

### OBJECTIVE:

Propose custom AI solutions to address specific business requirements and needs identified in the scoping session.

### ACTIVITY:

Proposal Development

### TIMELINE:

2 – 3 weeks



## INTEGRATE: SEAMLESS INTEGRATION

### OBJECTIVE:

Integrate AI solutions with existing systems to ensure smooth operation and minimal disruption.

### ACTIVITY:

Integration Planning and Execution

### TIMELINE:

4 – 8 weeks



## DEPLOY: IMPLEMENTING SOLUTIONS

### OBJECTIVE:

Deploy AI solutions into production environments to start delivering business value.

### ACTIVITY:

Deployment and Testing

### TIMELINE:

2 – 4 weeks



## MAINTAIN: ONGOING SUPPORT

### OBJECTIVE:

Provide ongoing maintenance and support to ensure the AI solutions continue to deliver value and adapt to changing business needs.

### ACTIVITY:

Maintenance and Optimization

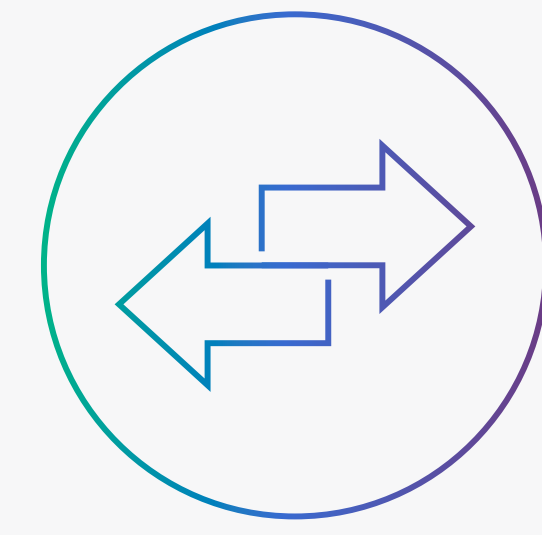
### TIMELINE:

Continuous, with regular check-ins and updates

SOLVING INDUSTRY-AGNOSTIC CHALLENGES:

# AI USE CASES

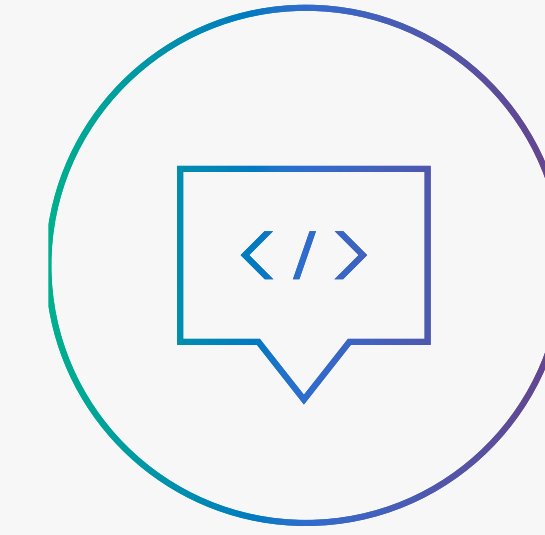
Explore a selection of use case examples to see how AI drives true business value.



### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

[READ MORE >](#)



### AUTOMATED CUSTOMER ENGAGEMENT

Leveraging AI chatbots and virtual assistants to provide 24/7 customer support and personalized interactions.

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### PREDICTIVE MAINTENANCE

Using AI to predict equipment failures and schedule maintenance proactively, reducing downtime and repair costs.

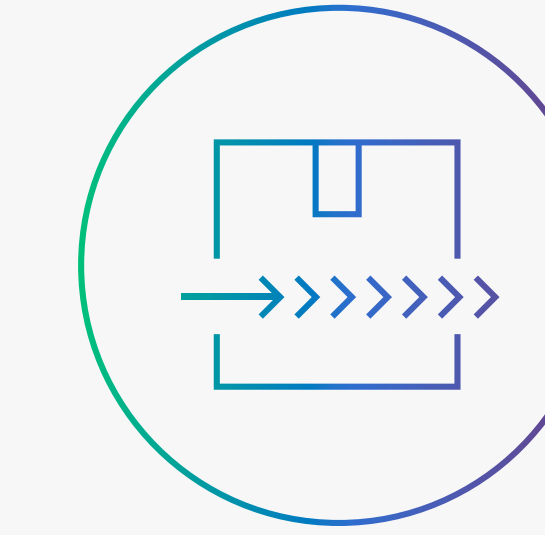
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### FRAUD DETECTION

Implementing AI to detect and prevent fraudulent activities by analyzing patterns and anomalies in data.

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### SUPPLY CHAIN OPTIMIZATION

Utilizing AI to improve supply chain efficiency by forecasting demand, optimizing inventory, and reducing logistics costs.

[READ MORE >](#)



### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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### PROCESS AUTOMATION

Streamlining and automating repetitive tasks with AI process automation, enhancing efficiency and reducing operational cost.

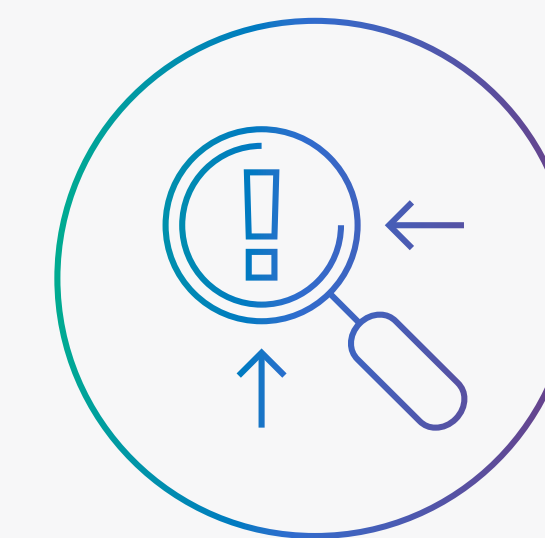
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### DOCUMENT PROCESSING

Automatically extracting, analyzing, and processing information from various documents (e.g. invoices, contracts, and forms) to reduce manual effort and errors.

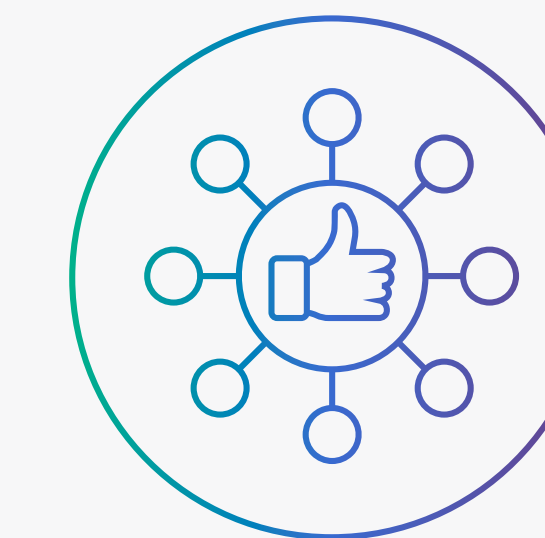
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### QUALITY CONTROL

Using AI-powered computer vision to inspect products for defects during the manufacturing process, ensuring high quality and reducing waste.

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### CUSTOMER INSIGHTS

Analyzing customer feedback, reviews, and social media interactions with AI to gain insights into preferences, sentiment, and areas for improvement.

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## TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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## PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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# Transaction Matching

### CLIENT CHALLENGE

Manual reconciliation of transactions across various systems is time-consuming, prone to errors, and requires significant manpower.

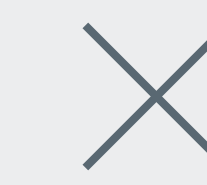
### SOLUTION

Implement AI-driven systems to automate the reconciliation process. AI algorithms can cross-check transactions across different systems, identify discrepancies, and ensure accuracy.

### RESULTS

Significant reduction in manual effort, increased accuracy in financial records, and quicker identification of discrepancies.

[PREVIOUS <](#)



### ROI AND BENEFITS

Enterprises typically see a 30-50% reduction in time spent on reconciliation processes, improved accuracy, and decreased risk of financial errors. Intelygenz's expertise in deep tech and AI ensures seamless integration and optimization of these systems, providing real-time reconciliation and alerts.

# 30-50%

**typical reduction in time spent on reconciliation processes**

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## CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

[E >](#)

## RESULTS

Customer feedback, social media interactions, insights into sentiment, and areas for improvement.

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### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Automated customer engagement

### CHALLENGE

Providing round-the-clock customer support and personalized interactions can be resource-intensive and challenging to scale.

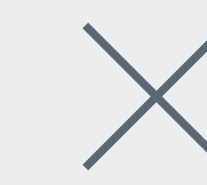
### SOLUTION

Deploy AI chatbots and virtual assistants to handle customer queries 24/7 with personalized responses. These systems can learn from interactions and improve over time.

### RESULTS

Enhanced customer satisfaction due to immediate responses, reduced workload for human agents, and increased engagement rates.

[< PREVIOUS](#)



### ROI AND BENEFITS

Companies often experience a 20-40% reduction in customer support costs and a 10-30% improvement in customer satisfaction scores. With Intelygenz's AI solutions, businesses can create intelligent, context-aware bots that offer superior customer experiences.

**20-40%**

typical reduction in customer support costs

**10-30%**

typical improvement in customer satisfaction

[NEXT >](#)

### CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

[E >](#)

### ER TS

Customer feedback, social media interactions insights into sentiment, and areas for improvement.

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### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Predictive maintenance

### CHALLENGE

Unexpected equipment failures lead to costly downtime and repairs, impacting productivity and operational efficiency.

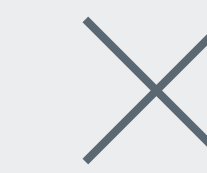
### SOLUTION

Use AI to predict potential equipment failures by analyzing historical data and real-time sensor data to schedule proactive maintenance.

### RESULTS

Reduced downtime, lower repair costs, and extended equipment lifespan.

[< PREVIOUS](#)



### ROI AND BENEFITS

Enterprises can achieve up to a 50% reduction in maintenance costs and a 30-40% decrease in equipment downtime. Intelygenz leverages advanced machine learning algorithms to provide accurate predictions, ensuring minimal disruption to operations.

**50%**

typical reduction in maintenance costs

**30-40%**

typical decrease in equipment downtime

[NEXT >](#)

### CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

[E >](#)

### ER TS

Customer feedback, social media interactions insights into sentiment, and areas for improvement.



### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Fraud Detection

### CHALLENGE

Identifying and preventing fraudulent activities is complex, requiring constant vigilance and sophisticated analysis.

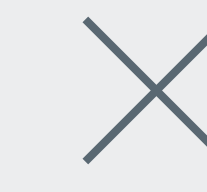
### SOLUTION

Implement AI systems to analyze patterns and anomalies in data, detecting and preventing fraudulent activities.

### RESULTS

Faster identification of fraudulent activities, reduced financial losses, and enhanced security.

[< PREVIOUS](#)



### ROI AND BENEFITS

Organizations can see a 40-60% improvement in fraud detection rates and a significant reduction in fraud-related losses. Intelygenz's fraud detection solutions utilize state-of-the-art AI to continuously monitor transactions, adapting to new fraud tactics.

# 40 - 60%

typical improvement in fraud detection rates

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### CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

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### RE R T S

Customer feedback, social media interactions insights into sentiment, and areas for improvement.

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### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Supply chain optimization

### CHALLENGE

Inefficiencies in the supply chain lead to increased costs, delayed deliveries, and reduced customer satisfaction.

### SOLUTION

Utilize AI to forecast demand, optimize inventory levels, and streamline logistics processes.

### RESULTS

Improved supply chain efficiency, reduced costs, and timely deliveries.

[< PREVIOUS](#)



### ROI AND BENEFITS

Businesses often achieve a 20-40% reduction in inventory costs and a 15-30% improvement in delivery times. Intelygenz applies sophisticated algorithms to enhance visibility and decision-making across the supply chain.

**20-40%**

typical reduction in inventory costs

**10-30%**

typical improvement in delivery times

[NEXT >](#)

### CHAIN ZATION

improve supply chain forecasting demand, inventory, and reducing

[E >](#)

### ER TS

customer feedback, social media interactions insights into sentiment, and areas for improvement.



### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Personalized marketing

### CHALLENGE

Generic marketing messages fail to engage customers effectively, leading to low conversion rates and wasted marketing spend.

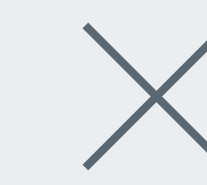
### SOLUTION

Use AI to analyze customer data and deliver personalized marketing messages and recommendations tailored to individual preferences and behaviors.

### RESULTS

Higher engagement rates, improved conversion rates, and increased customer loyalty.

[< PREVIOUS](#)



### ROI AND BENEFITS

Enterprises often experience a 20-30% increase in conversion rates and a 15-25% boost in customer engagement. Intelygenz's AI-driven marketing solutions create dynamic, personalized campaigns that resonate with customers.

**20-30%**

typical increase in conversion rates

**15-25%**

typical boost in customer engagement

[NEXT >](#)

### CHAIN ZATION

improve supply chain forecasting demand, inventory, and reducing

[E >](#)

### ER TS

customer feedback, social media interactions insights into sentiment, and areas for improvement.

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### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Process automation

### CHALLENGE

Repetitive tasks drain valuable time and resources, preventing employees from focusing on higher-value activities.

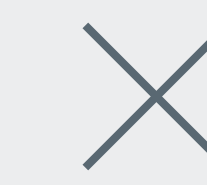
### SOLUTION

Implement AI-driven robotic process automation (RPA) to streamline and automate these tasks, such as data entry, invoicing, and customer onboarding.

### RESULTS

Enhanced efficiency, reduced operational costs, and freed-up human resources for more strategic work.

[< PREVIOUS](#)



### ROI AND BENEFITS

Organizations can achieve a 30-50% reduction in operational costs and a 20-40% improvement in process efficiency. Intelygenz's RPA solutions ensure seamless integration and robust performance across various business processes.

**30-50%**

typical reduction in operational costs

**20-40%**

typical improvement in process efficiency

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### CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

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### ER TS

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### TRANSACTION MATCHING

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Document processing

### CHALLENGE

Manual processing of documents is labor-intensive, time-consuming, and prone to errors, affecting productivity and accuracy.

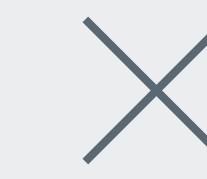
### SOLUTION

Use AI to automatically extract, analyze, and process information from various documents such as invoices, contracts, and forms.

### RESULTS

Reduced manual effort, fewer errors, and faster document processing times.

[< PREVIOUS](#)



### ROI AND BENEFITS

Companies often see a 40-60% reduction in processing time and a significant decrease in error rates. Intelygenz's document processing solutions leverage advanced AI to handle complex documents with high accuracy and speed.

# 40 - 60%

typical reduction in processing time

[NEXT >](#)

### CHAIN ZATION

improve supply chain forecasting demand, inventory, and reducing

[E >](#)

### ER TS

customer feedback, social media interactions insights into sentiment, and areas for improvement.

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### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to deliver highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Quality control

### CHALLENGE

Ensuring product quality manually can be inconsistent and resource-intensive, leading to defects and waste.

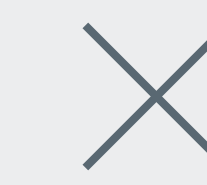
### SOLUTION

Implement AI-powered computer vision to inspect products for defects during the manufacturing process.

### RESULTS

Consistent high-quality products, reduced waste, and lower production costs.

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### CLIENT CHALLENGE

Enterprises often see a 30-50% reduction in defect rates and a 20-40% decrease in production costs. Intelygenz's AI-driven quality control systems offer real-time, accurate inspection capabilities, enhancing overall product quality.

**30-50%**

typical reduction in operational costs

**20-40%**

typical improvement in process efficiency

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### CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

[E >](#)

### ER TS

Customer feedback, social media interactions insights into sentiment, and areas



### TRANSACTION MATCHING

Automating the reconciliation of transactions across different systems to ensure accuracy and reduce manual effort.

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### PERSONALIZED MARKETING

Analyzing customer data to create highly personalized marketing messages and recommendations, improving engagement and conversion rates.

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## Customer insights

### CHALLENGE

Gaining actionable insights from customer feedback and interactions is challenging and often overlooked.

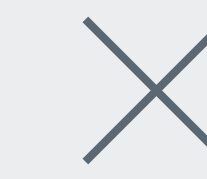
### SOLUTION

Use AI to analyze customer feedback, reviews, and social media interactions to understand preferences, sentiment, and areas for improvement.

### RESULTS

Deeper understanding of customer preferences, improved products and services, and enhanced customer satisfaction.

[< PREVIOUS](#)



### CLIENT CHALLENGE

Companies can achieve a 20-30% improvement in customer satisfaction and a significant boost in product and service innovation. Intelygenz's AI solutions provide comprehensive insights, driving continuous improvement and customer-centric strategies.

# 20-30%

**typical improvement in customer satisfaction**

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### CHAIN ZATION

Improve supply chain forecasting demand, inventory, and reducing

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### RESULTS

Customer feedback, social media interactions insights into sentiment, and areas for improvement.

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AI DEFINED

THE INTELYGENZ DIFFERENCE

AI USE CASES

CASE STUDIES

CONTACT US



# CASE STUDIES

DEEP TECH AND AI SUCCESS STORIES



### AUTOMATING KEY DIGITAL CASE STUDY COMPONENTS

Automating the extraction of relevant data from an ever growing digital library of case studies.

[VIEW CASE STUDY >](#)

### DIGITIZING TICKET PROCESSES

Using AI to improve quality of service by indentifying issues, creatiing tickets, and automating repetitive maintenance tasks.

[VIEW CASE STUDY >](#)

### PREDICTING PRESCRIPTION AND SALES DEMAND

Overcoming challenges within the forecasting domain to develop an accurate prediction system.

[VIEW CASE STUDY >](#)

### ENSURING QUALITY WITH AI POWERED PRODUCTION

Utilising AI to improve quality control while maintaining production speed.

[VIEW CASE STUDY >](#)



CASE STUDY

AUTOMATING  
KEY DIGITAL  
CASE STUDY  
COMPONENTS \_



# The ask

A leading company in the content intelligence space asked us to automate the extraction of relevant keyphrases and a solution description from > 500,000 business case studies within their continuously growing digital online library.

# What we did

We developed and deployed several AI-driven pipelines and grouped them into four components based on functionality.

## Content extraction pipeline:

A pipeline that extracted for each case study in the client's library, the keyphrases that best described the content, and a set of short summaries describing the key business needs that the case study addresses.

## Accounts needs summarization pipeline:

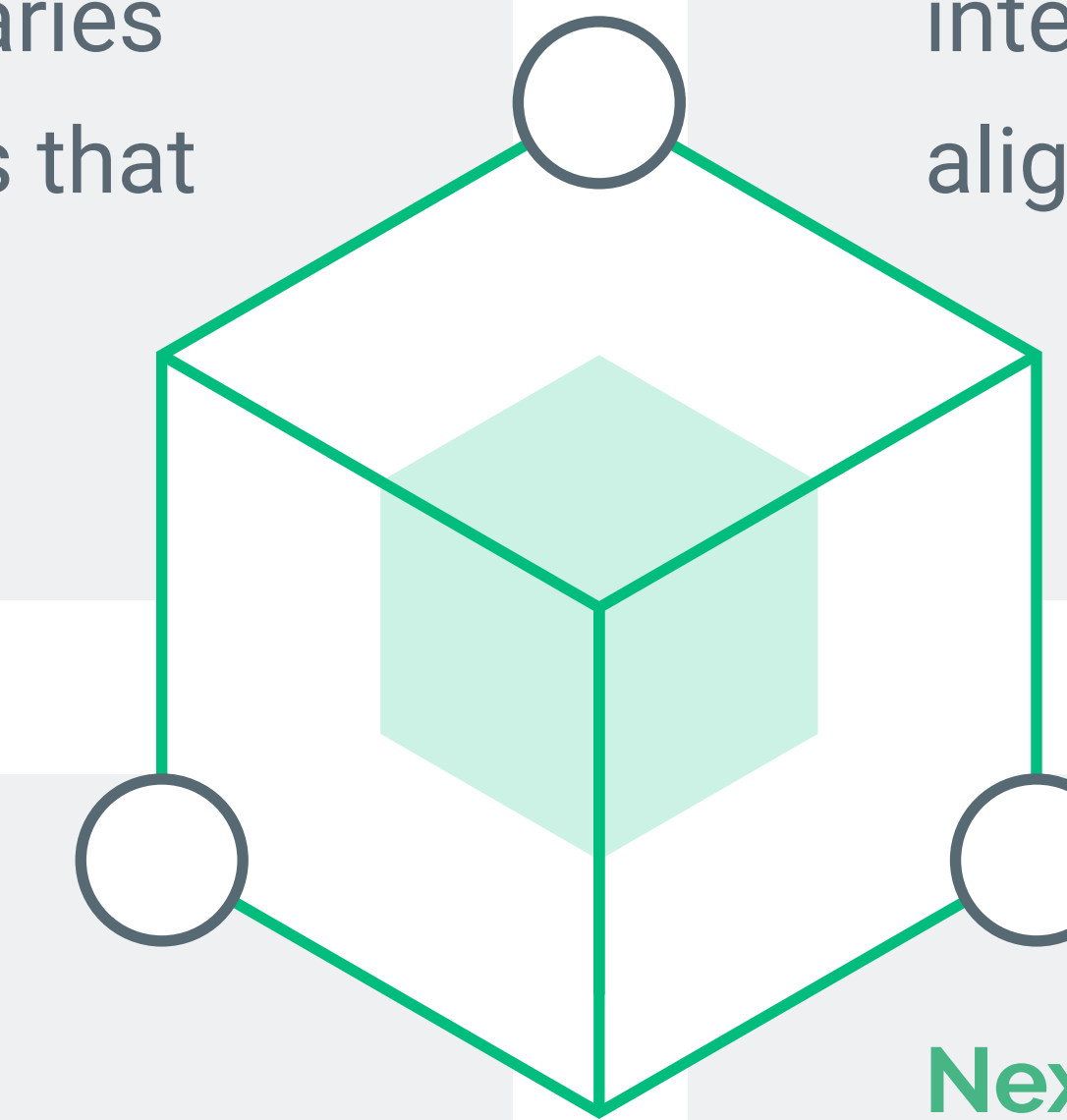
An AI-model that identified and summarized common topics that would interest the user or group of users, and align with their business needs.

## Interest score pipeline:

A model that relied on advanced analytics and statistical causal inference to distil the topics and keywords that perform best with each group of audiences.

## Next best asset recommendation engine:

An API that would recommend, given an input asset and (optionally) a user's historical content consumption data, the most relevant assets to be promoted.





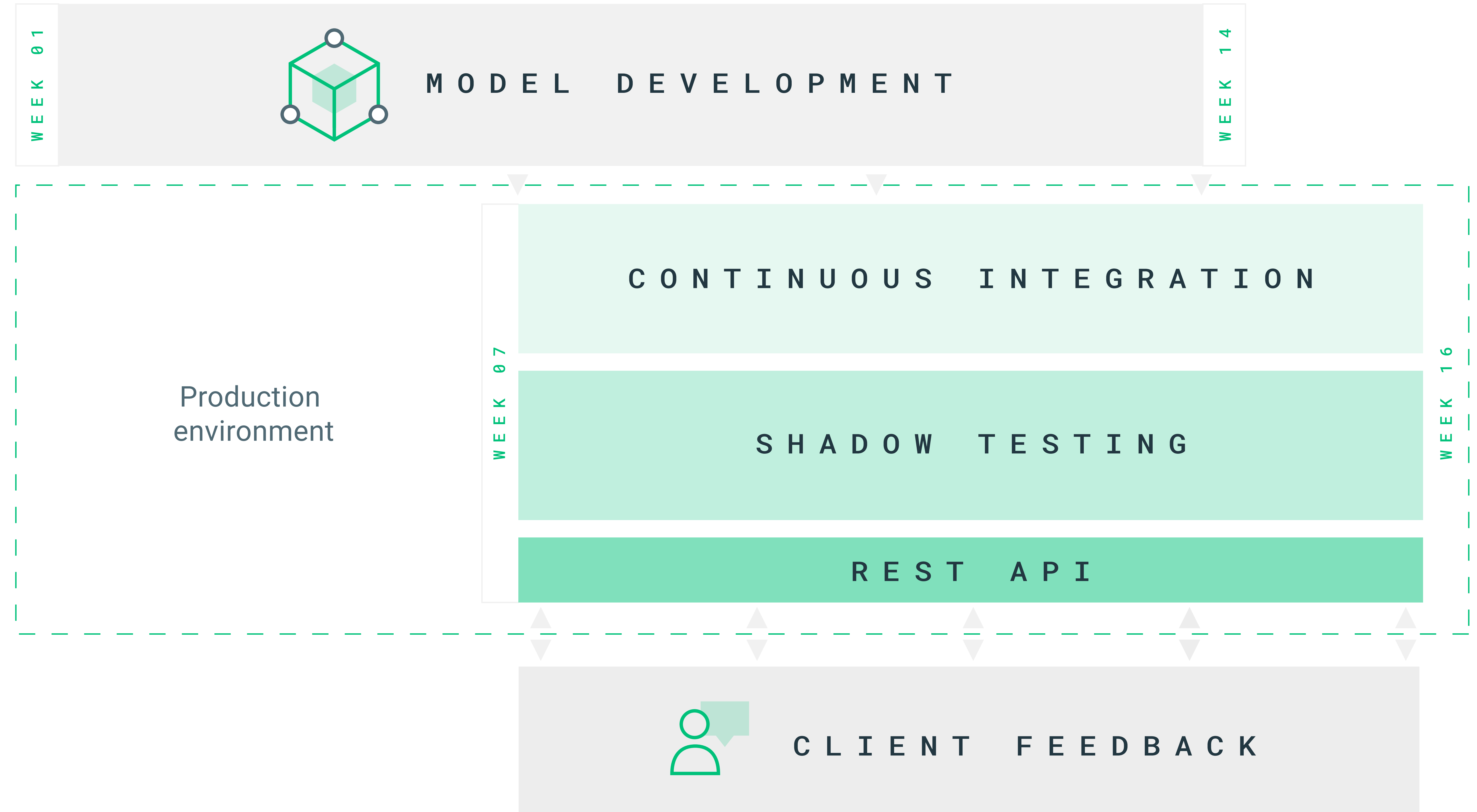
# The process

During the first 4 to 8 weeks, we performed a Discovery Phase to gather all the information, perform the required experiments and design the solution to ensure a successful development and deployment.

Together, in a flexible and collaborative approach, we sequentially developed and deployed each pipeline as fast as possible in the client's systems, so that we could test the outputs in a real setting, get feedback from business stakeholders and iterate from there.

# Delivery Phase

We broke down each project into manageable sprints, which could be reviewed and refined by the client as it evolved. From the first model version being produced at week 7, there were one or two model updates deployed every week thanks to Continuous Integration and Shadow Testing. These could be consumed in a production setting by business stakeholders, who then feedback, and changes were iteratively made by the development team. By week 16, the acceptance criteria was met.





# Results

The company can now handle and manage larger volumes of data, without the worry of manual limitations. With automated suggestions, the company also gets a better volume of quality content, reducing manual efforts in content curation and recommendation, which was initially relied upon through varying individual's interpretation. And ultimately, their clients can find related documents and tailored content a lot more easily based on their pain points – enhancing satisfaction and engagement.

Once we developed and deployed that first solution, we continued helping our client to harness the power of AI to automate and enhance other areas of their product and business.





CASE STUDY

DIGITIZING  
TICKET  
PROCESSES



# The ask

Telecommunications company, MetTel, which provides data, network, cloud, and mobile IT solutions for businesses and government agencies wanted to enhance the efficiency and quality of their trouble ticket system.

Customers would submit repair request emails and an operator or engineer would manually raise, sort, and resolve each ticket. So MetTel were curious as to how AI and process automation could be used to execute the identification of issues, the creation of tickets, and the day-to-day repetitive maintenance tasks of monitoring and triage of network devices (SD-WAN).

# What we did

A large volume of the corrective tasks required a complex triage operation to analyze the reason for failure and would take a team member around 10-15 minutes on each device to gather enough information to make a decision on how to proceed.

To radically improve performance and speed up processes, we created Ticket Next Best Action (TNBA) – a solution that uses programming techniques to automate each stage of the issue resolution process, and AI to identify and execute the best possible next action using historical data.

We also created a complementary solution capable of automatically classifying the customer's initial repair request emails, extracting specific information from their content, generating a maintenance ticket, and passing it to TNBA so automation is now present across every part of the customer maintenance journey.

# The process

The first task for each solution was to aggregate the historical data needed from across MetTel's existing systems. For TNBA, we collated and prepared data from internal tools and logs associated with previous tickets/issues to train and design the AI models.

For the email classification component, we used NLP to enable the system to understand email content, so it can be correctly classified as a repair request. We then built process automation functions to extract the information required, generate a maintenance ticket, and send it into TNBA.

As for TNBA's second step, we developed an automation engine capable of using the classification gained in the first task to connect to several APIs, request the status of related systems, and assign a ticket to the correct resolution team. For cases where human interaction wasn't necessary, we implemented an additional functionality that enables the engine to request a better decision from TNBA instead.



# Results

By building on MetTel's existing technology, TNBA provides the required efficiency improvements without the financial investment and operational disruption that a full system overhaul would demand.

The email request component is capable of accurately classifying 98% of repair request emails, 68% of which can have tickets automatically created and entered into TNBA. MetTel can now process thousands of emails per month without any human interaction – unlocking hours of time and massively speeding up the response and adherence to SLAs, significantly improving service.



# Results

Within the maintenance process chains, TNBA can accurately predict the first stage of each ticket 75% of the time. A further 60% of the time, it confidently predicts the next stage of the ticket and, if applicable, automatically moves it along to solve the customer's issue.

A further 20% of the time, the solution helps with efficiency and saves time as it correctly suggests the next stage to an operator. All triage of SD-WAN is now fully automated and 52% of corrective maintenance operations are now completely solved by AI predictions.

This allows MetTel to dedicate valuable resources into offering more proactive services and to drive continuous company growth without significantly increasing department budgets.

52%

CORRECTIVE MAINTENANCE OPERATIONS  
NOW SOLVED BY AI PREDICTIONS

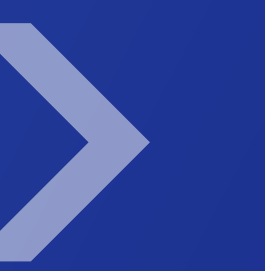
98%

ACCURACY IN CLASSIFYING  
REPAIR REQUEST EMAILS



CASE STUDY

# PREDICTING PRESCRIPTION AND SALES DEMAND \_



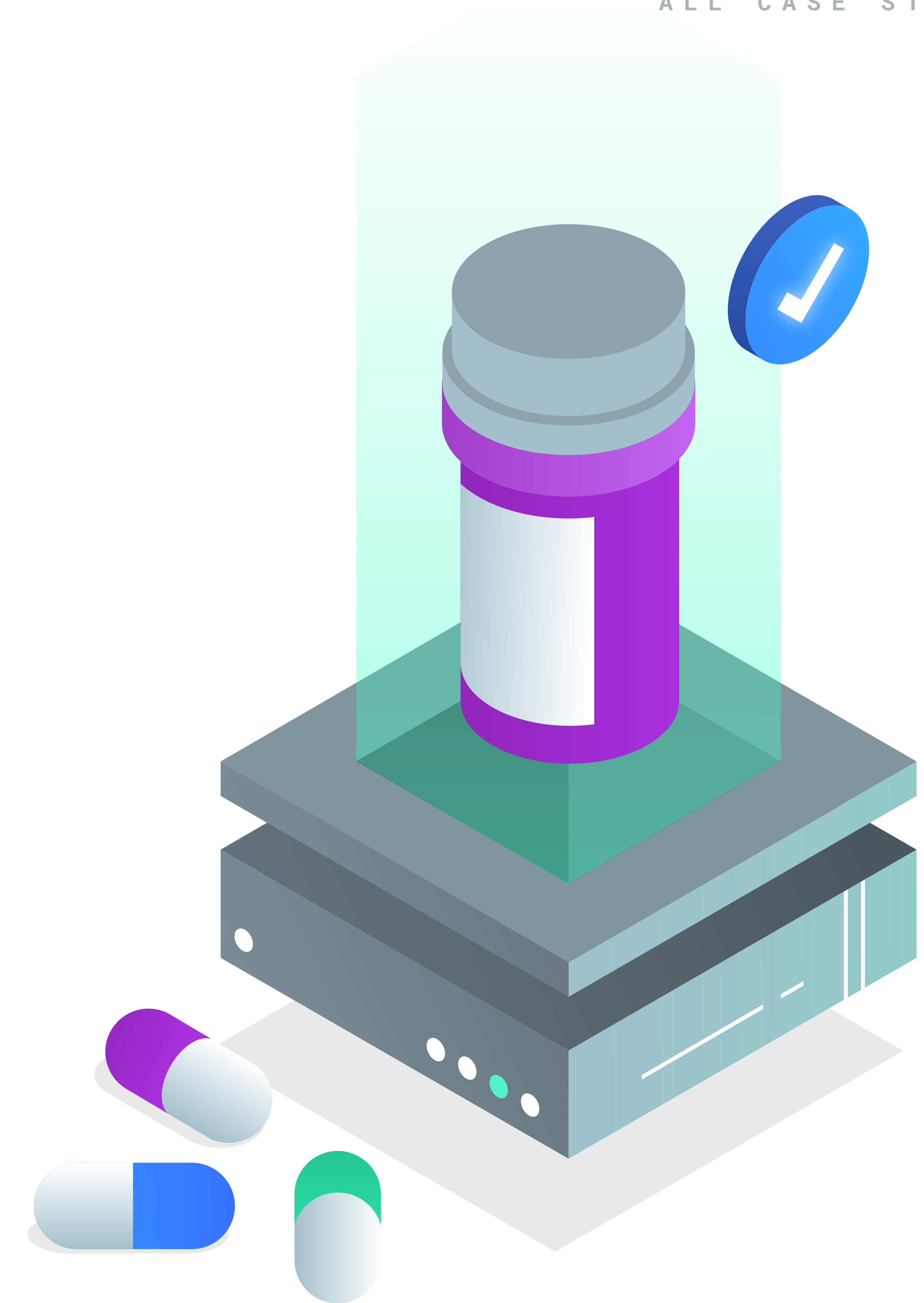
# The ask

A global pharmaceutical corporation was looking for ways to predict the volume of sales for a number of their pharmaceutical products that would be prescribed within 30 days. Their ultimate goal was to build a new solution that armed the sales team with reliable data-driven insights to drive decisive action.

# What we did

We developed forecasting models for each product which was capable of predicting sales numbers within a rolling 30 day timeframe.

One of the main characteristics of this solution includes the stacking of different ML models. This approach allowed the solution to overcome previous challenges within this forecasting domain, such as dealing with active data, dynamically changing trending estimations, and outlier detection.





# The process

In the first stage, we needed to establish a baseline forecasting model for the next 30 days of all the prescriptions of the products. Using historical and duplicates of prescription data, we undertook overtime analysis at 30 day intervals, which presented us with clear patterns that could be identified across the years.

To enhance the accuracy of the model, we then introduced additional features capable of recognizing temporal changes in the data, such as seasonal variance. We then evolved the model further by applying a more analytical approach using daily cumulative averages compared to previous years. This stacked model approach helped to balance and generalize the data across all predictions and achieve the desired prediction accuracy.



# Results

The system is capable of making daily predictions for sales over the next 30 days, and achieves an average accuracy level of 98.5% when predicting sales volume. This high level of accuracy allows the company to include this forecasting in their business decision workflows, enriching data-driven decisions and enabling them to achieve desired commercial goals.



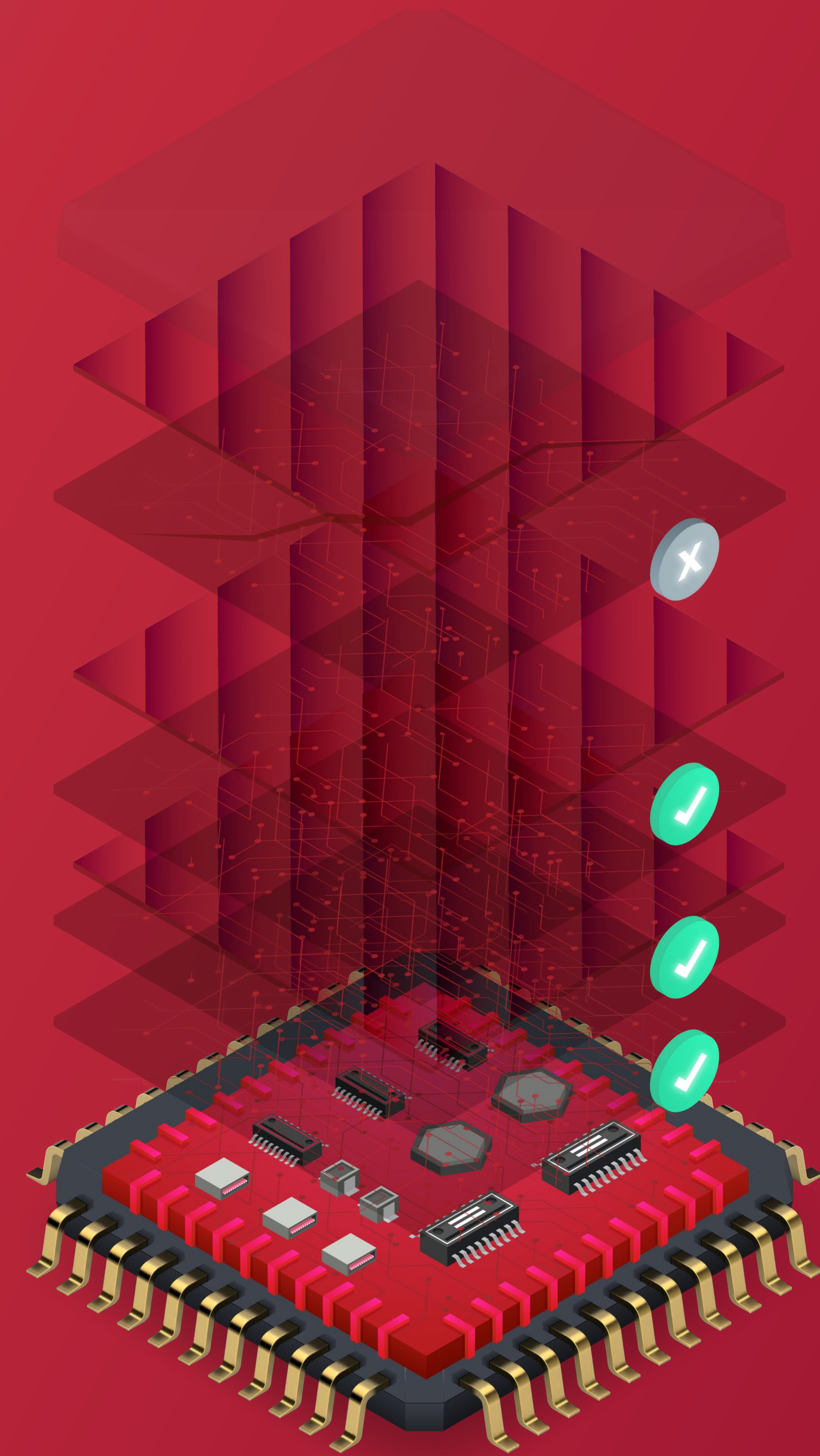
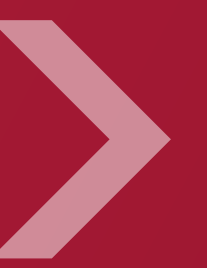
# 98.5%

ACCURATE WHEN PREDICTING  
SALES VOLUME



CASE STUDY

ENSURING  
QUALITY WITH  
AI POWERED  
PRODUCTIONS



# The ask

A Silicon Valley chip manufacturer was looking for a new way to identify and remove cracked silicon dies from the production line in real time, without disrupting the manufacturing process. The manufacturer asked for our help in creating a new solution that could be embedded into their current production line and related system.

# What we did

Through Deep Learning, we created an AI image recognition solution that uses existing and synthesized data to accurately classify dies as “good” or “cracked”.

The solution then appropriately instructs the production line to continue or remove each die. Seamlessly integrating into the client’s existing systems, it ensures this is achieved while maintaining production speed.

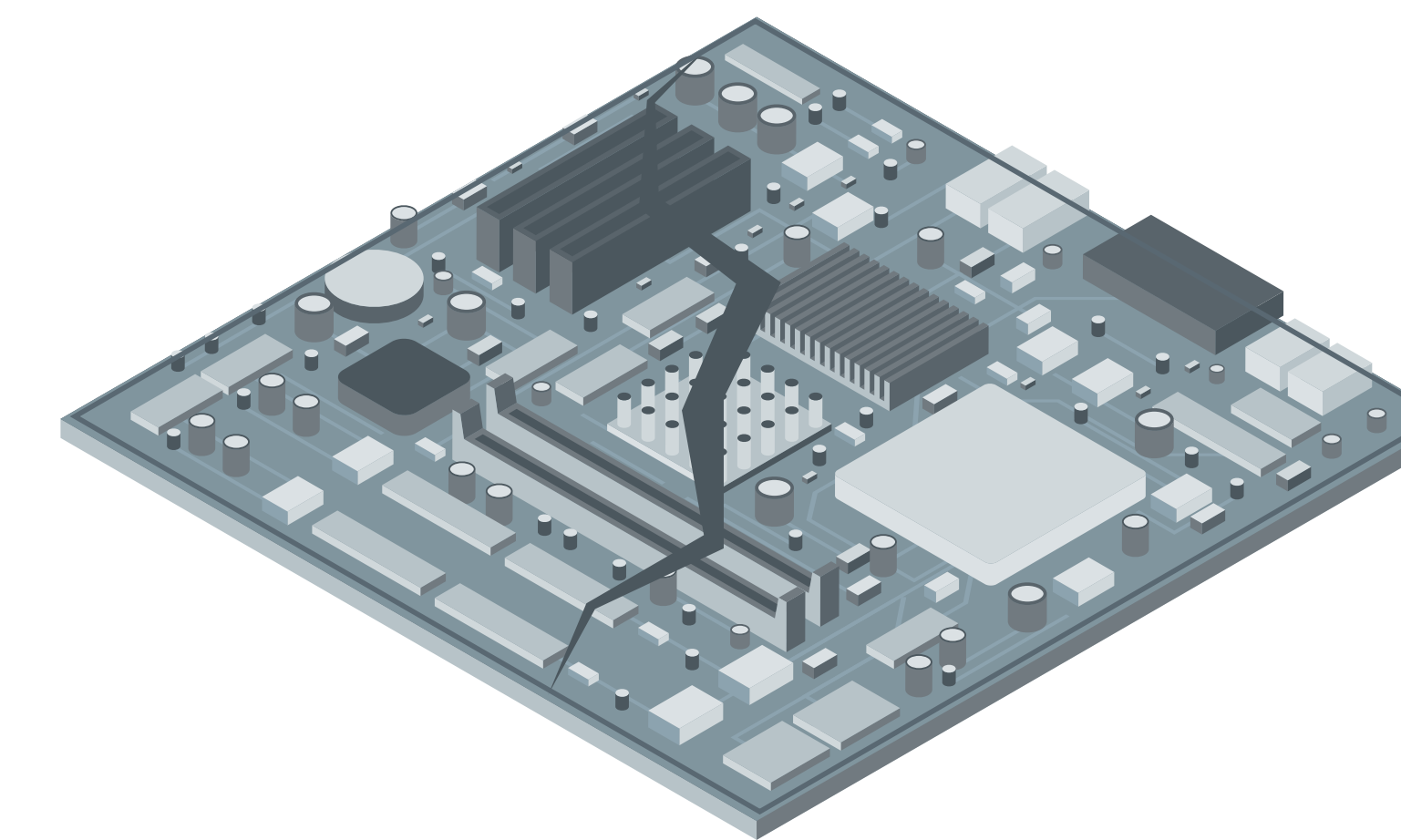
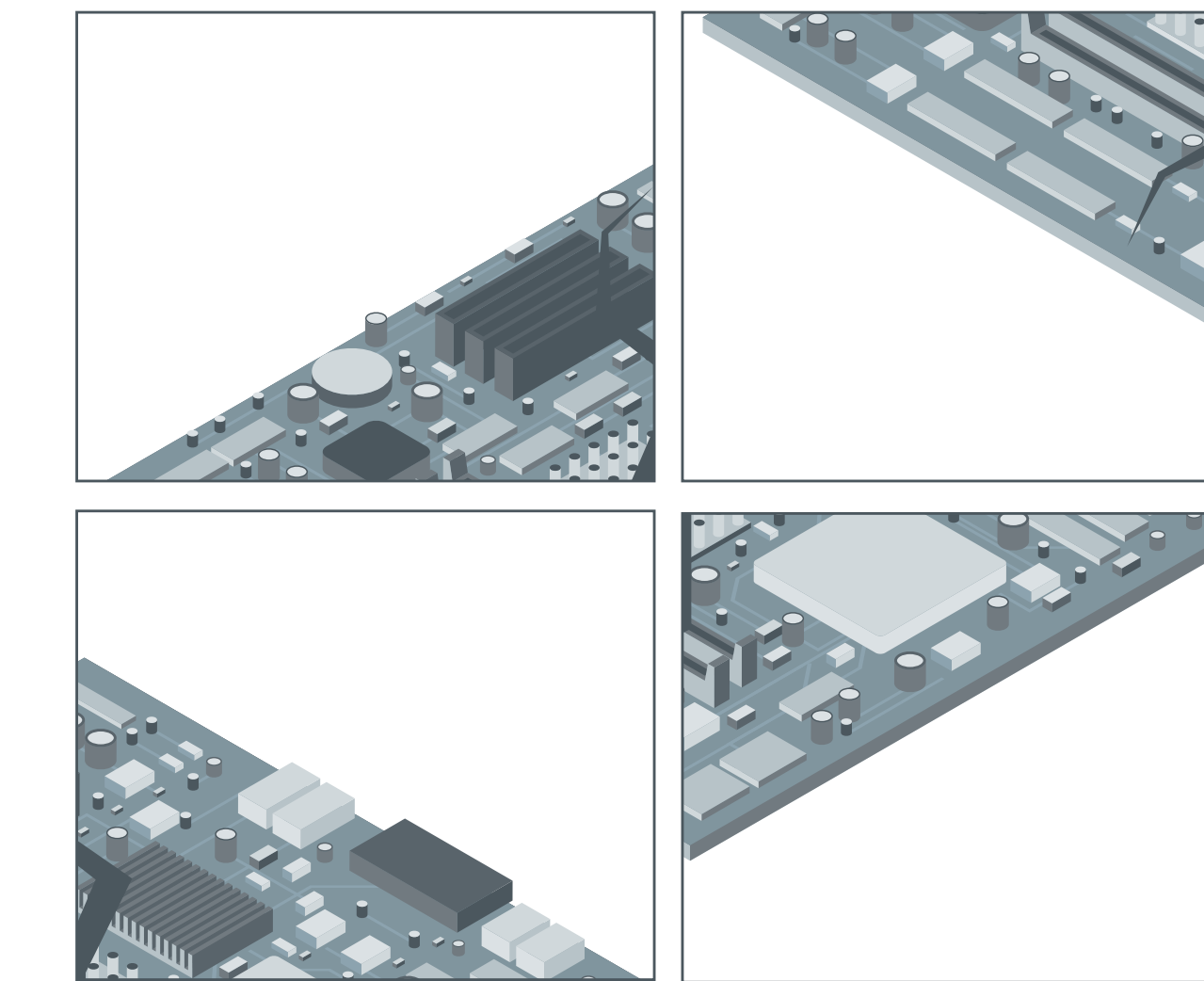
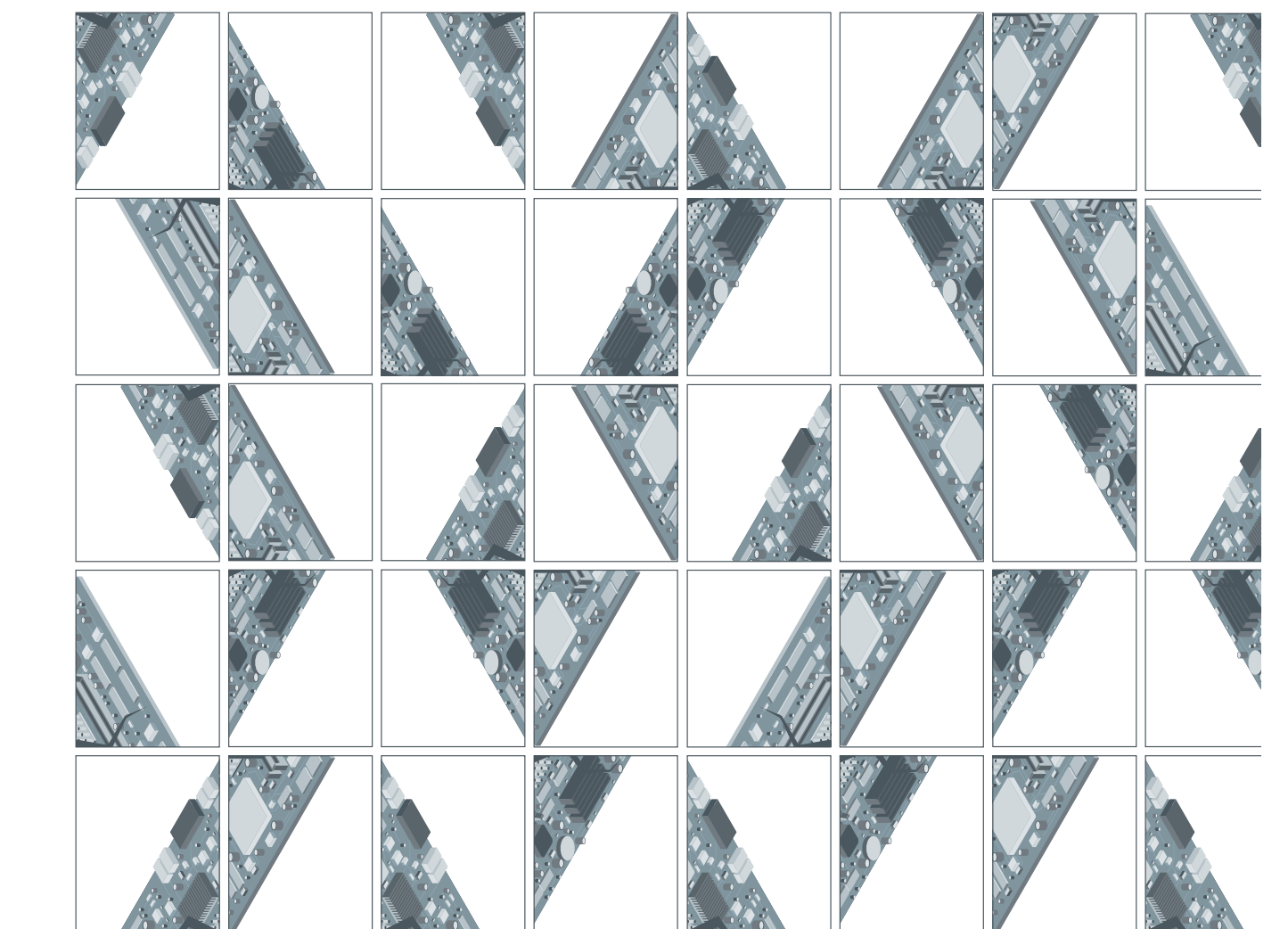
Machine Learning allows the solution to be fully retrainable, so its accuracy is continuously and remotely improved, and could potentially be retrained for multiple different product types.

# Challenge 01

The first challenge was a lack of data available to train the AI with. In this case, there were very few numbers of “cracked” die images to work with. We used two data augmentation approaches to solve this.

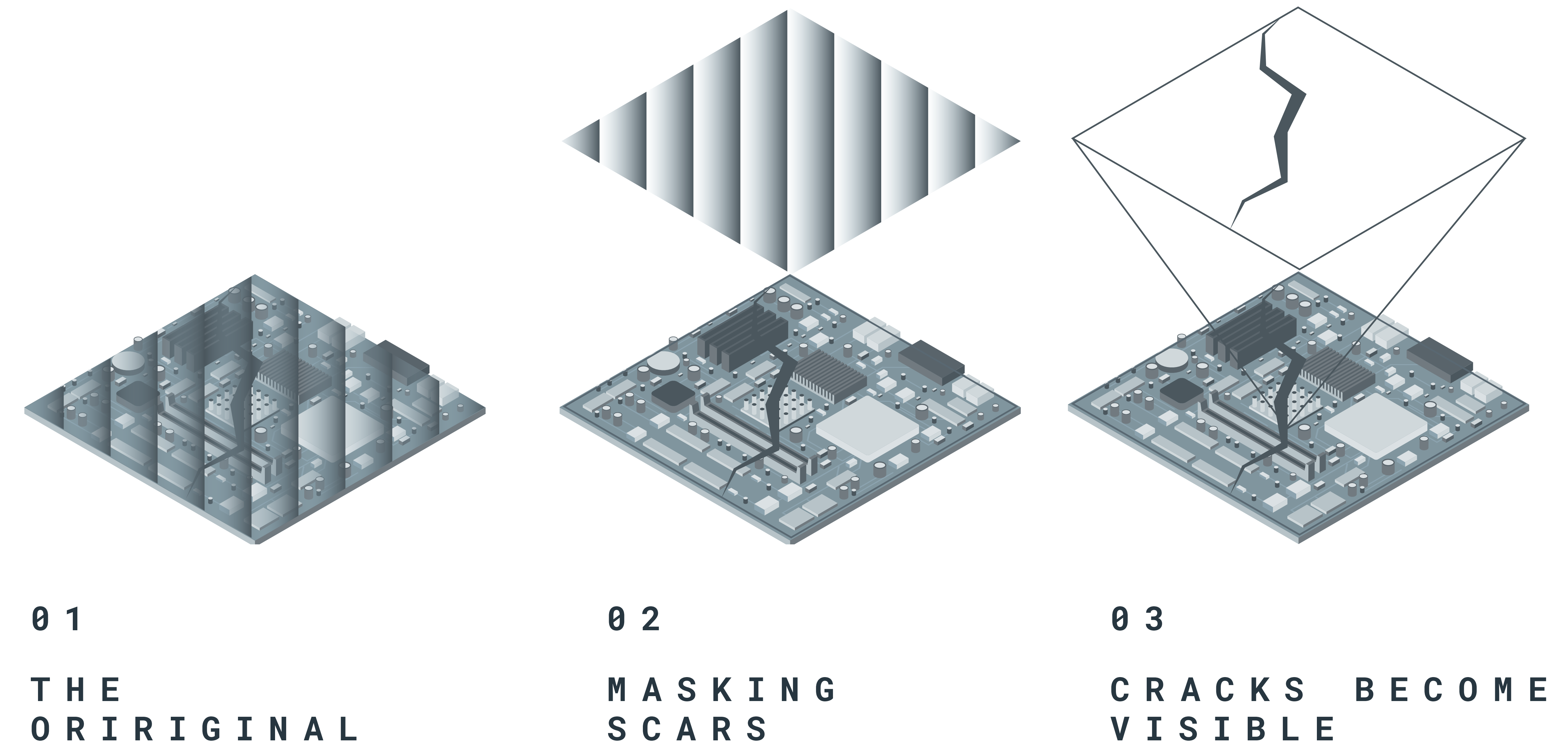
The first was to split each cracked image into smaller windows, and then flip and rotate them to provide 10x the amount of examples. We also used data synthesization techniques to create hugely realistic replicas of cracked dies using real-world examples as a base.

Once we had verified that the models were accurate enough, we combined these two methods to give us a representative amount of information to train the ML model, so we could accurately classify a wider variance of images.

**01****T H E  
O R I G I N A L****02****W I N D O W  
C R E A T I O N****03****1 0 X  
A U G M E N T A T I O N**

# Challenge 02

Our second challenge was to enable the AI solution to differentiate cracks from backgrounding scars (a reduction of wafer thickness). Through careful research and experimentation, our experienced Data Scientists were able to identify the best scientific approach of using Fourier Transforms to identify backgrounding stripe masks. We applied these masks to the images and then reversed the Fourier Transforms to provide cleaned images. Since cracks are never uniform, this process ensured cracks would not be removed from images by mistake.



# Challenge 03

The final challenge was to ensure the solution worked in the real world where it can meet the commercial demands of the business. To achieve this, we needed to take AI out of the lab and into production.

In this case, we needed to utilise the customer's centrally-controlled Edge computing abilities to meet the operational needs and ensure commercial viability. To achieve this, we used a cloud environment to simulate and fine tune the solution, with the intention of porting it to local hardware once ready. This approach allows us to flexibly make adjustments and ensures the final solution will meet speed requirements.



# Results

The final solution classifies dies with a 0% false negative error rate and <1% false positive error rate, which was originally above 12%.

Current speed tests indicate images can be processed in less than 0.7 seconds, which we are able to improve by fine tuning and removing complexities from the AI model.

Once we achieve the business acceptance criteria of less than 0.4 seconds while maintaining the same false negative and false positive error rate, the solution will be placed into full production.

# 0%

FALSE NEGATIVE ERROR RATE

# <1%

FALSE POSITIVE ERROR RATE



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# Let's talk opportunity

Intelygenz provides expert AI implementation services, collaborating closely with internal teams from concept through to deployment to help develop, integrate, and maintain customized solutions. Businesses trust us to tackle their most complex challenges, confident in our capacity to support their teams in delivering critical AI-enabled projects on time and within budget.

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Let's talk



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Let's talk

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