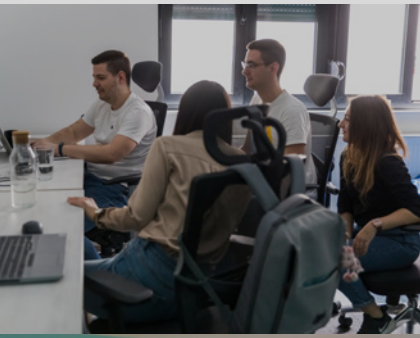


# Proptech

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BRAIN POWERED AI COMPANY



## About SmartCat

SmartCat is a service-based company that specializes in delivering comprehensive data solutions for businesses. With eight years of experience in the industry, our team of experts is dedicated to expanding their knowledge and incorporating new technologies and methods. Our focus lies in leveraging the power of data to help businesses unlock their true potential, while also highlighting our solutions in the PropTech industry with an ESG approach.

At SmartCat, we excel in creating robust data platforms and foundations that enable true analytics and AI capabilities. We understand that the value of data extends beyond its mere collection; therefore, we have developed a holistic approach to product development. Our end-to-end solution covers every aspect of the product development lifecycle, ensuring a comprehensive and seamless process.

In addition to our expertise in data solutions, we successfully manage to maximize building efficiency and living space quality by harvesting property-related data through intelligent systems, smart devices, and sensors. This approach allows our clients to generate smart data-driven decisions and create new business models that are more competitive and profitable, while also aligning with environmental, social, and governance (ESG) principles.

Through our dedicated Labs, we invest in knowledge and develop cutting-edge solutions that address various levels of the data science pyramid, from data analytics to AI integration. Our commitment to innovation and expertise enables us to deliver tangible results to our clients in both the SmartCat service offerings and the PropTech industry.

Proptech:

## Why and what...

We recognize the colossal potential in the **PropTech industry**, and we make some data-driven decisions that allow us to be part of future green technologies impacting the future of our planet.

Our services are based on **real-time analytics, machine learning, and AI to optimize and utilize properties smartly.**



### BUILDING ENERGY EFFICIENCY

Improving the energy performance of any building to **reduce CO2 emissions** is a crucial challenge, and energy efficiency optimization by using real-time analytics and ML leads to significant savings.



### ASSET & MAINTENANCE MANAGEMENT

In times of distribution challenges, it is crucial to **track, maintain, and optimize the load** on consumable components. Advances analytics offers a chance to **exclude extended outages** and make savings.



### SPACE OPTIMIZATION

Through advanced analytics and ML, **companies can maximize the use of their offices and workspaces**, and provide essential real-time data and predictions on workspace usage for future planning.



### LOCATION ANALYTICS AND PEOPLE MOVEMENT

Real-time analytics and AI can provide an insight into the indoor movement as well as **how the space is occupied and utilized**. With the data collected from cameras and other sensors, possibilities are endless.



### DISTRIBUTED ENERGY RESOURCES

Facilitating connections between building control systems and the electricity grid can enable the **optimal use of decentralized generation and renewable energy sources** while maintaining flexibility.

## What we did...

We successfully manage to maximize building efficiency and living space quality by harvesting property-related data through intelligent systems, smart devices, and sensors. Consequently, our clients generate smart data-driven decisions and even **create new business models becoming more competitive and more profitable.**

**Please check the Industry diagram** specially designed to give you a better perspective on our impact on the PropTech Industry.

For more information you can contact us here:  
[info@smartcat.io](mailto:info@smartcat.io)

# Proptech – industry knowledge diagram

## 01 BUILDING ENERGY EFFICIENCY

### PROBLEM

Large-scale HVAC systems management and energy consumptions optimization

### SOLUTION

Smart forecasting – a solution that instantly reduces HVAC systems' energy consumptions. 20% budget savings.

**SmartBonus:** This solution is highly scalable and flexible. It adapts not only to people's behavior but also to seasonal changes.

• Kubernetes • Data Ingestion • Reinforcement learning • Spark real-time processing • Spark real-time processing • Temporal ML models • Monitoring • Real-time analytics • Alerting • In-flight data encryption •

## 02 ASSET & MAINTENANCE MANAGEMENT

### PROBLEM

Reducing malfunction costs by optimizing the load on components.

### SOLUTION

Implementing semi-automated actions to control the speed of fan and detection of anomalies for low-latency predictive maintenance.

**SmartBonus:** This is a highly scalable solution that includes root-cause analysis and fan speed control in HVAC systems.

• Data Ingestion • Anomaly detection • Semi-automated actions controller • Energy consumption reduction • Monitoring • Alerting •

## 03 SPACE OPTIMIZATION

### PROBLEM

Improving and upgrading current space optimization analytical system.

### SOLUTION

Implementing alert-based reporting through advanced technological upgrades based on the entire data pipeline and analytical system.

**SmartBonus:** This is a highly scalable solution that includes root-cause analysis and fan speed control in HVAC systems.

• Reporting • Alerting • Analytics pipeline • New hardware integrations •

## 04 LOCATION ANALYTICS AND PEOPLE MOVEMENT

### PROBLEM

How to predict and infer space occupancy and utilization in order to optimize the use of commercial and corporate spaces..

### SOLUTION

To generate precise insights of an exact number of persons and use of assets and space. AI in-camera person tracker that provides spatial analytics is a practical, highly accurate, and maximally convenient solution.

**SmartBonus:** State of the art computer vision algorithms with 90% persons detected and tracked alongside superb and exclusive fisheye camera technology.

• Real-time asset detection and utilization • Real-time cleaning reports • Batch processing pipeline • Door Ajar • Real-time person and occupancy detection • Person pose inference • Object tracker • MLops •

## 05 DISTRIBUTED ENERGY RESOURCES

### PROBLEM

Predicting when to use and how much energy to use from various power sources.


### SOLUTION

Smart energy controller that suggests the optimal plan for the energy usage of power-hungry devices such as electric cars.

**SmartBonus:** This is a comprehensive, three-in-one solution- including forecasting algorithms, a core decision-making algorithm, and a simulator for testing.

• Scalable simulator • Time series forecasts • Statistics and rule-based decision controller

For more information you can contact us here:  
[info@smartcat.io](mailto:info@smartcat.io)



Case study:

# Decreasing carbon footprint and energy consumption costs

How we achieved a 15% decrease in carbon footprint and energy consumption costs by creating an optimization algorithm for charging EVs

Electric vehicles are helping us meet global goals on climate change. They're eco-friendly and don't emit greenhouse gasses. At least not directly. They run on electricity and many parts of the world still use fossil fuels to produce it. We also use energy to produce EVs and their batteries. One way to influence carbon offset is to optimize energy consumption during charging EVs.

## Our client produces hardware that tracks energy consumption in households

They connect their monitoring device to an electric grid inside the house. It tracks energy consumption from all electric devices, collects the data from solar panels and measures carbon footprint, while comparing it to country-wide measures. They approached us with a request to create an algorithm that optimizes the consumption of electric energy and reduces the carbon footprint when charging EVs.

### SmartFact

Apart from EVs, you can apply electricity consumption optimization and carbon footprint reduction systems on HVAC, refrigerators, batteries and other electrical devices.

### SmartTip

Governments provide environmental subsidies to companies and individuals that take part in carbon offsetting initiatives or create and implement such systems.

### Testimonial

Don't just take our word for it. Here's what the client says.

Their algorithm helped us create a greener, more sustainable and optimized future for households country-wide."

Product Manager in our client's company

### Challenge

- We had to optimize charging, make the entire process more eco-friendly and help households to cut electricity costs.
- To do that, we had to analyze historical data from many households and real-time data of carbon emissions at a country-level in order to create an algorithm.
- However, it would take at least 10.000 real hours to train it properly.

### Solution

#### 1. Research and simulation phase

We created a simulator by using historical data, simulated 10.000 hours and trained our algorithm. The simulator included the historical data from typical households and connected EVs. This allowed us to train our algorithm in just a few days.

#### 2. Implementation phase

We implemented the algorithm that we developed through the simulator in the cloud of our client. This time, we tested it by using real-time data from houses and connected EVs, as well as solar panels.

**Technology:** Python, AWS, MySQL, DynamoDB, ActiveMQ

### Results

To test the efficiency of our algorithm, we used 2 baseline strategies to compare its results to.

- The first strategy was Charge Now - when the user plugs in the EV, it starts charging.
- The second strategy was Charge At Midnight - whenever the user connects the EV, it starts charging at midnight.

The user could choose whether to optimize based on CO2 reduction or energy consumption. Our optimization algorithm decreased energy costs and carbon footprint by 15% after 5.000 hours of use, compared to these two baseline strategies.



Case study:

# Optimisation and utilization of the space

We helped our client develop a space optimization product used by enterprise-level companies and higher education institutions US-wide

Because of the inefficient real estate utilization tracking, companies are wasting millions per annum. There's a lot of data around us waiting to be collected. It allows companies to make timely decisions, reduce their portfolio, and lower overall costs. However, few companies use it.

Our client was a US-based startup that uses AI to optimize the usage of real estate space. Their technology helps higher education institutions and enterprise-level companies to:

- Improve their portfolio tracking and reduction,
- Increase the efficiency of processes (cleaning, management, overall comfort...) according to the occupancy rate, and cut the maintenance, electricity, and other real estate management related costs.

They approached us to extend their AI team and reinforce the product.

## SmartFact

According to HBR, some corporations in the US waste more than \$300 million per year on inefficient space management.

## SmartTip

Using real time data helps you not only optimize usage of space, but also increases the happiness of tenants - and this results in greater client lifetime value.

## Testimonial

"SmartCat was a crucial piece of the puzzle in creating a powerful AI-based real estate occupancy tracking product. They integrated so well that we felt they're part of the company."

*Product Manager in our client's company*

## Challenge

Our challenge was twofold.

1. We had to integrate into our client's team and deliver the final product according to their plans - while providing fresh ideas.

2. We had to improve the precision of the tracking system that is based on data collection through Wi-Fi hotspots and sensors.

## Solution

How we solved these two challenges

1. Apart from regular meetings with our client's PM, faster delivery and increased scalability, we also integrated our internal SmartCat processes and took part in brainstorming sessions.

To speed up feedback and improvement, we took full ownership of integrating the Amazon QuickSight. This tool allowed us to have faster iterations and feedback of higher quality.

2. We improved the analysis of data collected through Wi-Fi hotspots and complemented them with a sensor-based tracking system.

The usual problem with Wi-Fi is precision in the zone-level tracking (single rooms). So we shifted from it to the floor and building-level tracking with Wi-Fi. Then we used sensors to define exactly how many people there are on a granular level. The whole data collection process is completely GDPR compliant.

## Results

This resulted in increased precision and improved processes

We increased precision in occupancy rate tracking up to 90%. That allows end-users to optimize space utilization to the maximum.

Our way of working improved internal processes at our client's side and helped them further develop their business models.

In the end, the overall success of our project led to the startup being recognized by investors and acquired by a larger group later on.



Case study:

# Optimus power

Super powerful #proptech AI software by SmartCat.io

## Problem

- How can you build energy-efficient buildings/factories, stop wasting energy, and generate a strong economic impact on your balance sheet all at once?
- Buildings use over 40% of worldwide electric energy just to set the temperature in a room.
- Energy efficiency is not just a business problem; it's a societal problem affecting all of us.
- To reduce energy consumption and CO2 emissions will soon be mandatory, not just a matter of preference.
- Companies are obliged to create more sustainable business practices soon and fast.

## Solution

Optimus Power, powerful #proptech AI software, provides automatic control of energy efficiency for commercial properties upgrading people's comfort.

- OP aims to predict and reduce energy consumption in a specific facility or area, consequently reducing the costs and CO2 emissions, supporting you in accomplishing one of the most important goals that our planet has at its forefront.
- Imagine Optimus Power as a central system for controlling, forecasting, predicting, and spotting anomalies all of which would be almost impossible to achieve through manual control.
- Enabling you to save up to 35% of energy, by creating significant savings in your budget, this tech shift might open new possibilities to re-allocate money into new technologies and opportunities.

## Results

Anomaly detection: get notifications about malfunctions, excess usage, unexpected temps, and any other problems that may occur

Forecasting: based on data, we predict information enabling energy managers to act at the right time and give information to financial managers which they can depend on

Autopilot: enabling you to have optimal control without any manual labor

Monitoring: analysis of old vs. new savings, savings trend, and much more so you better understand the impact of your AI-powered solution

## SmartFact

• Optimus Power (OP) is a perfect solution for optimal control of energy consumption of HVAC appliances in commercial buildings, malls, airports, industrial halls or hotels.

• Our client said: "Optimus Power is the winning product of SmartCat on PowerUp!" - InnoEnergy

## SmartTip

• Almost every Government supports this kind of project.



Case study:

# Space Optimization

## About the Client

US -based startup that aims to use AI to optimize and utilize its corporate space.

## Problem

- Gaining a competitive edge in real estate with AI-driven geospatial analytics with Data & **knowledge as a business power**.
- It is not a secret that data analysis can significantly improve decision-making in real estate. How to **predict and infer space occupancy and utilization** to optimize the use of commercial and corporate spaces?
- Knowing how **occupancy and utilization** influent gives many businesses a competitive advantage. Good example could be increasing the number of employees in case of the high frequency of customers in some period of the day.
- **Real-time analytics and AI** can provide a valuable insights into the indoor movement and positioning and how space is occupied and utilized. Analyze surveillance videos and make outputs for BI tool.

## Solution

The process:

We defined which parts of the system can be generic and camera-specific and need to be adapted to each case.

- **The pilot project** includes retraining networks that are **camera specific**, representing what networks see via data that is easy to be manipulated. Then, we use this data with post-processing to meet our client's specific needs.
- SmartCat use the database for **training multiple models** designed to extract different kinds of information from videos.
- We perform an automatic secondary analysis of the collected raw data , so it can be used to create **human-readable insights, alerting, and visualizations**. As a result, occupancy and utilization serve as a business intelligence for clients to make smart decisions.

## SmartFact

- In 2022 the focus will be on AI-driven spatial analytics. Why? Because it is a quick and affordable way to provide reducing manual observations.

## SmartTip

- Most CV algorithms hardly apply or apply with many difficulties to the security cameras, but we improve the Smart AI-Powered Systems that support those algorithms, using custom algorithms and optimization.

## Results

SmartCat collects relevant data from videos with high accuracy. Up to 90% of people and objects were successfully detected. This data is then automatically manipulated and transformed to accommodate specific client's needs. SmartCat improves the systems that support the algorithms applicable to security cameras.



Case study:

# Data Lakehouse

## About the Client

Client's company operates in more than 160 countries.

## Problem

An EU enterprise, construction and industrial company is committed to sustainability and environmental responsibility, with a history of keeping urban areas clean for almost a century. Therefore, the client was looking for a stable data infrastructure solution that they could scale up and later on add other partner companies too. **Having multiple data sources in their business led to a need for a unique storage solution.** In addition to that, the client wasn't utilizing the data to its full potential, despite the fact that their end users were requesting various insights that they might offer if the data was kept and arranged in a better manner. **The challenge was to identify the requirements and to adjust the pipeline in order to get data from different sources.** Moreover, there was a need to ensure that the solution could be easily scaled up to accommodate future data needs.

## Solution

Since the client wanted to make an impact by reducing carbon emissions, decreasing fine dust levels, and employing alternative fuels, with the aim to provide responsible solutions for municipal street cleaning challenges, SmartCat created a **Data Lakehouse solution** in order to enable advanced analytics and machine learning for the client, as well as an API implementation that would enable easier access to data and building reports.

The team worked closely with the client in order to identify and adjust the pipeline to ensure that data could be easily accessed and used for advanced analytics and machine learning. We delivered value through reports with insights and forecasts while enabling the client to smoothly read and understand data and how to use it in an efficient way.

## Technologies Used

Platforms:

- AWS cloud storage: used for storing unstructured, semi-structured and structured data.
- Databricks: combines data warehouse and data lake advantages into single architecture.

Tools:

- Apache Spark: an open-source distributed computing system for big data processing.
- Terraform: a tool for building, changing, and versioning infrastructure safely and efficiently.
- Python: a programming language used for data analysis and data science.
- Power BI: a tool for data visualization used for generating reports.

## Results

SmartCat built the necessary infrastructure to deploy an internal Data Lakehouse solution - AIDA to the Client's AWS account. This allowed for a stable and scalable solution that could accommodate future data needs. The end result was a successful Data Lakehouse solution that met all of the Client's requirements and enabled them to achieve their goals. Moreover, having structured data allowed different visualization options through dashboards that brought more value from the data.

## SmartFact

- The Data Lakehouse solution that SmartCat had implemented helped optimize the performance of swipers, leading to increased efficiency and reduced downtime.

## SmartTip

- When implementing a Data Lakehouse solution, it's important to work closely with the client in order to identify their specific needs, and bring value to their data processing mechanism, all while creating easy access and creating more overall value for the client.



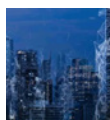
Proptech

## Final Words...

When you choose SmartCat as your partner, you embark on a journey that begins with a visionary approach, followed by meticulous design and implementation, and culminates in the delivery of production-ready systems. We are dedicated to providing a comprehensive service that encompasses all the necessary steps for a successful project. With our brain-powered AI capabilities and offices in the Netherlands, USA, and Serbia, we bring together the essential departments crucial for AI development, including Data Science and Data Engineering, making us a one-stop shop for data projects in the ever-evolving PropTech industry.

To gain a better perspective on our impact on the PropTech industry, we invite you to explore our Industry presentation specially designed to showcase the value we bring to the table. If you're ready to take the next step, please get in touch with SmartCat, the leading provider of smart data solutions and ESG-driven innovations in the PropTech space.

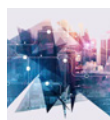
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