



ATM Intelligence and AI Today



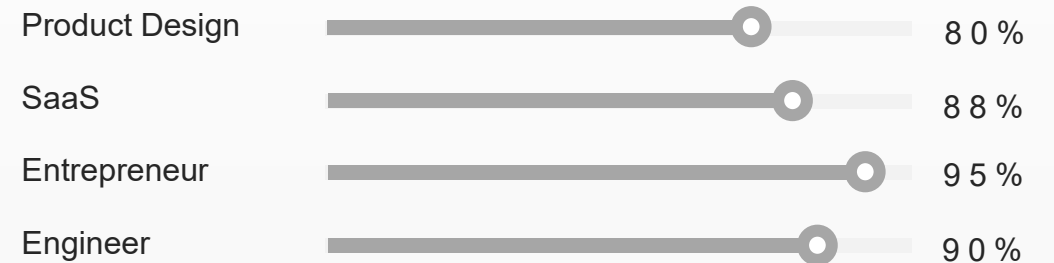
ALIF RAHMAN
CO-FOUNDER

MEET OUR CO-FOUNDER,

PRESIDENT, AND CHIEF TECHNOLOGY OFFICER

Alif is instrumental in the development of the software and the incredible success of Morphis since its inception in 1999 with co-founder Dr. Mahmud Hossain.

PERSONAL SKILLS



AGENDA

01
Strategic
Insights

02
Deep Dive into
“Machine Learning”

03
Driving Efficiency
in the ATM
Industry



Strategic Insights

What is AI?

Artificial Intelligence

A set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand, and translate spoken and written language, analyze data, make recommendations, and so on.

In other words, machines that are programmed to perform specific tasks automatically without the need for a human to supervise their work



Machine Learning (ML)

Allows systems to learn and improve from data without explicit programming.



Automation

The use of technology to perform tasks with minimal human intervention, streamlining processes for efficiency.



Natural Language Processing (NLP)

Enables machines to understand and generate human language.



Computer Vision/Image Recognition

Helps machines interpret and process visual information from the world.

AI in the ATM Industry

Can significantly enhance efficiency and accuracy.



Data Analysis

AI can analyze vast data sets, including cash costs, fuel prices, maintenance expenses, and asset depreciation, to provide more accurate cash flow predictions.



Real-Time Monitoring

AI systems can provide real-time insights into fleet operations, enabling quick adjustments to field conditions.



Predictive Maintenance

AI algorithms can predict when hardware may need maintenance, reducing unexpected breakdowns and costs and allowing more effective budgeting.



Risk Management

AI can identify patterns and trends that might indicate financial risks, allowing owners to take proactive measures to mitigate potential issues.



Optimize Resource Allocation

By forecasting cash flows, AI helps ATM fleet managers optimize the allocation of resources, ensuring funds are available for critical needs.



Improved Decision Making

With AI-driven insights, ATM owners can make more informed decisions regarding budgeting, cost management, and strategic investments across all business areas.

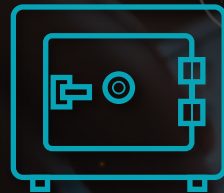
AI-Driven Cash Forecasting Model

For this workshop, we will specifically focus on how the “Machine Learning” aspect of AI can be used to analyze and forecast the cash demand of a Terminal

Machine Learning can be utilized to analyze and forecast the cash demand of any terminal.



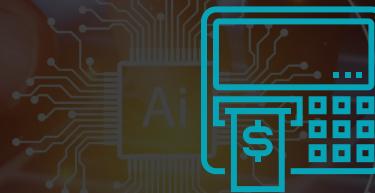
Cashier Drawer



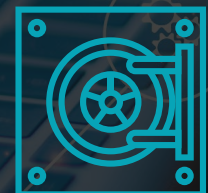
**SmartSafe
Cash Recycler**



Cash to Card



ATM/BTM



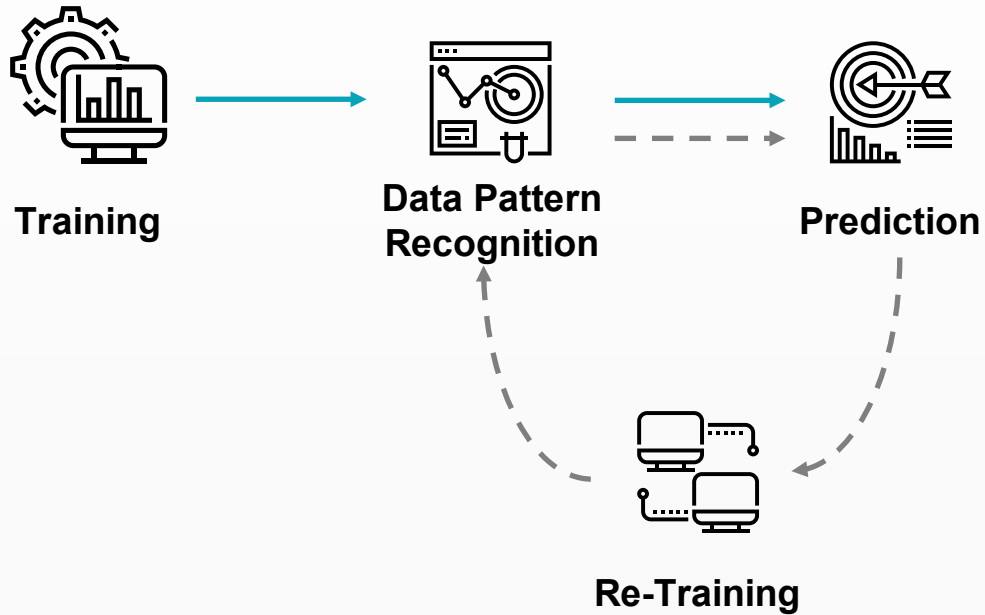
Cash Vault



Machine Learning

Deep Dive

Machine Learning



1

Training

Machine learning systems are trained on a data set to learn how to analyze similar inputs in the future.

2

Data Pattern Recognition

The software uses algorithms to analyze the data and identify patterns and correlations.

3

Prediction

The system uses the patterns and correlations from the data analysis phase to make predictions.

2.5

Re-Training

If the predictions are inaccurate, the system is re-trained on the data until it produces the correct response.

Machine Learning

Training

- **Data Input (Historical)**
 - Frequency (Daily/Real Time)
 - Type (WD, Dep, Rep, Empty)
- **Data availability: Different training methods based on data availability:**
 - 6 months or less – simple moving average
 - Years – Start to incorporate pattern recognition and trend analysis
- **Data Preprocessing (Quality):**
 - Data cleaning (fixing holes, identifying and removing outliers/data smoothing and normalization)



Data Pattern Recognition*

*Requires multiple years of data

• Historical Data Pattern

- Regular Cycle (Repeats)
- Seasonality: data change at regular intervals within a year
 - Holidays, Special Events, Weekends, first or last day of the month

• Location Data Pattern

- The similarity of terminal location to borrow data
- Multiple terminals at the same location



Prediction

Trend Analysis

- Analyze and find the best-fitting trend per location.
- Analyze and separately predict withdrawal (WD) and deposits (if any) for Net Pay.
- Analyze and predict for each denomination (if available) and combine results.

Example of Models:

- Best-fitting curve
- ARMA
- Neural Network
- Simple Moving Average
- Statistical Analysis



Machine Learning

Balance by Denomination

Machine Learning

Prediction

Decision Making

- You must consider the “Location Profile” and “Business Rules.”
 - **Terminal Type:** ATM, Recycler, SmartSafe, Crypto Kiosk, Cash in Machine
 - **Business Rules:** Load Cycle, Load Type, Source of Fund, Cost, Terminal and Account/Vendor Balance, Consider Strap/Bundle Size restrictions



Machine Learning

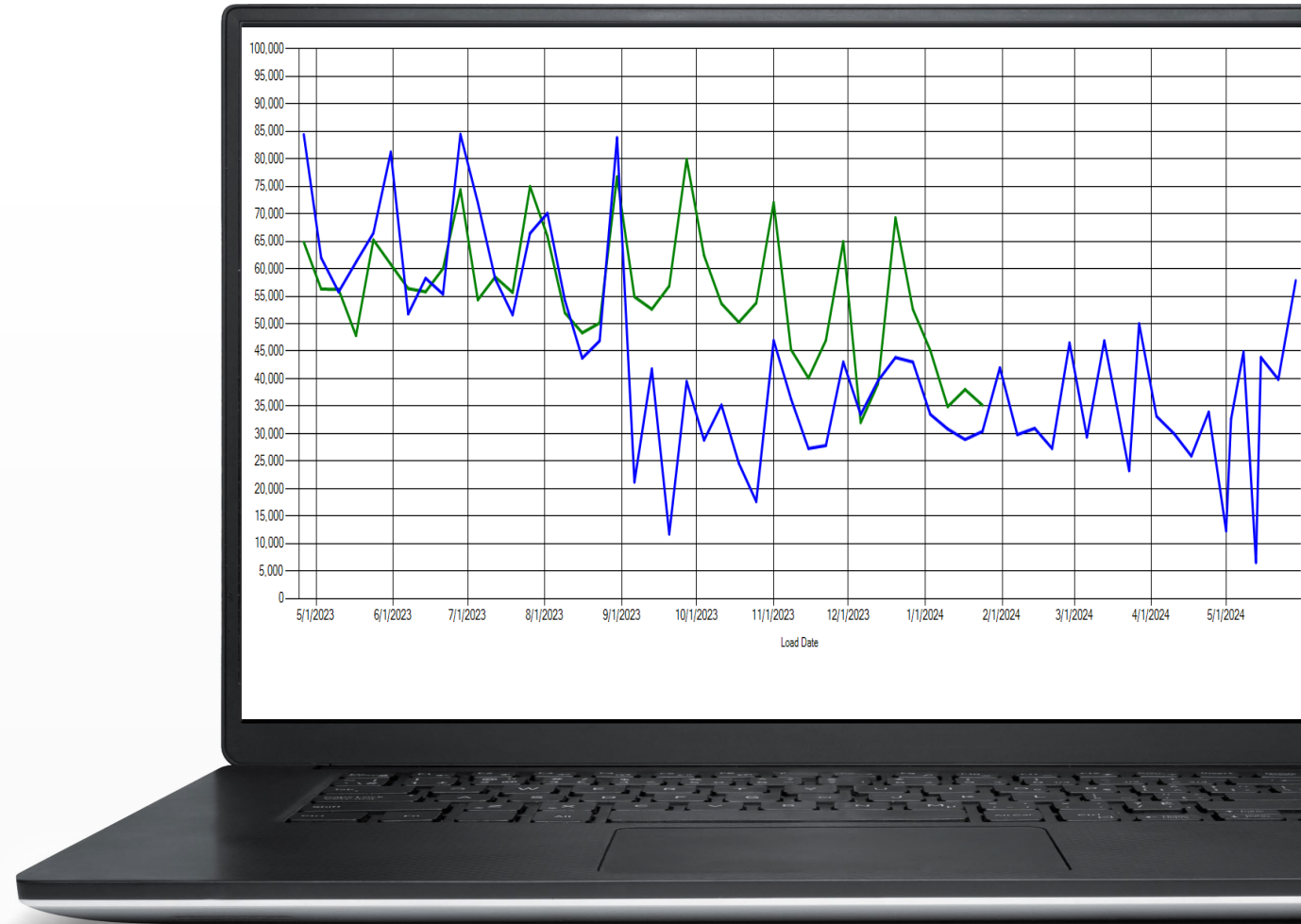
Re-Training

Compare Actual vs. Historical Estimates

- Constant And Evolving

Historical Data Influencing:

- Manual: Visualize with a “What If” dashboard
 - Truncate historical data with a specific start date
 - Adjust raw transaction data with influencing factors



Machine Learning

Re-Training

Future Estimate Influencing:

- Specify special events and holidays (Regular/Shifting)
- Specify future irregular events such as natural disasters, hurricanes, etc.
- Visualize Inventory Level and Influence the Estimates
 - Bump up or down estimated WD and DEP by percentage or amount within a given period

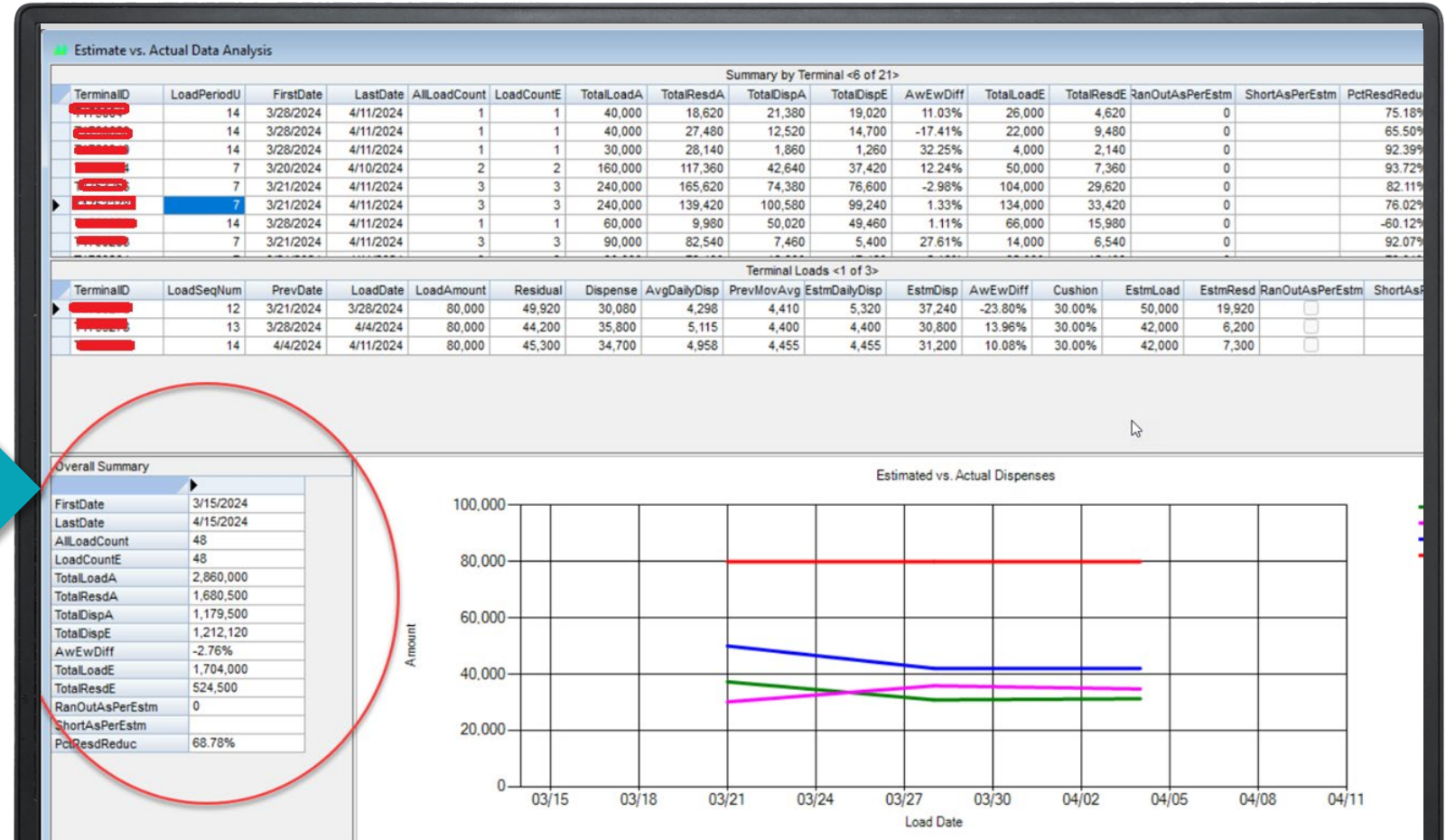




Case Studies

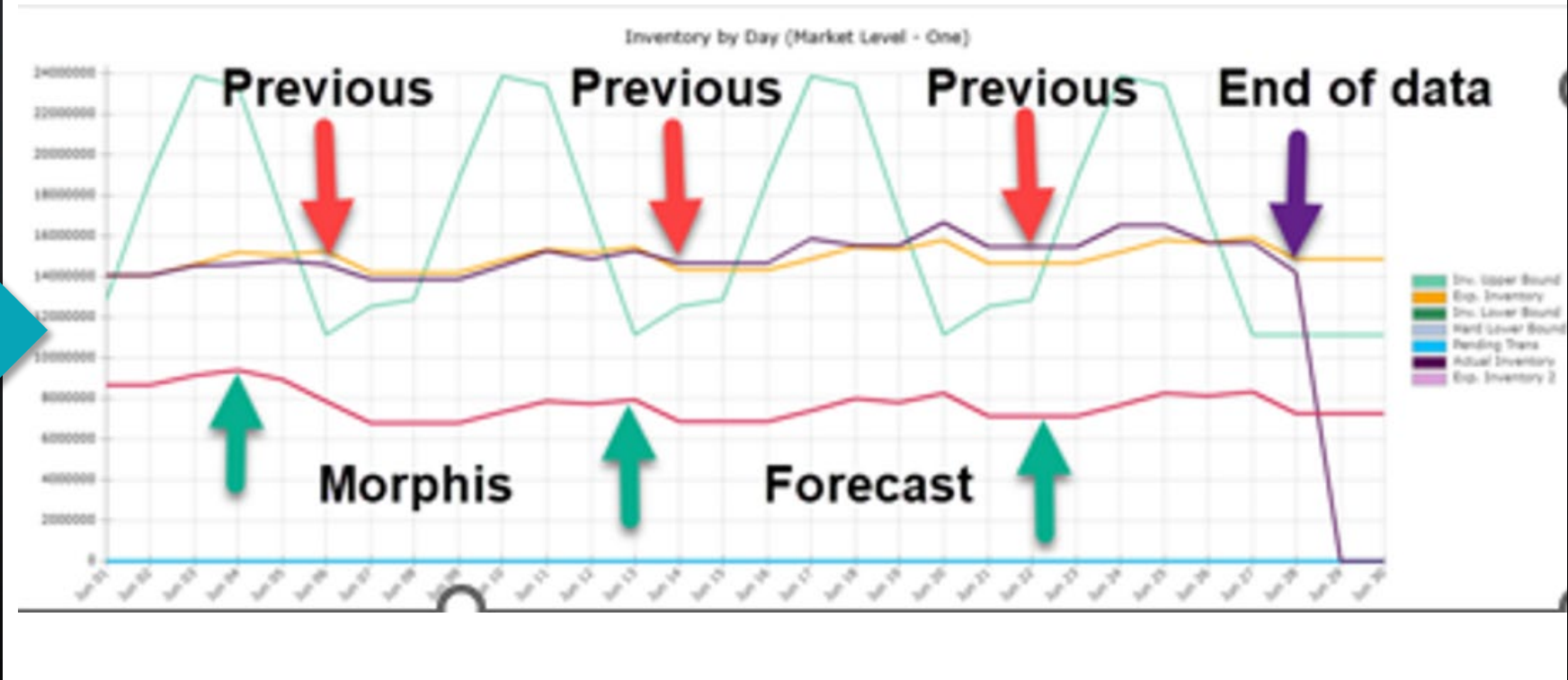
Case Study #1: 48 ATM loads

Residual
Reduction by
68.78%



Case Study #2

Branch Inventory
Reduction by
40%





Driving Efficiency

In the ATM Industry

Artificial Intelligence

Driving Efficiency in the ATM Industry



Automation

Automate the regular cash order process and focus only on exceptions (ECs).



Dashboards

Consensus planning via “What If” dashboard data analysis.



Real Time Alerts

Notifications are based on real-time transaction and balance data. Including hourly forecasts.

Artificial Intelligence

Moving Toward a Dynamic Model



Hub and Spoke: Virtual Vault

Analyze and suggest funds based on inventory availability and proximity.



Look Ahead:

Transfer funds from surplus to needed sources based on excess and demand data analytics.



Result: Imagine Your Cost Savings

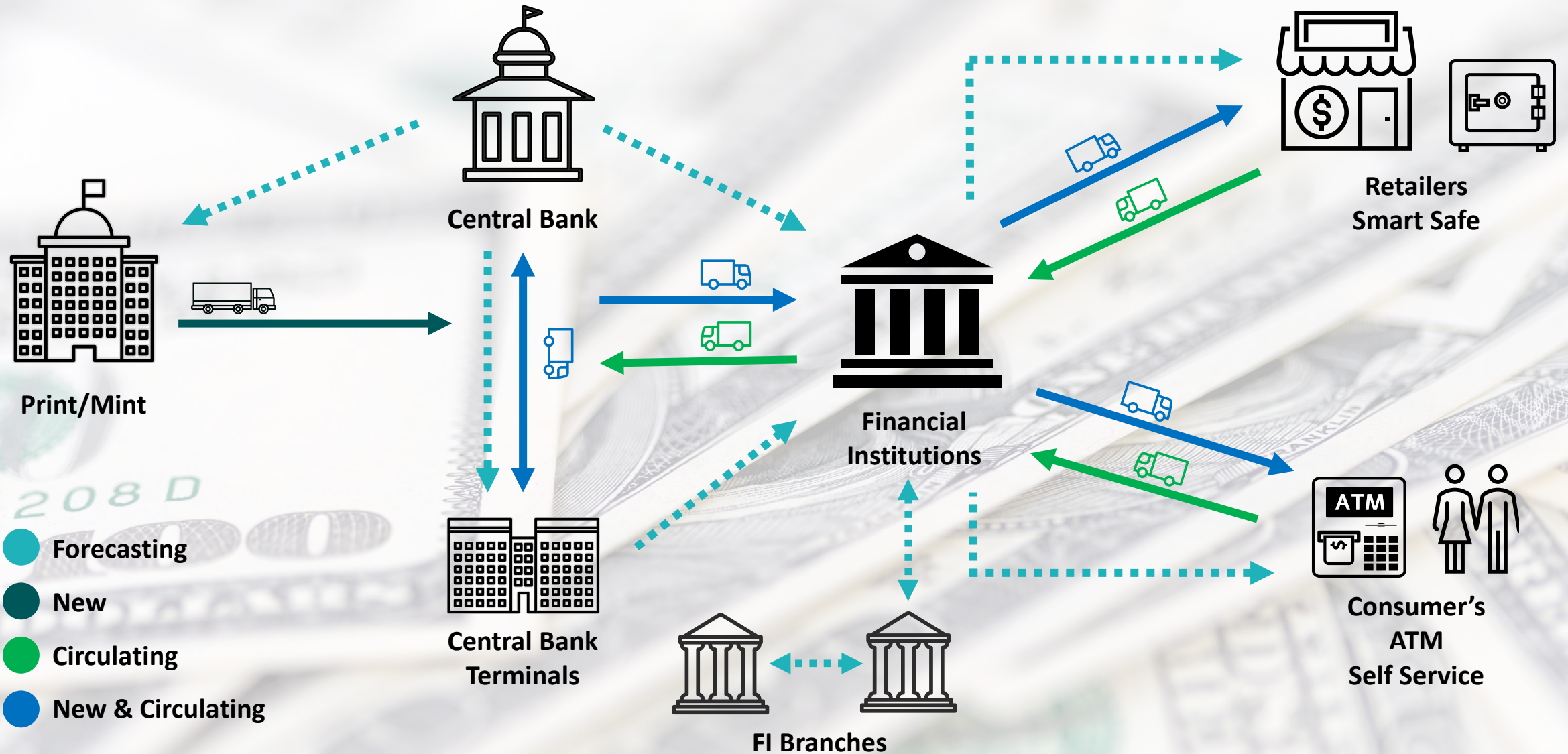
Reduce the cost of cash and transportation. Combine service and cash routes for maximum efficiency.

Artificial Intelligence

Goal: Optimization

Optimize cash balances in your currency supply chain, ensuring the right amount of cash is at the right place at the right time reducing transportation and idle cash costs.





ANY
QUESTIONS?





Thank you!

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