Prodapt Chase Extraordinary

To Treat, or Not to Treat: Increase marketing ROI with targeted campaigns, through Uplift Modelling

Credits | Ankit Tomar Dinesh Singh GC Prashantkumar Maloo Rohit Karthikeyan

Personalized marketing strategy of DSPs (Digital Service Providers) relies upon the ability to determine the **propensity to churn and target the right set of customers**

DSPs have been **increasing their investments in strategic marketing to** retain customers. However, it is critical to justify the investments by **targeting the right set of customers**, **who are most likely to respond** to the marketing campaigns.

- Focusing on a **personalized marketing approach** will retain active customers and active subscriptions
- The key to personalized marketing is to first **identify the most probable churners** and their corresponding **uplift metric**, which determines their **likelihood to respond to the marketing campaigns**
- Thus, the **uplift metric enables DSPs to target** the right set of customers with personalized campaigns and maximize marketing return on investment (ROI).

Personalized outreach is a key lever for DSPs to retain customers and increase revenue

Engagement	Levers	Upside
Drive customer value	Reduce churn and grow advocacy	15-40% absolute churn reduction
	Personalize outreach and cross-sell	15-30% increase in revenue from cross-sell

Source: McKinsey & Company

DSPs' marketing strategy should be based on four key criteria

1. Identify customers who are most likely to churn voluntarily
2. Determine the propensity to churn
3. Identify customers with a higher probability to respond positively to marketing campaigns
4. Target those customers with personalized marketing campaigns

Different approaches to **determine the right set of target customers** for achieving **higher marketing ROI**

Types of customers based on their buying response to marketing campaigns

Buy with marketing campaign

Yes

Persuadables

Customers who buy only when a marketing campaign is served

Targeting them will generate incremental value

Sure things

Customers who buy with or without a marketing campaign

No

Lost cause

Customers who would not buy irrespective of a marketing campaign is sent to them or not

Sleeping dogs

Customers who buy without marketing campaign. But would stop buying when a campaign is targeted at them

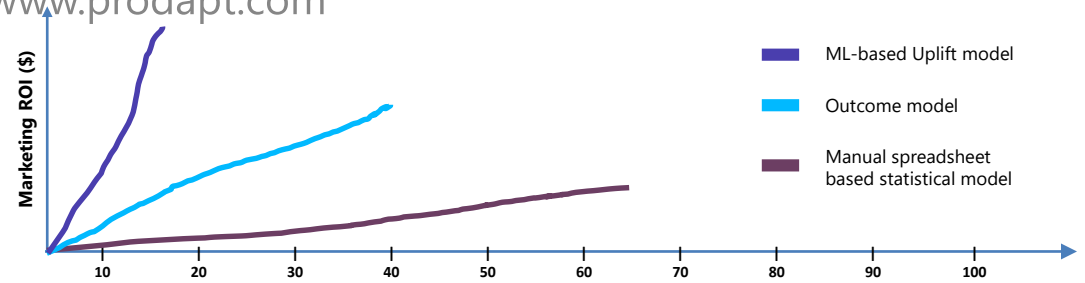
No **Yes**

Buy without marketing campaign

Different types of approaches to determine the right set of target customers

Manual spreadsheet based statistical modelling	• The model provides a **randomized and inaccurate list** of target customers, which may include all four types of buyers. This results in targeting the wrong customers • Results in **low return** on marketing investment
Outcome modelling	• The model identifies the list of buyers and non-buyers. The model lacks granularity in terms of categorizing the buyers into persuadable and sure things • Results in **medium return** on marketing investment
ML-based uplift modelling	• The model identifies the list of buyers and non-buyers and **provides granularity** in terms of which buyers are persuadables. This results in targeting only one type of customer – persuadables, thereby improving marketing efficiency and drive higher incremental revenue • Results in **high return** on marketing investment

Customers targeted vs marketing ROI achieved using different types of approaches



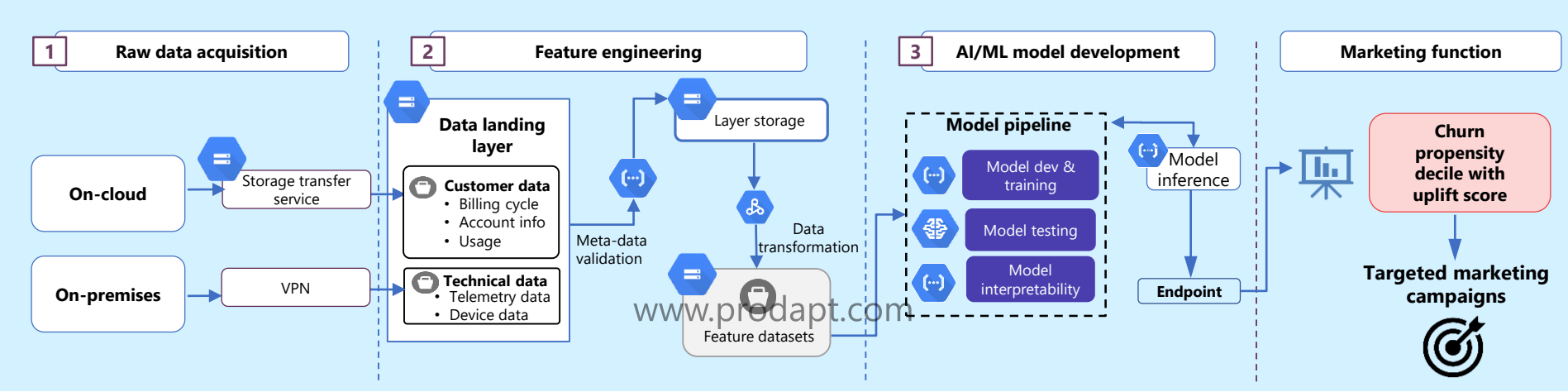
Recommendation

ML-based uplift model promises to deliver higher return on marketing investment. The successful implementation of the model requires right set of enablers such as raw data acquisition, data engineering, and lifecycle management using ML Ops. These enablers are presented in upcoming slides.

Final outcome of ML-based uplift model

Increase in uplift score: An increased uplift score determines which decile of customers has high probability to respond positively to marketing campaigns.

Implementing 3 key enablers of the uplift model to achieve excellence in targeted marketing



1

Raw data acquisition

Determining the right type of data input to get the right features and eventually an accurate churn propensity

2

Feature engineering

Selecting the best feature datasets from a wide range of raw data, resulting in enhanced AI/ML model accuracy

3

AI/ML model development

Developing an AI/ML engine to increase the uplift and predict the churn propensity

With these 3 key enablers, DSPs can achieve an increase of 10%-18% in the uplift score. Furthermore, the return on marketing investment for DSPs would increase drastically.

Raw data acquisition: Selecting the best raw data to achieve accurate churn propensity and improved uplift

It is critical to **prioritize only the most relevant and the best raw data** input, to achieve an accurate churn propensity output and uplift score.

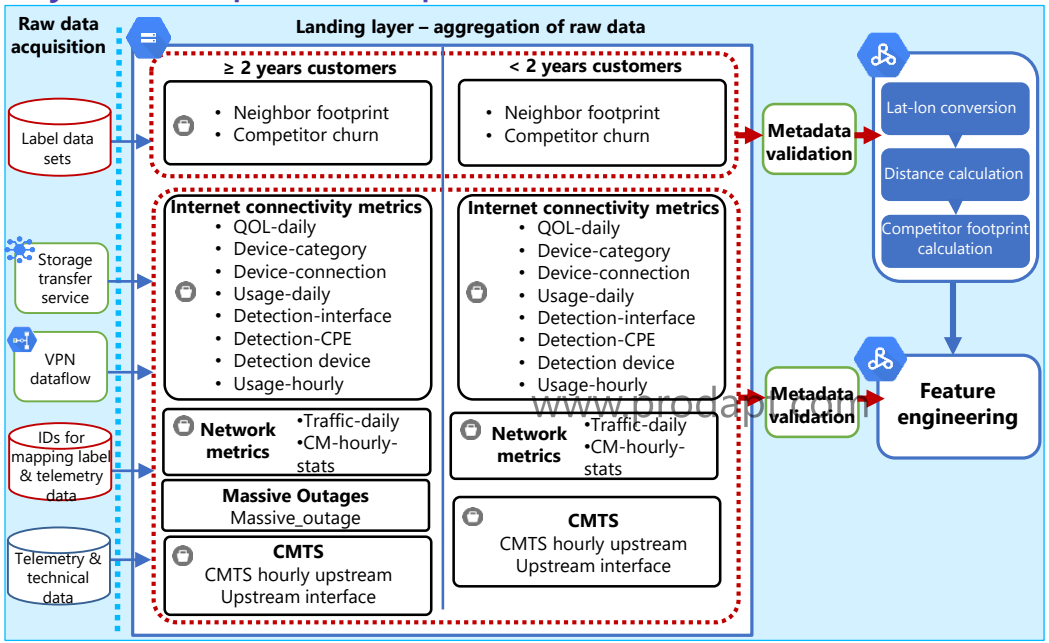


Fig: Raw data acquisition and landing layer

Recommended raw datasets for uplift model

- Device throughput
- Massive outages
- Neighbor data
- Call center
- Churn probability
- Competitor footprint
- Interface status
- Daily traffic
- Tickets
- Socio demographic
- CPE performance
- Hourly stats of CM
- Daily usage
- Hourly usage
- Network health

RECOMMENDATIONS

Aggregation of raw data:

- **Solution architects and domain experts should collaborate** to decide on data aggregation strategies and finalize the type of raw datasets to be used.
- Select the raw data **based on the past 2-3 months trends**. The historical trends depends on
  - Customers churn data
  - Active customers feedback
  - Customer response from marketing campaigns
- **Select the raw data, which has high influencing features** such as distance between an active customer and churner, competitor footprint, hourly broadband usage, etc.

Metadata validation to check the quality of raw data:

- Perform metadata validation daily, as the raw data acquisition is a continuous on-going process.
- Metadata validation tool could be built using Python.

The raw data, once obtained, must be engineered to get the best feature dataset, which would be fed into the AI/ML engine to achieve churn propensity and uplift score.

Feature engineering (FE): Leveraging data science to process raw data and select the best features

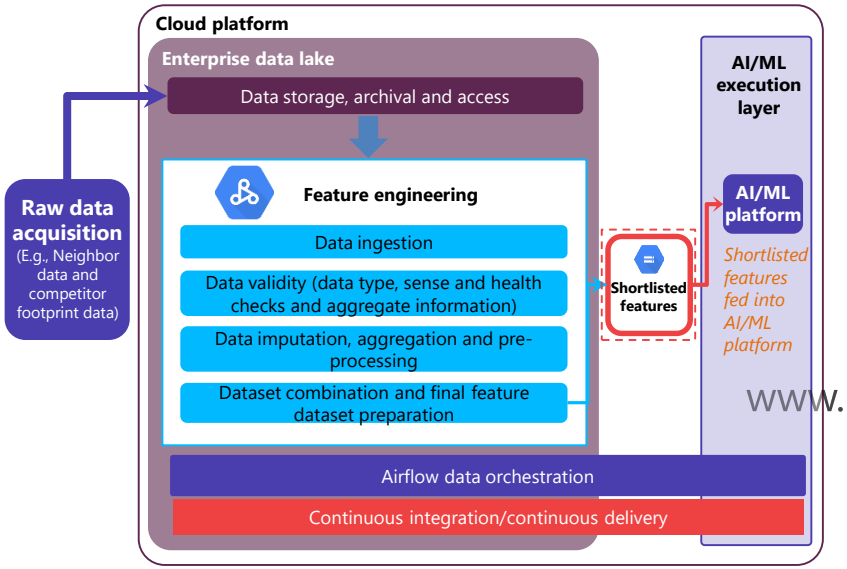


Fig: Feature engineering process

BENEFITS FOR DSPs

The selection of few best features out of more than thousands of features increases the accuracy of churn propensity. This is not achievable in traditional manual churn modeling.

Completely automated engineering allows the processing of any raw data, irrespective of the occurrence of data bias or data shift, which occurs due to customer behaviour shifts. Thus, DSPs do not have to repeat the feature engineering process depending on data variations.

Significance of feature selection:

- With feature engineering, the raw data is transformed into features that better represent the underlying issue to the ML algorithm, resulting in enhanced model accuracy.

RECOMMENDATIONS

Engineer the raw data to determine high-quality features

- Use the FE model to ingest and analyze the raw data to obtain a total of 3,000-11,000 features. (*Note: this number may differ based on raw data*)
- Execute the feature selection process, using the AI/ML platform to select only the best 400-1,000 final features (out of the 3,000-11,000 total features)

The most critical features for an effective uplift model are listed below:

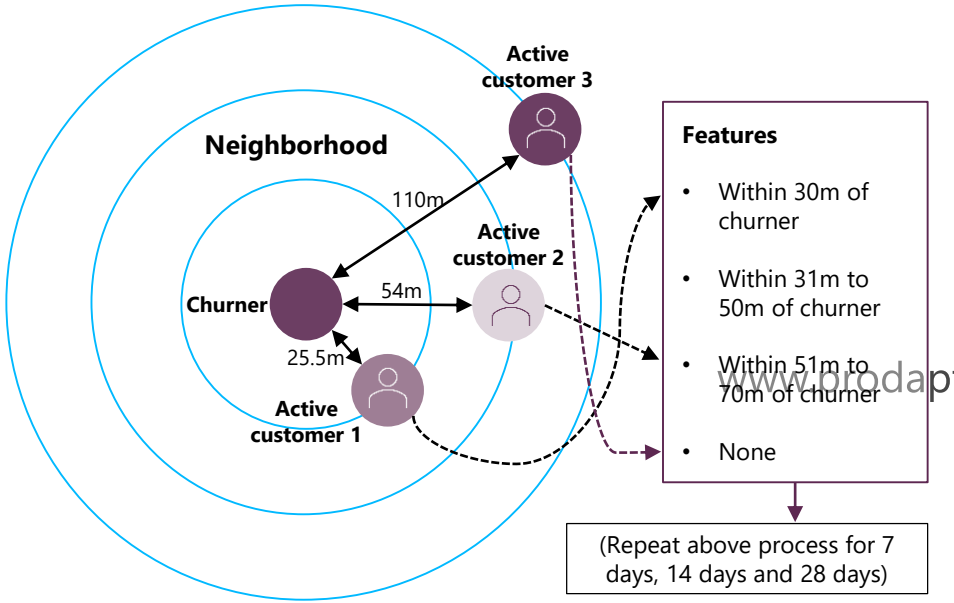
- Active churners who are present within 30 meters from possible churner
- Ratio of competitor networks present closer to 200 meters of churners churned in 30 days
- Active churners who are present within 50 meters from possible churner and churner before last 15 days
- Probability of churning to competitor X
- Probability of churning to unknown competitors
- Downstream hourly broadband usage in MB
- Upstream hourly broadband usage in MB
- Power cycle detection
- Number of stations per interface (hourly)
- Broadband connectivity detection

Use data orchestration platform to automate FE data pipeline

- The whole FE architecture should be managed on a data orchestration and scheduling platform such as **Apache Airflow**, which allows the FE data pipeline to be triggered automatically bi-weekly or monthly

The features, once obtained, must be fed into the AI/ML engine to achieve churn propensity and uplift score.

Example to illustrate feature generation using **neighbor and competitor footprint data**



Note: *m represents distance in meters*

The above diagram shows the features generated based on the distance between a churner and active customers, in a particular neighborhood. The features are generated for every 7, 14, and 28 days and fed into the AI/ML model.

Neighbor and competitor footprint data provide higher number of influencing features, which are useful to achieve an accurate churn propensity and higher uplift score.

RECOMMENDATIONS

Use the neighbor and competitor footprint data to determine the following:

- Density of active and churned users in a neighborhood
- Competitor footprint in the same neighborhood
- Number of churners for every 7 days, 14 days, and 28 days
- Period of churn: date and time of a customer churn
- Distance between a churner and active customer/subscriber

AI/ML model development: AI/ML engine increases the uplift score and enables DSPs to target the right set of customers

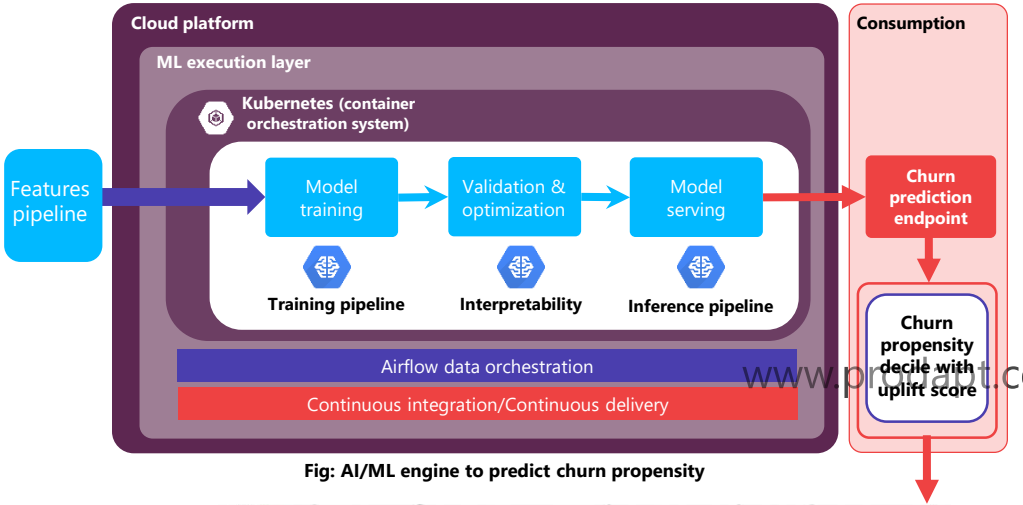
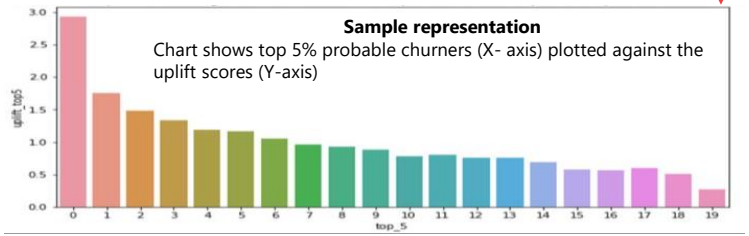


Fig: AI/ML engine to predict churn propensity



	top_5	sum_volChurn	count_volChurn	pct_volChurn_fivepct	pct_customer_base_churn	uplift_top5
0	0	1114.0	12904	0.086330	0.029445	2.931885
1	1	668.0	12904	0.051767	0.029445	1.758078
2	2	565.0	12903	0.043788	0.029445	1.487113
3	3	507.0	12904	0.039290	0.029445	1.334350
4	4	451.0	12904	0.034950	0.029445	1.186966

The AI/ML engine uses the best features, from the feature engineering pipeline, to predict the probability scores of the churners.

RECOMMENDATIONS

- Adopt **multiclass classification**-based AI/ML model, as a variety of features are analysed to predict the churn
- Implement custom **hyperparameter tuning** before the ML process begins, as it helps in testing different configurations when training the ML model
- Implement **Kubernetes, an open-source container-orchestration system,** to automate the deployment and management of ML model

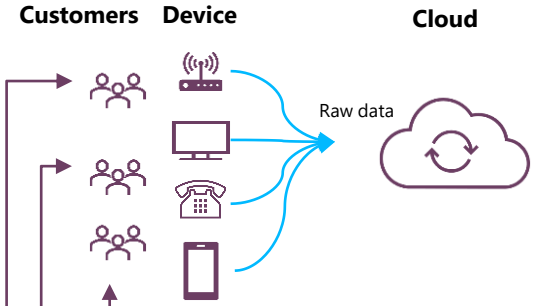
Run supervised ML algorithm on the engineered features

- Run the engineered features through three ML algorithms – i) Variance inflation factor, ii) Random forest algorithm, iii) XGBoost model
- These algorithms analyze and select the top features, which is required to predict the churn propensity and increase the uplift

BENEFITS

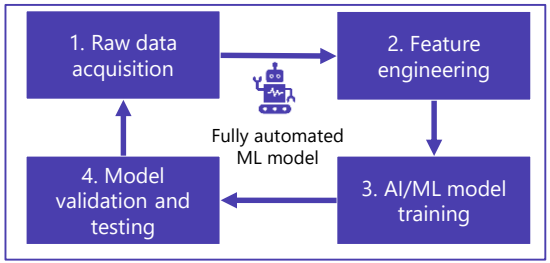
- The model sorts the probable churners into deciles, with the corresponding uplift score
- A high uplift score determines the customer's likelihood to respond to marketing campaigns

A leading DSP in the Americas implemented the ML-based uplift model to achieve excellence in targeted marketing

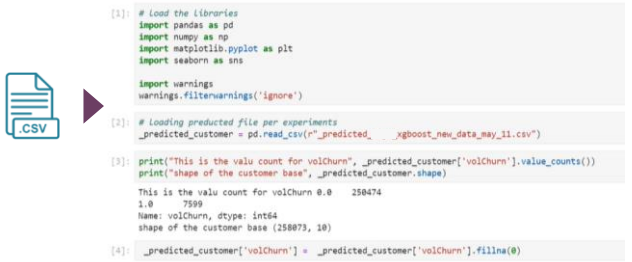


Cloud

Cloud-backend processing



The output is a .csv file which is used in the coding script to determine the churn propensity decile with uplift score



Marketing function

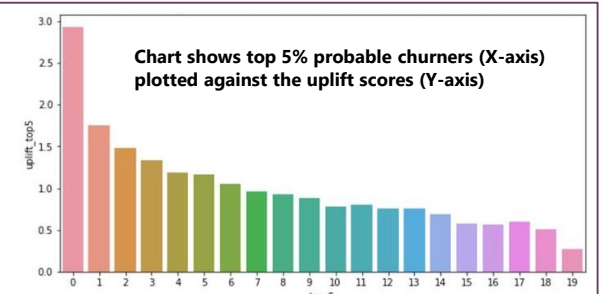
Targeted marketing

- Customer success manager
- Technical team

Output can be downloaded as an Excel spreadsheet (representative data)

Likelihood to respond to marketing campaigns	Top 5% probable churners			
	Uplift score	Customer name	Customer contact details	
			Phone no.	Email
High	2.93	Customer 1	112233445	customer1@xyz.com
High	2.93	Customer 2	112233445	customer2@xyz.com
High	2.93	Customer 3	112233445	customer3@xyz.com
Medium	1.76	Customer 4	112233445	customer4@xyz.com
Medium	1.76	Customer 5	112233445	Customer5@xyz.com
Low	1.49	Customer 6	112233445	customer6@xyz.com

Sample results



	top_5	sum_volChurn	count_volChurn	pct_volChurn_fivepct	pct_customer_base_churn	uplift_top5
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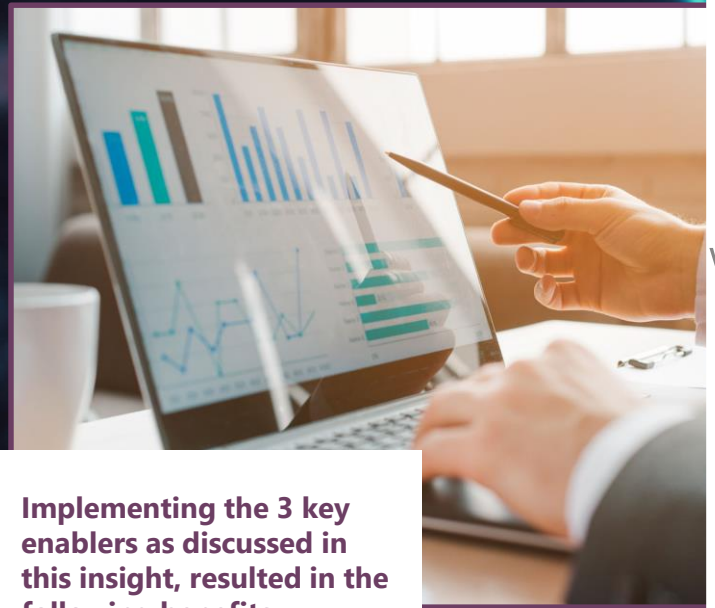
Benefits achieved by the DSP after implementing the ML-based uplift model



Implementing the 3 key enablers as discussed in this insight, resulted in the following benefits.

10%-18% increase in uplift score resulted in targeting the right set of customers, who would respond positively to the marketing campaigns

	Uplift score of top 10,000 probable churners
Traditional/manual approach	3.47
ML-based uplift modelling	4.1
% increase in uplift score	**18.2%**

Improved customer retention due to personalized marketing campaigns

Improved targeted marketing
- Increase in marketing ROI
- Reduction in time-to-market for targeted campaigns

Used Google Cloud Platform (GCP) for end-to-end execution of the ML-based uplift model, which drastically reduced the architecture setup time

THANKS!

Get in touch

USA

Prodapt North America, Inc.
Oregon: 10260 SW Greenburg Road, Portland
Phone: +1 503 636 3737

Dallas: 1333, Corporate Dr., Suite 101, Irving
Phone: +1 972 201 9009

New York: 1 Bridge Street, Irvington
Phone: +1 646 403 8161

CANADA

Prodapt Canada, Inc.
Vancouver: 777, Hornby Street,
Suite 600, BC V6Z 1S4
Phone: +1 503 210 0107

PANAMA

Prodapt Panama, Inc.
Panama Pacifico: Suite No 206, Building 3815
Phone: +1 503 636 3737

CHILE

Prodapt Chile SPA
Las Condes: Avenida Amperico Vespucio Sur 100, 11th Floor, Santiago de Chile

UK

Prodapt (UK) Limited
London: 1 Poultry, EC2R 8EJ

Reading: Suite 277, 200 Brook Drive,
Green Park, RG2 6UB
Phone: +44 (0) 11 8900 1068

IRELAND

Prodapt Ireland Limited
Dublin: Suite 3, One earlsfort centre,
lower hatch street
Phone: +44 (0) 11 8900 1068

EUROPE

Prodapt Solutions Europe &
Prodapt Consulting B.V.
Rijswijk: De Bruyn Kopsstraat 14
Phone: +31 (0) 70 4140722

Prodapt Germany GmbH
Münich: Brienner Straße 12, 80333
Phone: +31 (0) 70 4140722

Prodapt Digital Solution LLC
Zagreb: Grand Centar,
Hektorovićeva ulica 2, 10 000

Prodapt Switzerland GmbH
Zurich: Muhlebachstrasse 54,
8008 Zürich

Prodapt Austria GmbH
Vienna: Karlsplatz 3/19 1010
Phone: +31 (0) 70 4140722

Prodapt Slovakia j.s.a
Bratislava: Plynárenská 7/A, 821 09

SOUTH AFRICA

Prodapt SA (Pty) Ltd.
Johannesburg: No. 3, 3rd Avenue, Rivonia
Phone: +27 (0) 11 259 4000

INDIA

Prodapt Solutions Pvt. Ltd.
Chennai: Prince Infocity II, OMR
Phone: +91 44 4903 3000

"Chennai One" SEZ, Thoraipakkam
Phone: +91 44 4230 2300

IIT Madras Research Park II,
3rd floor, Kanagam Road, Taramani
Phone: +91 44 4903 3020

Bangalore: "CareerNet Campus"
2nd floor, No. 53, Devarabisana Halli,
Phone: +91 80 4655 7008

Hyderabad: Workafella Cyber Crown 4th Floor,
Sec II Village, HUDA Techno, Madhapur

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