



**NANYANG
TECHNOLOGICAL
UNIVERSITY**
SINGAPORE

Empowering Alumni Giving by ML-Driven Targeting

University Advancement Office

Jan 2022

Content

- What do we want to resolve?
- What is our challenge and opportunity?
- What resources do we have?
- What is our strategy?
- What is our methodology?
- What's the impact?



What do we want to resolve?

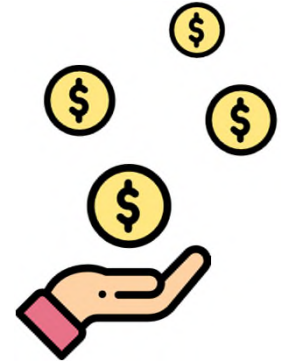


Nanyang Technological University, the world's best young universities based on QS ranking, has over 265,000 alumni.

- How to identify the right donors with potential to give from our alumni pool?



- What is the right approach to engage and cultivate the alumni?
 - Theme
 - Channel



Is this our challenge or opportunity?

– New to data-driven decision making process



From "**spray and pray**" approach being used for years since the inception of the advancement office, how to create a healthy “eco-system” for our fundraising teams to use **data-driven strategies** to plan their fundraising activities?

Is this our challenge or opportunity?

- Big data



Our two “Vs” data has been proven as the key to our success

- **Variety** - refers to the merging of several data sets, such as transaction, demographics, and campaign related data
- **Volume** - refers to the huge amount of data collected over years

However, imbalanced datasets and prolonged processing time becomes a huge challenge for the team to develop a solution that is robust and stable.

What resources do we have?

- Expertise in data science and fundraising



We gathered resources from various highly functioning teams within the University and external volunteers to help build data analytics capabilities within the University Advancement Office (NTU UAO).

- **Management Support**
Emphasis from the University Management on use of data to support fundraising decisions and strategies, and allocation of resources to start the data analytics function within NTU UAO.
- **Experts in data science**
Volunteers and NTU Alumni from Dell provided coaching to the young data analytics team in NTU UAO and help build models to study our data
- **University staff with domain knowledge**
NTU Centre of IT Service (CITS) provided infrastructure and domain knowledge support, and constructive input/feedback from NTU UAO fundraising, marketing and data teams

What is our strategy? – Robust model with seamless process



--- → **ML-powered solution to predict alumni donation probability and capacity for an appeal with specific theme and sent out via a specific channel**

- self learning capability by regularly getting live data from our CRM
- seamless process for fundraisers to use the model
 - set modelling criteria (e.g., theme, channel and segment)
 - running the model and checking performance
 - downloading model result for targeted fundraising

How do we develop our solution?



Data Preparation

- Revenue data from 1990 to Dec 2020
- 260,000 alumni data
- Status of Ability to Contact
- Appeal Mailing – selected theme activities

Modelling Process

- **Clustering by Kmode to resolve the imbalanced dataset issue**
- Featuring engineering by rolling back the alumni status (e.g., age, year after graduation) to ensure modelling accuracy
- **Feature selection by using random forest to shorten the modelling time**
- Multiple models including LightGBM were included in the modelling process, and the best model result will be selected

Setting Parameters

Allow user to set parameters to predict probability and amount based on

- Selected Theme (e.g. Seasonal Greeting)
- Selected Sub Theme (e.g. Chinese New Year)
- Time sensitivity (e.g. Seasonal Greeting)
- Sub-time sensitivity (e.g. Chinese New Year)
- Presence of token (e.g. No Token)
- Selected Channel (e.g. Phonathon, Email)
- Aggregate donation amount (e.g. Average)

Showing Output

- A list of prospects ranked by their predicted probability of donation and donation amount
- A bar chart that denotes relative importance of features in deriving the predictions
- if more than 1 channel is selected, users can choose to rank the predictions by their preferred channel type

What is our strategy? – Strategize collaboration with frontline



Collaboration and partnership with frontline teams

- **Strategically select partnership:** worked closely with Phonathon to use model results for targeting, and shared successful case to other fundraising teams
- **Steadily establish collaboration with other fundraising teams:**
 - Better Planning: help the team to firm up their fundraising plan by providing projection based on modelling results
 - Continuously improve the process for frontline users to use modelling result
 - Work closely with the frontline team to provide training and understand their pain point
 - Reviewed the result and share learning within the working group

What is the impact since the transformation started in Jan 2021?

More targeted

- 2021, **43% less appeals** have been sent out to NTU alumni, while **alumni annual participation rate y-o-y increase hit 28%**.

Improve efficiency

- In 2021, the gifts raised by Phonathon is **65% higher than the total gifts raised in 2020**, and number of donors donated via Phonathon is **45% more than the total Phonathon donors in 2020**.

Free up capacity

- With extra Phonathon and direct mail capacity, the team started a new programme to convert existing donors to recurring gift donors. After rolling out the programme for 3 months, the **monthly recurring gifts from alumni segment increased by 50%**.

Holistic Approach

- In 2021, the team initiated a few multiple channel appeals by using modelling to segment the alumni by their preferred channel.
- One of the appeals has raised **51% more gifts** than similar appeal done in 2020, with **140% increase of donors** supporting the appeal.



What is the impact for Alumni Giving Team's long term development?

Fundamentally changed our way of thinking, and the team started to adopt this three steps approach:



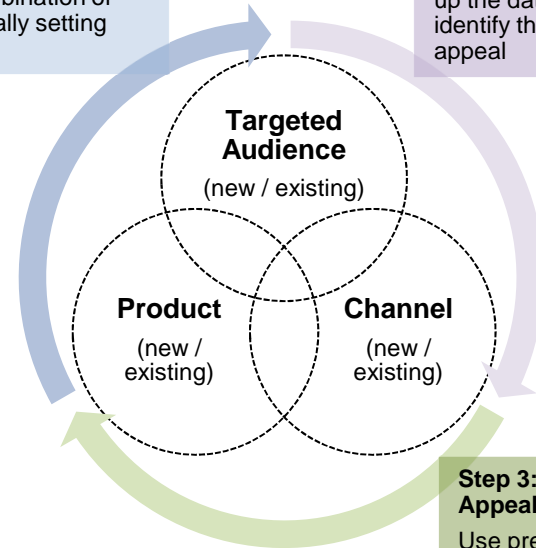
Step 1: 1st Appeal with “New element(s)”

No Restriction on Resources:
solicit the whole population

Limited Resources: sampling or identify leads by combination of modelling and manually setting criteria

Step 2: Self-learning Predictive Model

After the appeal, predictive model will automatically pick up the data and start to identify the leads for next appeal



Step 3: Subsequent Appeal with “3 Existings”

Use predictive model to identify good leads for solicitation

The goal is to transform ourselves into a highly efficient data-driven fundraising organization



WHY

should we discover high propensity prospects?

Targeting the right prospects to stretch limited marketing resources to the fullest.



WHAT

are the best fit situations for which we want to plan marketing budget?

Defining the boundaries of the problem statement to ensure concentrated efforts with high impact.



WHO

are the high propensity prospects?

High predicted probability to join the donor pool, specific to the cause and/or targeted amount.



HOW

to identify high propensity prospects?

A predictive model to generate a list of prospects based on user's input for planned appeal campaigns.



WHERE

do we invest to maximize ROI?

Target those prospects with highest probability of donating via channel of choice, thereby stretching the marketing budget.

