Engaging Senior Volunteers

LOOKING BACK, LOOKING AHEAD

Why Seniors as Volunteers?

The proportion of seniors will continue to grow as Singapore becomes a greying society

In 2018, seniors aged **65 years old and above make up 14% of the total population** in Singapore.[1]

In 2030, this segment will make up **1 in 4 of the population,** or a growth of about 80%.[2]

[1] Source: Singapore Department of Statistics (2018). Retrieved 04 April 2019
[2] Source: National Population and Talent Division (2016). Population.SG. Retrieved 04 April 2019
Photo credit: MediaCorp
INDIVIDUAL GIVING STUDY 2018 – SILVER V STUDY
©2018, NATIONAL VOLUNTEER & PHILANTHROPY CENTRE, ALL RIGHTS RESERVED
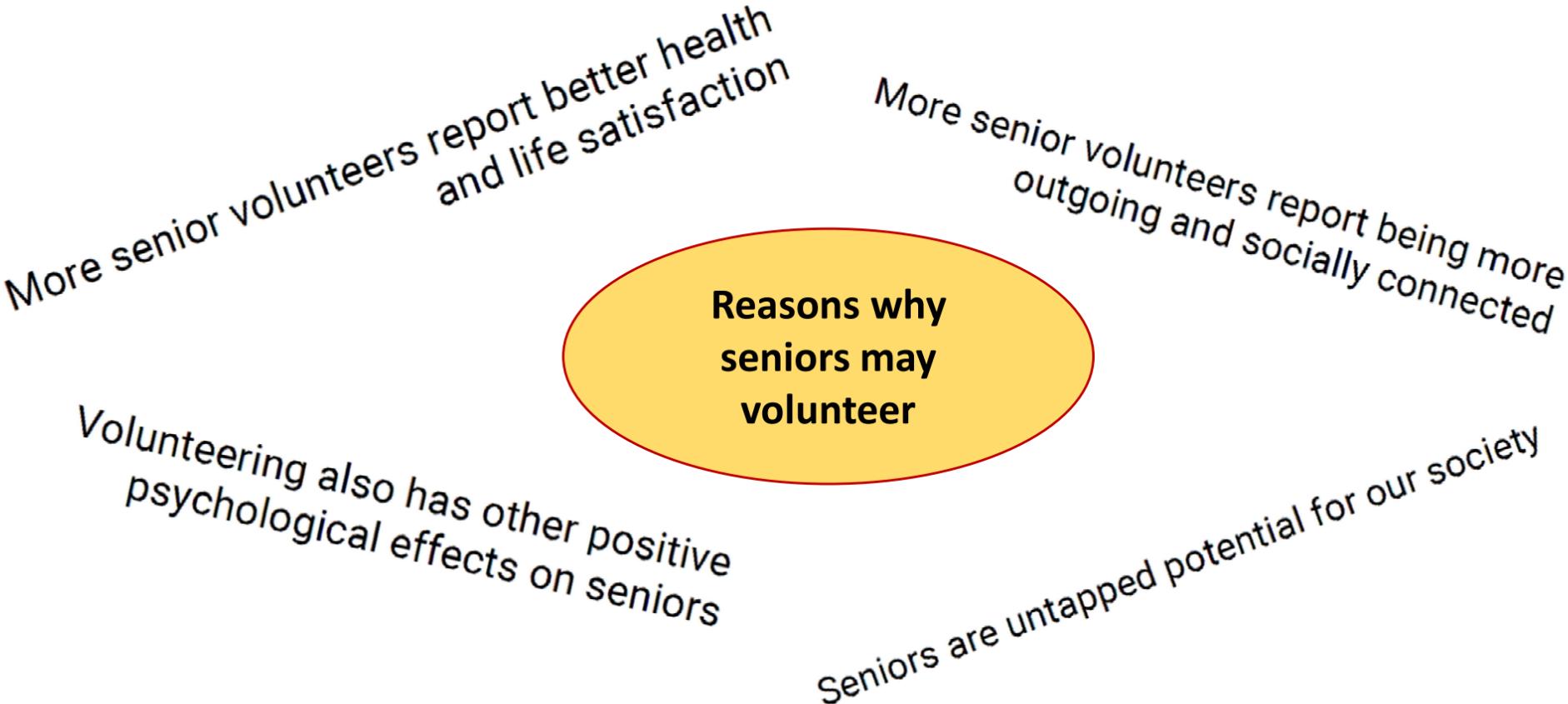
62% HEALTH	51% FAMILY COMMITMENTS	37% LIVE A RELAXING LIFE	31% WORRY-FREE RETIREMENT	30% FINANCIAL SECURITY
25% MOBILITY	20% RELIGION/ SPIRITUALITY	17% STAYING EMPLOYED	16% MAINTAIN CURRENT FRIENDSHIPS	12% CONTRIBUTE TO SOCIETY

*Reference: **Empowering Seniors Through Volunteerism***
Individual Giving Study 2018 –Silver V Study
Updated 14 September 2019

What seniors are looking for?

More senior volunteers report better health and life satisfaction

More senior volunteers report being more outgoing and socially connected

Reasons why seniors may volunteer

Volunteering also has other positive psychological effects on seniors

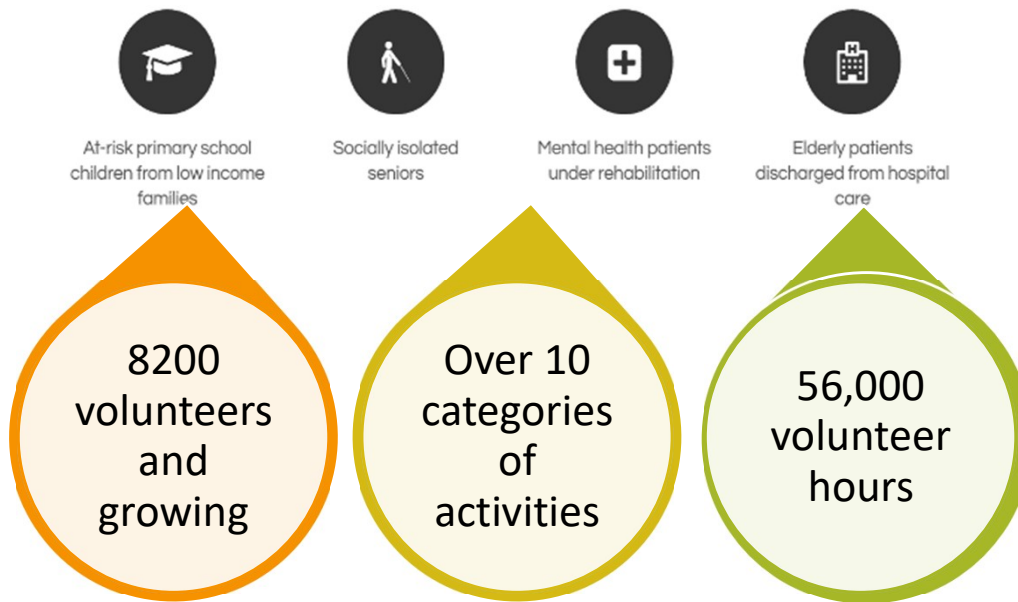Seniors are untapped potential for our society

Dataset

- Volunteer registration data details – excel sheet

- Volunteer activity data details (2015-2019 (till Oct 2019)) – excel sheet

- Inputs from organization providing datasets and working with senior volunteers
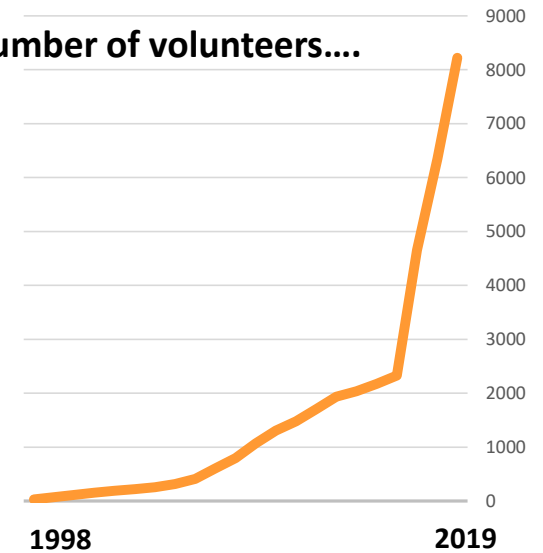
Issues to resolve /Problem statement

- Profile of volunteers

- What activities are these volunteers most involved in? (Comparison of numbers)

- Clustering of volunteers – based on activity /profile

- Recommendations:

  - Information for organization for planning of future activities
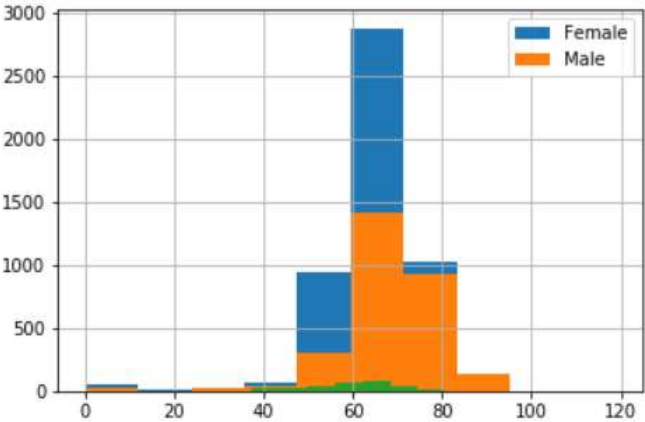
Current statistics

At-risk primary school children from low income families

Socially isolated seniors

Mental health patients under rehabilitation

Elderly patients discharged from hospital care

8200 volunteers and growing

Over 10 categories of activities

56,000 volunteer hours

Growing number of volunteers....

9000
8000
7000
6000
5000
4000
3000
2000
1000
0

1998   2019

.... living all over the island

(graphics are based on details available in dataset)

Volunteer activities in hours (2015-2019)

Gender-age mix of volunteers (2019)

Volunteer profile (as at Oct 2019)
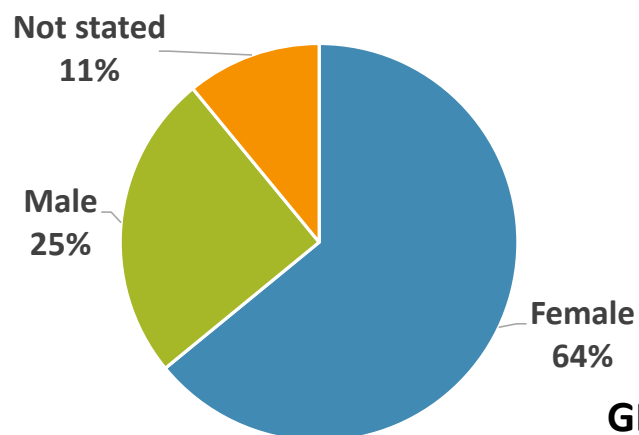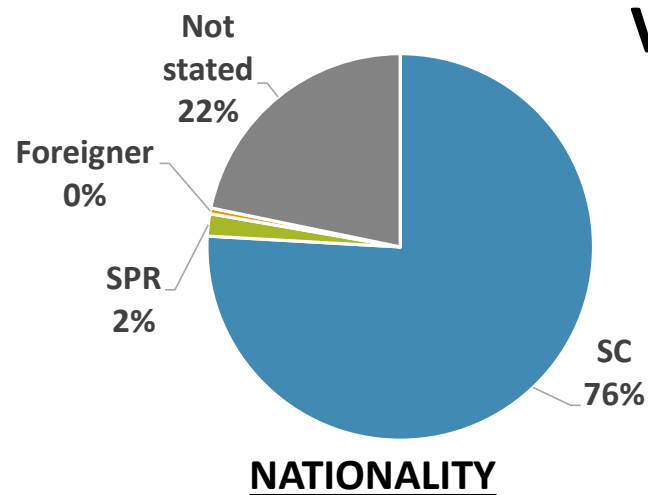## (based on the available info on gender, race and nationality)
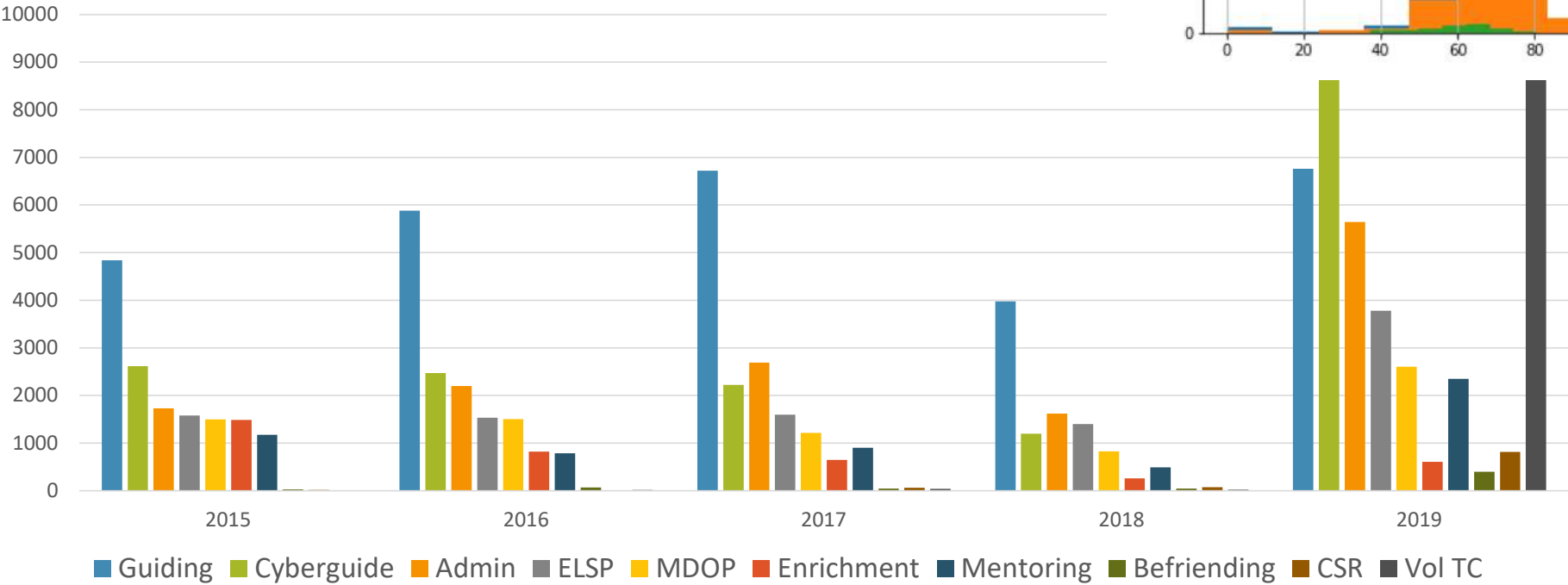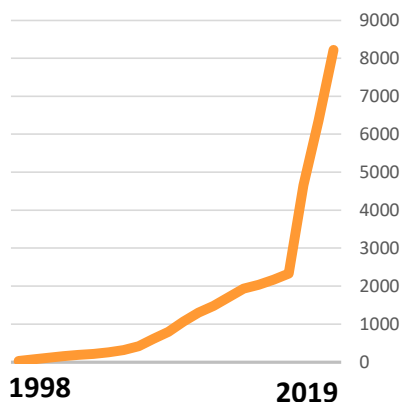
Recent years have seen rapid increase in signing up of volunteers
2017: 2327 pax
2018: 1694 pax
2019: 1876 pax (till Oct 2019)

1998   2019

NATIONALITY

Not stated 22%
Foreigner 0%
SPR 2%
SC 76%

GENDER

Not stated 11%
Male 25%
Female 64%

RACE

Others 1%
Eurasian 0%
Malay 1%
Indian 2%
Not stated 39%
Chinese 57%
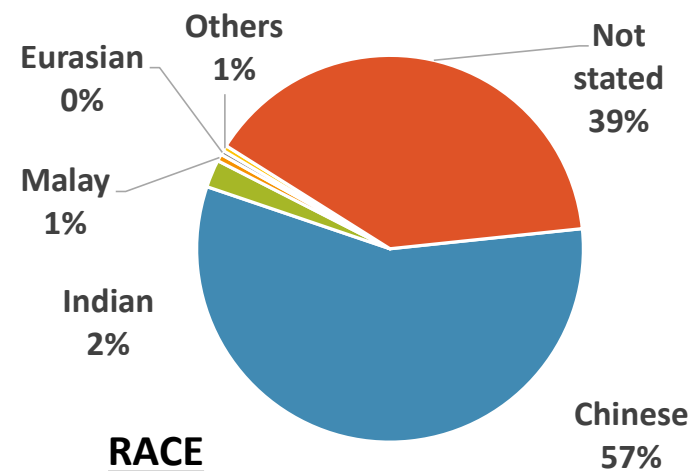
Volunteer clusters defined by K-means clustering (2015-2019)

	2015	2016	2017	2018	2019
All_rounders	441	3	502	424	960
Volunteer_at_leisure	105	399	11	100	2095
Cyberchamps	44	88	1	3	318
Guide_leads	4	113	93	27	19
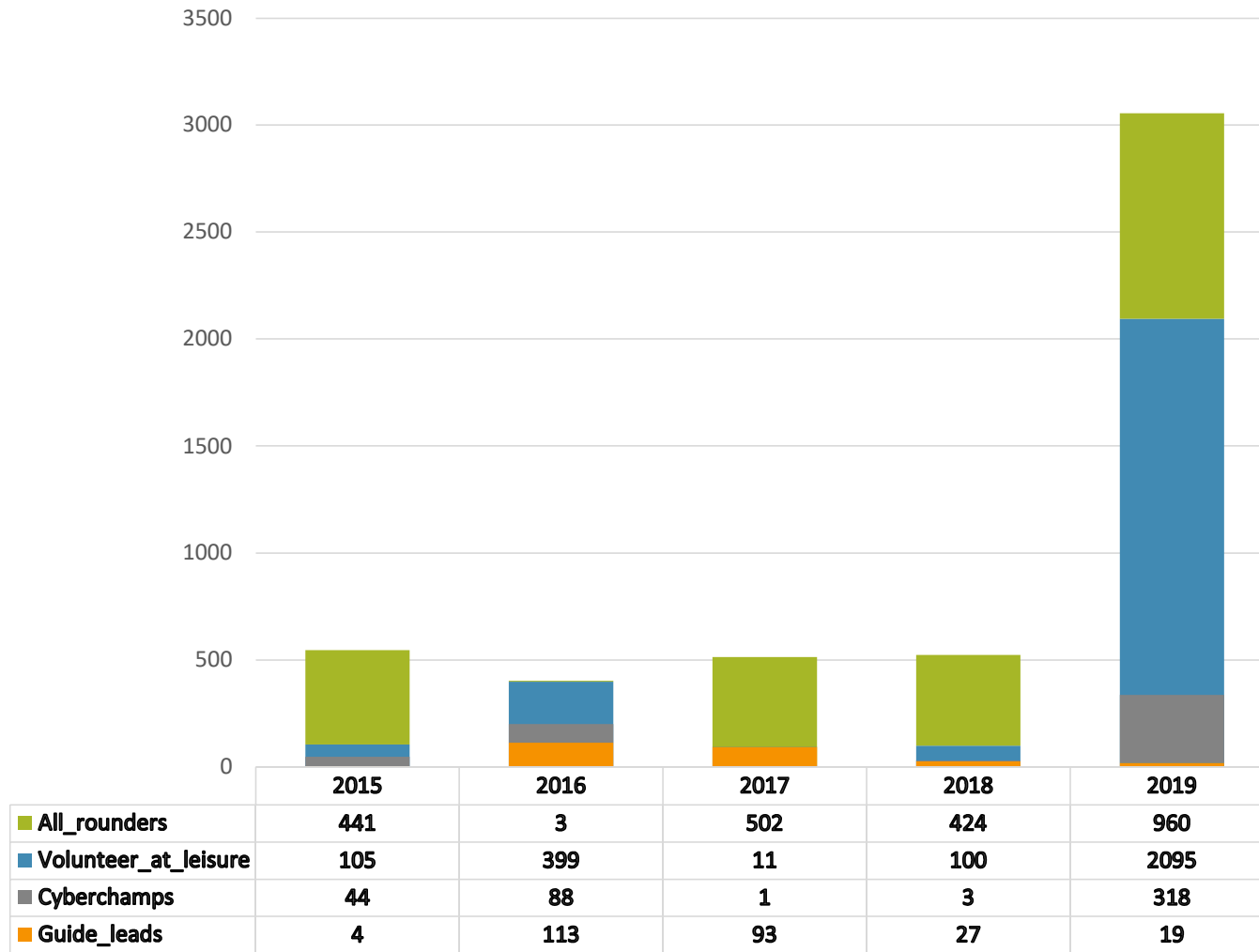
Note:
2017:
- Volunteer_at_leisure category is replaced with 'Enriched'

2018:
- 'Cyberchamps' category is replaced with 'MDOP_champs'

2019:
- Volunteer_at_leisure category is replaced with 'Volunteer_at_leisure 2.5 hrs'
- 'All-rounders' category is replaced with 'Volunteer_at_leisure 14hrs'

Typical activity groups of volunteers identified by algorithm

CYBERCHAMPS
- Conduct and participate in cyberguide and other IT programmes (50% of total time)
- Also assist with admin work (mostly submissions for skillsfuture credits)

GUIDE_LEADS
- Primarily involved in guiding at various locations
- Also observed to volunteer as cyberguide

ALLROUNDERS
- Involved in various activities, including guiding, MDOP, mentoring, ELSP.

VOLUNTEER_AT_LEISURE
- Attend one or two events in a year, typically about 3-14 hours

MDOP_CHAMPS
- In 2018, there were 3 volunteers who had spent a large amount of time (over 700hours) in MDOP.

Volunteer activities through the years – 2015 -2019

Year-wise details of volunteer involvement follows …..

Volunteer activities

Legend:
- admin
- befriending
- csr
- cyberguide
- elsp
- enrichment
- guiding
- mdop
- mentoring
- vlc

Cluster	#
Volunteer_at_leisure	399
Guide_leads	113
Cyberchamps	88
All-rounders	3
Total	**603**

Administrative work

Enriching Lives of Seniors Programme

Senior Guiding programme

Mentally Disadvantaged Outreach Programme

Mentoring programme

Volunteer Learning Centre

Cyberguide programme

Enrichment activities

Corporate Social Responsibility activities

Befriending Programme

Volunteering in 2015

Volunteer activities

Legend:
- admin
- befriending
- csr
- cyberguide
- elsp
- enrichment
- guiding
- mdop
- mentoring
- vlc

Guide_leads

Cyberchamps

Volunteer at_leisure

All-rounders

Cluster	#
All-rounders	441
Volunteer_at_leisure	105
Cyberchamps	44
Guide_leads	4
Total	**594**

Volunteering in 2016

Administrative work

Enriching Lives of Seniors Programme

Senior Guiding programme

Mentally Disadvantaged Outreach Programme
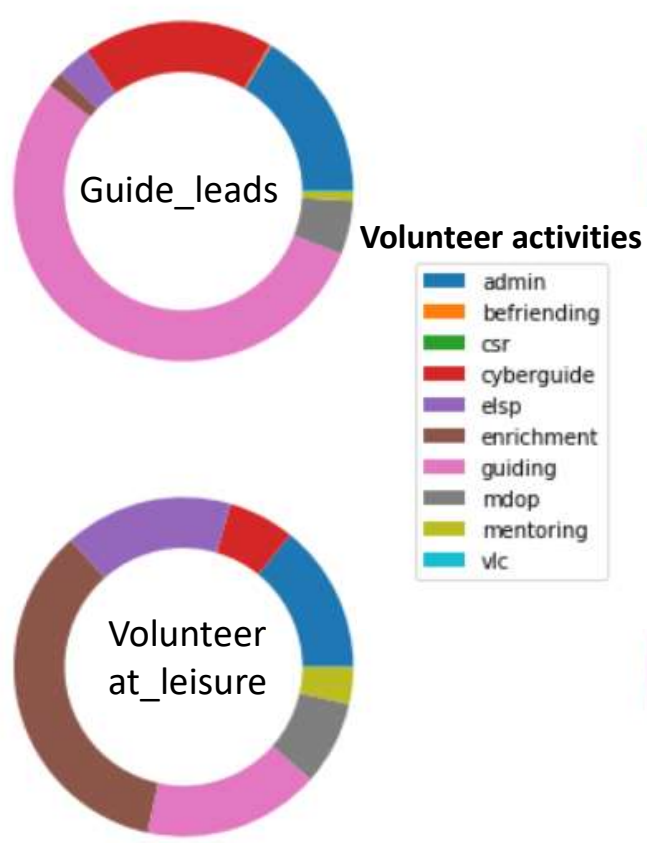
Mentoring programme

Volunteer Learning Centre

Cyberguide programme

Enrichment activities

Corporate Social Responsibility activities

Befriending Programme

Volunteer activities

Cluster	#
All-rounders	502
Guide_leads	93
Enriched	11
Cyberchamps	1
Total	**607**

Volunteering in 2017

Administrative work

Enriching Lives of Seniors Programme

Senior Guiding programme

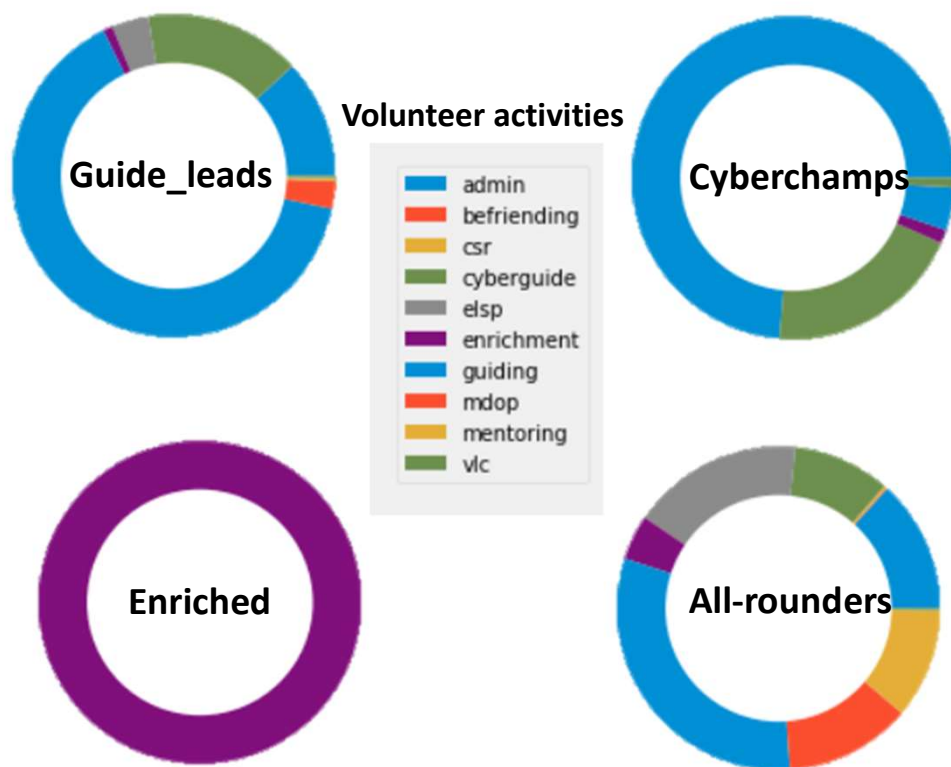Mentally Disadvantaged Outreach Programme

Mentoring programme

Volunteer Learning Centre

Cyberguide programme

Enrichment activities

Corporate Social Responsibility activities

Befriending Programme

Volunteer activities

Legend:
- admin
- befriending
- csr
- cyberguide
- elsp
- enrichment
- guiding
- mdop
- mentoring
- vlc

Charts: Guide_leads, MDOP_champs, Volunteer at_leisure, All-rounders

Cluster	#
All-rounders	424
Volunteer_at_leisure	100
Guide_leads	27
MDOP_champs	3
Total	**554**

MDOP_champs: In 2018, there were 3 volunteers who had spent a large amount of time (over 700hours) in MDOP

Volunteering in 2018

Administrative work

Enriching Lives of Seniors Programme

Senior Guiding programme

Mentally Disadvantaged Outreach Programme
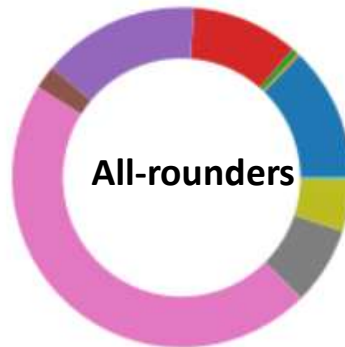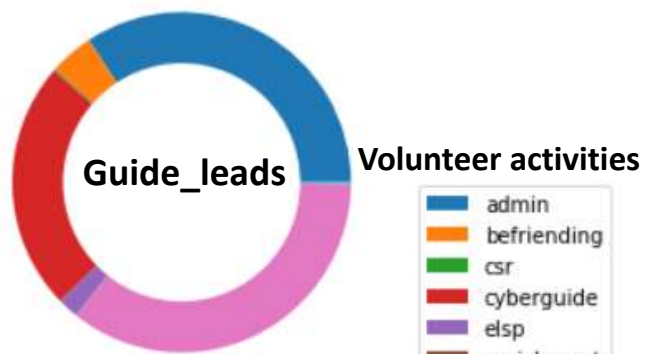
Mentoring programme

Volunteer Learning Centre

Cyberguide programme

Enrichment activities

Corporate Social Responsibility activities

Befriending Programme

Volunteer activities

Guide_leads

Cyberchamps

Volunteer at_leisure 2.5hrs

All_rounders

Legend:
- admin
- befriending
- csr
- cyberguide
- elsp
- enrichment
- guiding
- mdop
- mentoring
- vlc

Cluster	#
Volunteer_at_leisure 2.5hrs	2095
All_rounders	960
Cyberchamps	318
Guide_leads	19
Total	**3392**

Volunteering in 2019 (Jan - Oct)

Administrative work

Enriching Lives of Seniors Programme

Senior Guiding programme

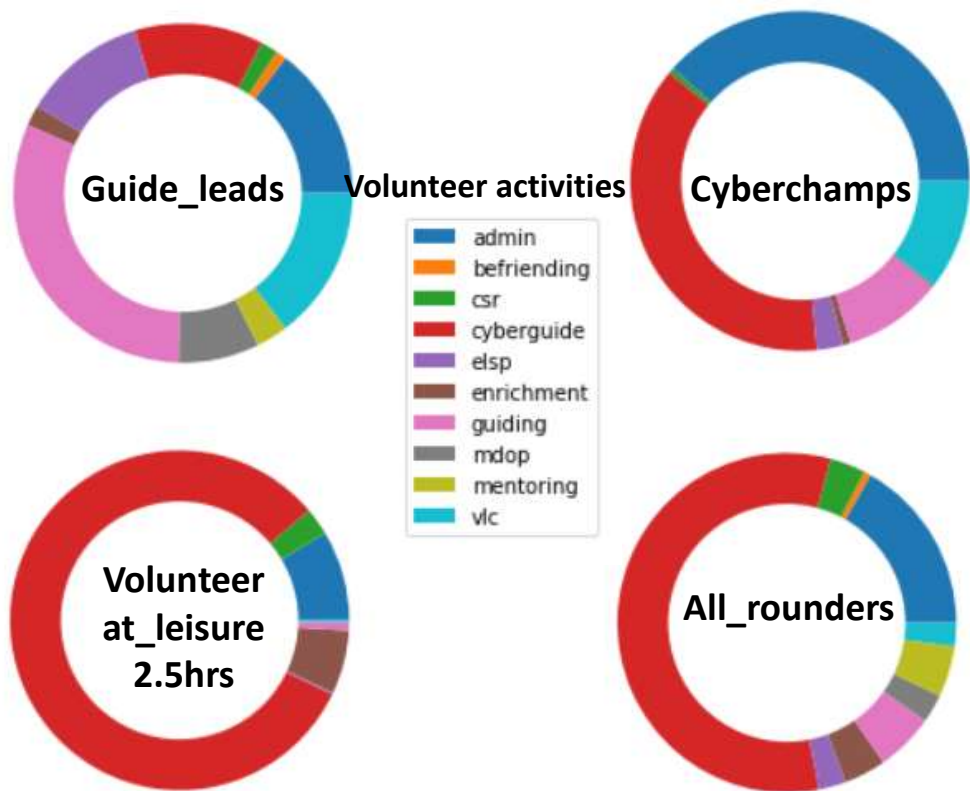Mentally Disadvantaged Outreach Programme

Mentoring programme

Volunteer Learning Centre

Cyberguide programme

Enrichment activities

Corporate Social Responsibility activities
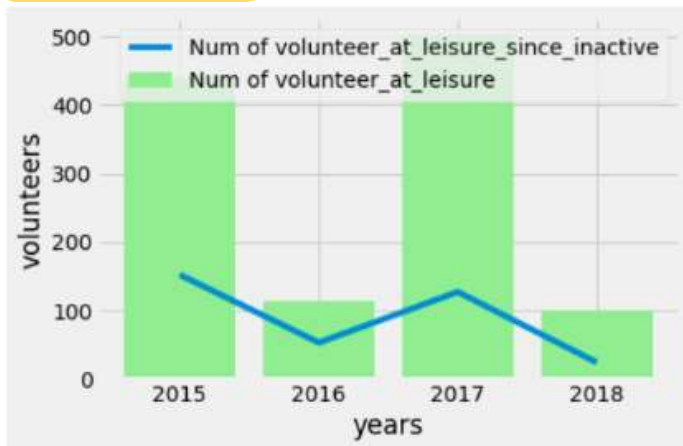
Befriending Programme

Volunteer_at_leisure category tends to become inactive in later years?

Are volunteers engaged in activities more frequently through the years?

3123 volunteers increased frequency of participation in activities

333 volunteers reduced increased frequency of participation in activities

Do volunteers take up activities in more categories over the years?

3059 volunteers took up activities in new categories they had not done earlier

292 volunteers reduced the number of categories they contributed in

Answering more questions on volunteer activities

Moving ahead ….

With sudden increase in number of volunteers (over 250%), the organisation needs to reassess its operations and activities to engage all volunteers.

253%

Recommendations:

- **Range of activities to increase to engage volunteers** and prevent dropout - traditionally this has been about 25%

- **Volunteers with professional skills can be engaged in new programmes** for eg. As Mentors for tertiary students in industry specific projects

- **Localised volunteering opportunities within neighbourhood** may receive higher response …. Can develop app where senior can input his postal code and find volunteering opportunities nearby

- **Support other smaller Social Service Agencies** who have needs for volunteers

- Innovative programmes based on **feedback from existing volunteers**

Limitations of the study:

- No health information available – can use to assess suitability of activities for those with impairments

- Feedback from existing volunteers not included – will be useful to study how programmes can be revitalised, identify any trainings needed

- Available data set had missing values / varied formats of dataset

- Volunteer activity of individuals may not be the complete picture - members maybe engaged in other organisations / doing volunteering on their personal initiative
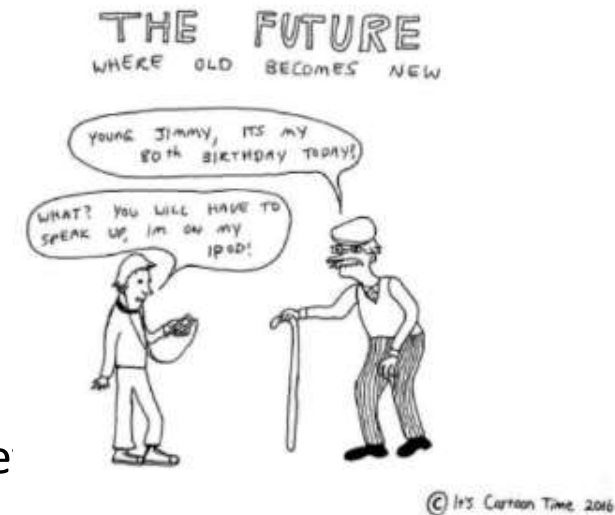
References used for project

Reference:
Understanding the Quality of Life of Seniors
Conducted by NCSS, 2017

TRANSLATING IDEAS TO ACTION		
SOCIAL SUPPORT & INCLUSION	**OPPORTUNITY**	**PERSONAL POTENTIAL**
Work towards full and effective participation and inclusion of seniors in society	Improve availability and access to resources and opportunities for seniors	Improve seniors' physical and mental well-being so that they can achieve their personal potential
Expand Pre-Seniors' ability to make choices and decisions in the services they receive	Improve access to mental health and disability support systems	Change Pre-Seniors' attitudes towards death and dying
	Cater services/initiatives to help seniors be more independent and self-reliant	Support females in the ageing process, particularly in maintaining their sense of independence as well as physical and psychological well-being
	Promote access to sports and recreation activities as well as other preventive measures	
Understand needs in a more holistic manner		
Nurture age-friendly workplaces and employ Pre-Seniors and Seniors who are able and wish to work		
Improve seniors' feelings of love and companionship as well as their ability to cope with sensory loss		
Advocate senior volunteerism		

	Volunteer Opportunities Interested In	All senior volunteers (Aged 50+)	Senior volunteers aged 50-64	Senior volunteers aged 65+
1	Located in my neighbourhood	47%	49%	39%
2	Is aligned with my hobbies/interests	34%	34%	32%
3	Allows me to learn a new skill so that I can volunteer with this new skill in future	32%	37%	16%
4	Task-based and can be done within a short period of time remotely	31%	35%	20%
5	Provides reimbursement for transport or meal	24%	24%	25%
6	Is part of my full-time job where my company allocates an agreed proportion of time (e.g. 3 hours per work week)	16%	21%	4%
7	Pays me a token salary	5%	5%	7%
8	Allows me to earn points for the time I spent volunteering so that I can exchange for service(s) I need in the future	3%	3%	2%
9	None of the above	26%	23%	37%

Reference:
Empowering Seniors Through Volunteerism
Conducted by NVPC
Updated 14 September 2019

Technical details of project

Objectives of project – as shared by client organisation during discussion

Interested in knowing how the programmes have been doing in terms of attendance

Profile of volunteers

Number of active and passive volunteers

How to engage volunteers – look into interests, languages, educational background

Any other information that can help with strategic planning of organisation

Data

Activity and volunteer data from a Social Service Agency working with Senior Volunteers

```
df_volunteer.shape
```

```
(8284, 23)
```

Activity data for years 2015, 2016, 2017, 2018

```
df_activity_1516.shape, df_activity_17.shape, df_activity_18.shape
```

```
((30245, 13), (16144, 11), (10010, 11))
```

Challenges:
- Sparse database with very few complete lines of data – needed to 'compute' for null values – eg. Spoken languages → Race
- Unknown and NotStated has been used to populate null values
- Misclassification of activities – hence need to redo

Project process

EDA
- Cleaning
- Preprocessing
- Refining of data for modelling

Modelling /Visualisation
- Prediction – Logistic Regression, Decision Tree
- Clustering
- Visualisation

Learning more from data
- Other questions on volunteer profile
- Work on questions arising from clusters

Wordcloud of interests of volunteers

5897 new volunteers since 2017

42   60   238   134   1876

New programmes on computers and use of skills future to pay for the courses encouraged more to sign up as volunteers

Logistic Regression and Decision Tree models
- classification models to predict if incoming volunteers will be active
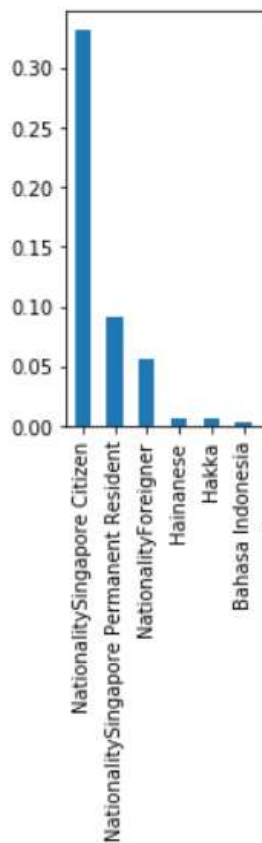

```
True Negatives: 380
False Positives: 89
False Negatives: 25
True Positives: 1563
Training score: 0.9443994164370239
Test score: 0.944093339815265
MSE: 0.05542051531356344
```
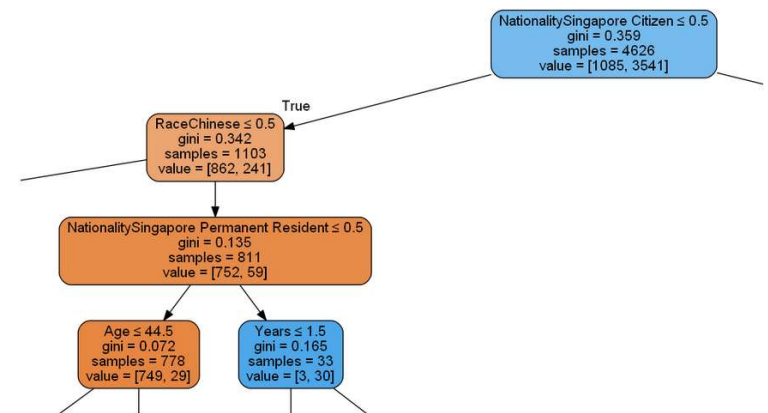
Logistic model

```
Score on training set: 0.95639487761387
Score on test set: 0.9431210500729217
True Negatives: 423
False Positives: 46
False Negatives: 17
True Positives: 1571
```

NationalitySingapore Citizen ≤ 0.5
gini = 0.359
samples = 4626
value = [1085, 3541]

True

RaceChinese ≤ 0.5
gini = 0.342
samples = 1103
value = [862, 241]

NationalitySingapore Permanent Resident ≤ 0.5
gini = 0.135
samples = 811
value = [752, 59]

Age ≤ 44.5
gini = 0.072
samples = 778
value = [749, 29]

Years ≤ 1.5
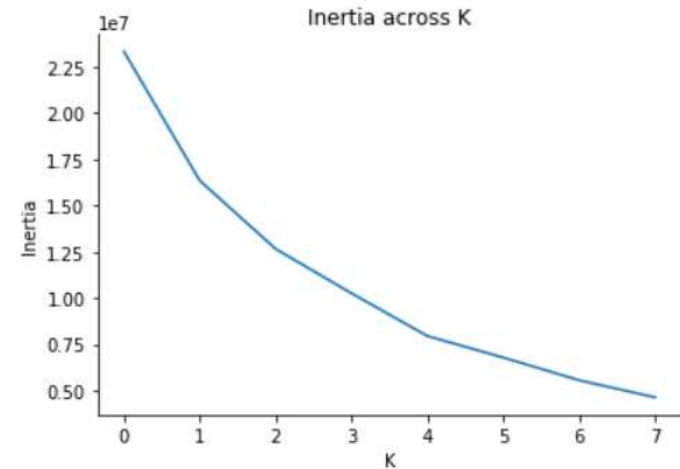gini = 0.165
samples = 33
value = [3, 30]

Decision Tree model

K means clustering
- to determine number of clusters

- Elbow diagram does not show a clear change in angle to indicate cluster numbers to be adopted.
- Comparing the silhouette scores for number of clusters 2 to 6
  - For n_clusters = 2 The average silhouette_score is : 0.7811572899876081
  - For n_clusters = 3 The average silhouette_score is : 0.5133756703092552
  - For n_clusters = 4 The average silhouette_score is : 0.531319966290713
  - For n_clusters = 5 The average silhouette_score is : 0.47432950272376223
  - For n_clusters = 6 The average silhouette_score is : 0.48321883674798555
- taking an optimum number of 4 clusters since after n_clusters=4 the change in silhouette score is minimal

Volunteer clustering
– K means clustering model

cluster	0	1	2	3
admin	5.377551	0.700000	604.937500	57.454545
befriending	0.178005	0.000000	0.000000	0.000000
csr	0.051020	0.011905	0.000000	0.000000
cyberguide	8.340136	0.361905	594.875000	84.534091
elsp	9.923469	0.304762	12.250000	13.511364
enrichment	8.086168	3.138095	25.500000	14.534091
guiding	22.848828	0.228571	0.000000	170.409091
mdop	9.043084	0.123810	0.000000	24.579545
mentoring	7.954649	0.066667	0.000000	7.909091
vlc	0.009070	0.000000	0.000000	0.000000
hours_sum	71.811980	4.935714	1237.562500	372.931818
attend_num	21.900227	1.342857	264.500000	107.522727
ave_days_betn_activity	35.615659	302.428571	1.452732	3.921516
Age	68.956916	71.752381	73.523048	72.363636
Years	7.943311	8.638095	11.500000	10.545455
Gender_Female	0.682540	0.809524	0.750000	0.659091
Gender_Male	0.312925	0.190476	0.250000	0.340909
Gender_NotStated	0.004535	0.000000	0.000000	0.000000

2015

cluster	0	1	2	3
admin	7.718274	65.960526	1.281879	508.833333
befriending	0.390863	0.771930	0.000000	0.000000
cyberguide	7.972081	69.543860	0.684564	629.333333
elsp	10.308376	13.947368	0.906040	0.000000
enrichment	3.805838	5.859649	2.577181	22.166667
guiding	27.964890	178.798246	0.765101	0.000000
mdop	10.296954	16.947368	0.365772	0.000000
mentoring	5.799492	2.473684	0.241611	0.000000
vlc	0.098985	0.105263	0.020134	0.000000
hours_sum	74.355753	354.407895	6.842282	1160.333333
attend_num	22.657360	103.087719	1.919463	224.666667
ave_days_betn_activity	30.868024	4.070584	225.369128	1.709189
Age	68.530457	71.070175	69.563758	71.030731
Years	7.154822	8.736842	7.765101	11.333333
Gender_Female	0.664975	0.666667	0.691275	0.666667
Gender_Male	0.332487	0.333333	0.308725	0.333333
Gender_NotStated	0.002538	0.000000	0.000000	0.000000

2016

cluster	0	1	2	3
admin	47.199468	0.702479	7.187643	508.833333
befriending	0.468085	0.000000	0.352403	0.000000
cyberguide	54.781915	0.314050	5.856979	629.333333
elsp	9.957447	0.719008	10.399314	0.000000
enrichment	4.186170	1.917355	3.837529	22.166667
guiding	159.175532	0.966942	17.080473	0.000000
mdop	14.122340	0.396694	8.819222	0.000000
mentoring	2.297872	0.272727	5.407323	0.000000
vlc	0.127660	0.024793	0.102975	0.000000
hours_sum	292.316489	5.314050	59.043860	1160.333333
attend_num	84.414894	1.586777	18.315789	224.666667
ave_days_betn_activity	5.268760	256.404959	41.479529	1.709189
Age_x	70.265957	69.314050	68.405034	71.030731
Years_x	7.861702	7.570248	7.059497	11.333333
Gender_Female	0.659574	0.694215	0.656751	0.666667
Gender_Male	0.319149	0.305785	0.343249	0.333333
Gender_NotStated	0.021277	0.000000	0.000000	0.000000
Age_y	70.265957	69.314050	68.405034	71.030731
Years_y	7.861702	7.570248	7.059497	11.333333
Gender_Female	0.659574	0.694215	0.656751	0.666667
Gender_Male	0.319149	0.305785	0.343249	0.333333
Gender_NotStated	0.021277	0.000000	0.000000	0.000000

2017

Hierarchical cluster model
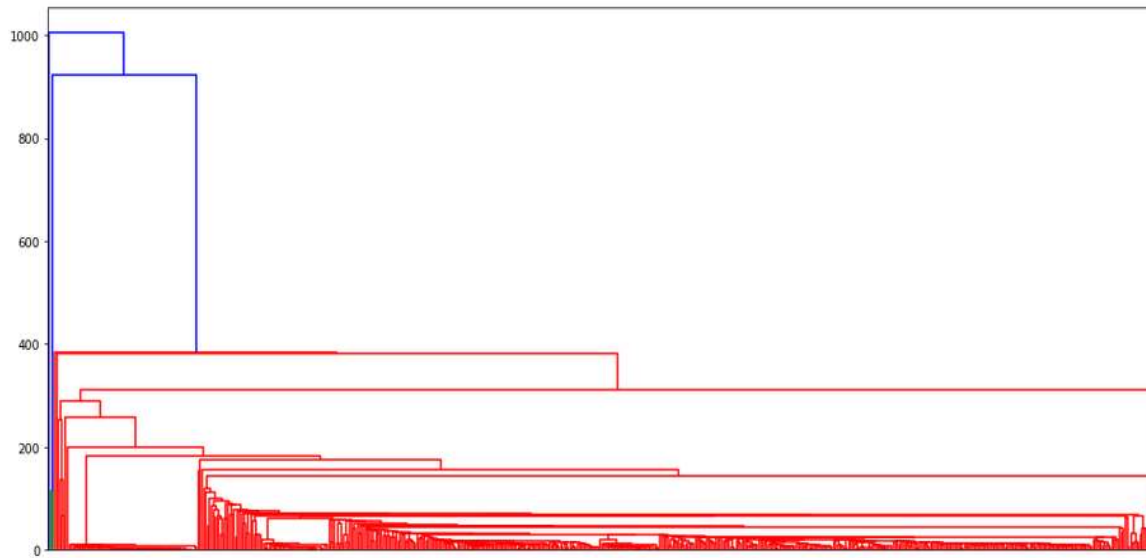
Work in progress

Hierarchical model
- **Creation of clusters?**
- **Characteristics of clusters?**

Visualisation

Distinctive clusters of volunteers

- ave age of volunteers in 68 - 74 years

  - Guide and befriend: frequent volunteer volunteers average hours
              is 372.93 hours, activities involved is guiding (170.4 hrs),
              cyberguide(52.2hrs) and admin (57.5 hrs).
  - Volunteer-at-leisure: volunteers about 5 hours in a year, maybe one event
  - Cyber champs: volunteers average 1237.6 hrs,
              activities cyberguide (594.9hrs) and admin (604.9hrs).
  - All rounders : volunteers involved in multiple activities
              average hours 71.8hrs,
              activities guiding(22.8hrs), elsp(9.9hrs), mdop(9hrs),
              mentoring(8hrs).

- 'Cyber champs' and 'Guide and Befriend' volunteers have been volunteering for over 10 years. 'All rounders' and 'Volunteer-at-leisure' have bene volunteering for less than 10 years

GROWING OLD IS MANDATORY, BUT GROWING UP IS OPTIONAL

WALT DISNEY