



Exploring **coop** with Data

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SCC 460, 1st Dec 2019

360Giving & their Brief

360Giving's vision

for UK grantmaking to be more informed, effective & strategic

Our project brief

better understand data in the 360 giving database 'Grant Nav'

Motivation

- limited data literacy amongst some publishers, funders, grant recipients
- use skilled data analysis techniques to gain new insights
- intended audience - 360Giving, funders & recipients

348K
grants

198K
recipients

115
funders



Case Study on The Co-operative Group “The Co-op”

GRANTS MADE BY

Co-operative Group between 2017 and 2018

12,021
GRANTS

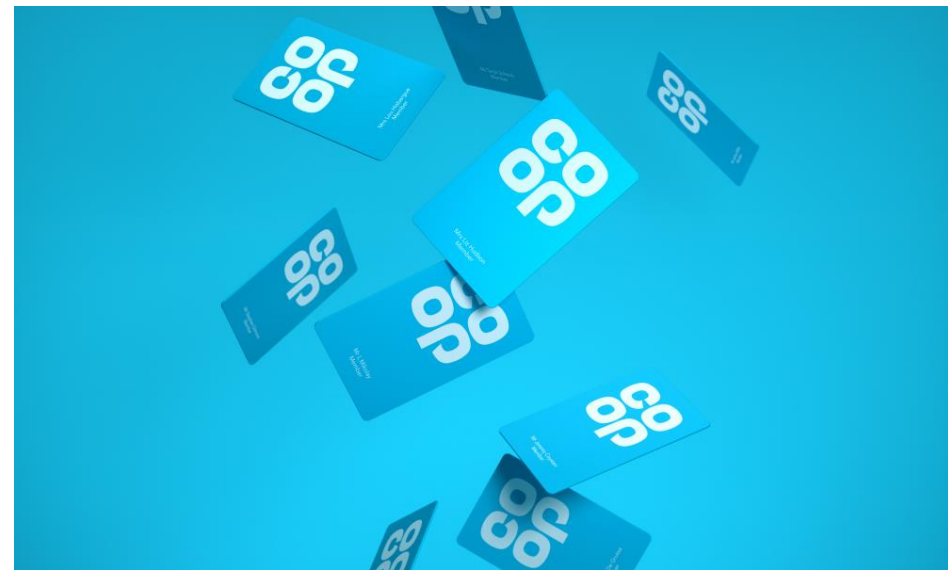
9,875
RECIPIENTS

£38.9
MILLION
TOTAL

£2.6
THOUSAND
(AVERAGE* GRANT)

Co-op funding

- 1% of products and service bought by members are allocated to local communities
- 4,000 local causes to choose from



From the 360Giving data registry

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<https://insights.threesixtygiving.org/file/a002400000qzkbKAAQ>

Research Strategy & Project Plan

Framing the Research Emma

- **Framing the research:**
Motivation: Improving data insights
Research opportunity
Identify gaps in knowledge



- **Define Research Questions:**
Focus on themes/topics and geography variations



- **Choose Research Method**



Data Processing Harry, Beth

- **Collecting Data**
360Giving



- **Data Processing**
Pre-processing
ML Labeling
Integration



Results Analysis Ravisha, Bogong, Zheng

- **Data Analysis**
visualization



- **Analysis of results**



- **Next Steps**
Further ML training
More analysis based on labelling

Research Questions

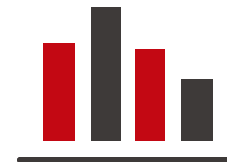
- What themes of grants are awarded by The Co-op?



- Where are the local causes located? Is there correlation between themes and locations?



- Is there any geographical variation in the amount awarded to recipients based on theme?



Data Processing

Tools

- R packages:
PostcodeioR
tidyverse



- Google Cloud Natural
Language API & Python



- Power BI



Data Flow

Raw Data



Cleaned Data



Labelled Data



Visualisation

Process

• Data Cleansing & Feature Selection

- Remove redundant columns/rows
- Convert postcodes to region, county, country and latitude & longitude data

• Labelling the Data

- Labelling the data allows us to categorize the grants into themes, for further analysis
- Python code to run the data to Google's API

Labelling/Categorization of Grants

Part 1

Step 1

Concatenate title, description and recipient name columns of each grant

	A	B	C	D
1		i.Identifier	Title	Description
2	1	360G-COOPGROUP-11483	Grant to Friends of Castle Park Primary School	We want to purchase a secure outdoor classroom for the scho
3	2	360G-COOPGROUP-11488	Grant to Friends of West Wimbledon	Funds will help us develop the playground area to include a se
4	3	360G-COOPGROUP-11490	Grant to Laira Greenshoots Community Forum	We want to buy new playground equipment and playground p
5	4	360G-COOPGROUP-11494	Grant to High Five	We want to provide social activities for disabled children and t
6	5	360G-COOPGROUP-11501	Grant to Rose Green Infant School PTA	We want to replace old and tired white boards with new inter
7	6	360G-COOPGROUP-11503	Grant to Children and Families in Grief Ltd	We want to give bereavement counselling and support to child
8	7	360G-COOPGROUP-11507	Grant to 1st Aberchirder guides	We would like take the girls on a trip to PGL Adventure Centre
9	8	360G-COOPGROUP-11510	Grant to Kirkwood Hospice	Money would go towards providing world class specialist care
10	9	360G-COOPGROUP-11517	Grant to Arthur Rank Hospice Charity	We want to buy specialist equipment, including chair clings an

Step 2

Categorise grants using the Google Cloud Natural Language API



Google Cloud Platform



Step 3

Save labelled results to BigQuery database and export to CSV for analysis



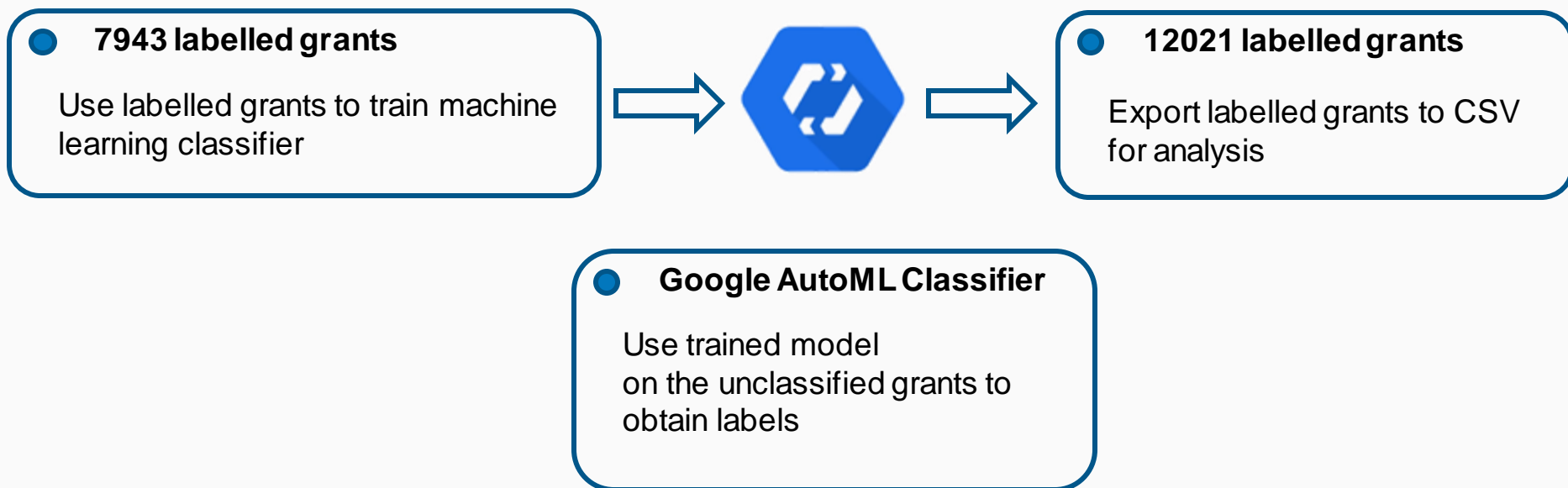
Google
BigQuery

Labelling/Categorization of Grants

Part 2

After categorising **12021** grants, **7943** were given a category, **4078** were unclassified.

Using **Google AutoML**, we can train a supervised classifier on our labelled grants to label the **4078** unclassified grants.



Trained Classifier for Unlabelled Data

Part 3



Cloud

grant_data_model



Average precision ?
0.873

Precision 82.78% ?

Recall 78.5% ?

Precision and recall are based on a score threshold of 0.5.

:

Precision of 83%
Recall of 79%

Overall, classifier returned more correct classifications than incorrect ones on the testing set

88% of Health grants in the test set were **correctly** classified

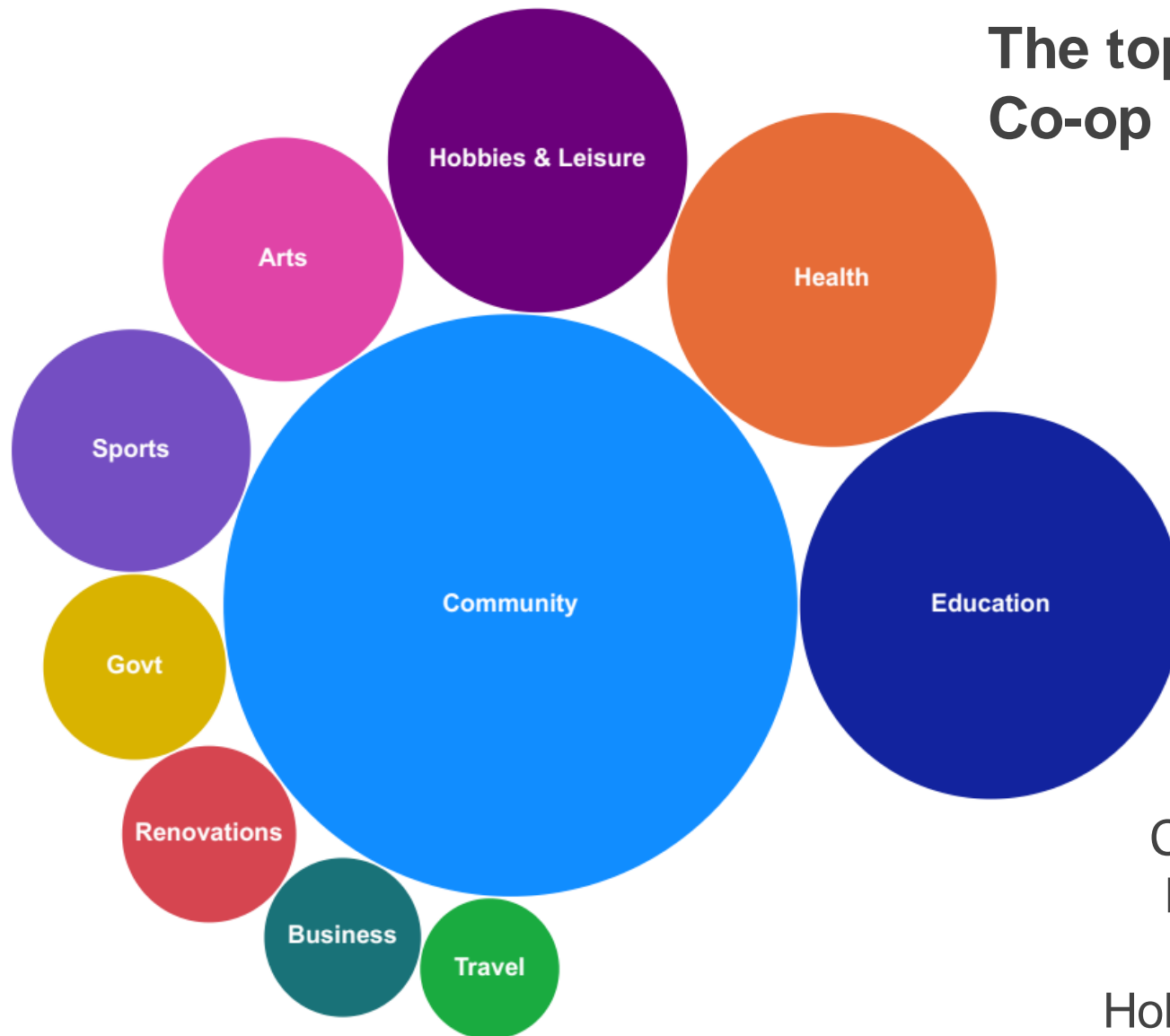
87% of Jobs and Education grants in the test set were classified **correctly**

However, **53% of Travel and Tourism grants** in the test set were incorrectly classified under **People and Society**

Confusion Matrix

True label	Predicted label										
	Arts and Entertainment	Gardening and Renovation	Health	Hobbies and Leisure	Jobs and Education	People and Society	Pets and Animals	STEM	Sports	Support Groups	Travel and Tourism
Arts and Entertainment	75%	2%	-	4%	2%	12%	-	-	6%	-	-
Gardening and Renovation	-	59%	-	4%	4%	33%	-	-	-	-	-
Health	-	-	88%	1%	1%	10%	-	-	-	-	-
Hobbies and Leisure	-	1%	1%	77%	2%	17%	1%	-	-	-	-
Jobs and Education	2%	-	-	1%	87%	10%	-	-	-	-	-
People and Society	2%	1%	2%	3%	3%	86%	0%	-	2%	-	-
Pets and Animals	-	-	-	57%	-	43%	-	-	-	-	-
STEM	-	-	-	-	50%	50%	-	-	-	-	-
Sports	-	-	2%	-	-	20%	-	-	78%	-	-
Support Groups	-	-	33%	-	-	33%	-	-	-	33%	-
Travel and Tourism	12%	-	-	12%	-	53%	-	-	-	-	24%

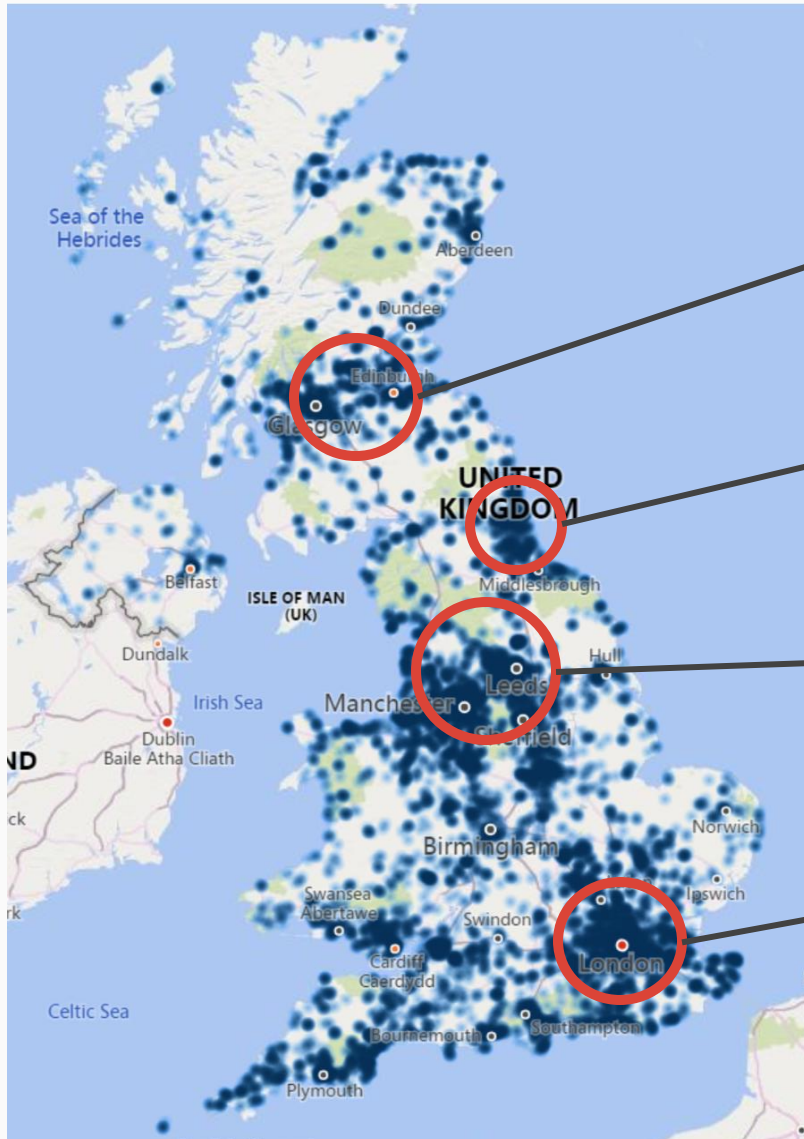
What themes of grants are awarded by The Co-op?



**The top 10 categories
Co-op awards funds to**

Top 4 :
Community 37%
Education 16%
Health 12%
Hobbies & Leisure 10%

Where are the local causes located?



Glasgow, Edinburgh

Newcastle upon Tyne

Manchester, Leeds

London

Is there any geographical variation in the amount awarded to recipients based on theme?

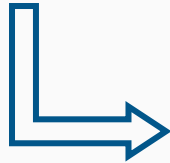


Recipient.Org.Name

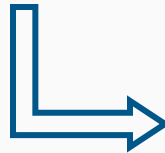
- Alzheimer Scotland- North Aberdeenshire Services
- Arbroath Lifeboat Station
- Barracuda Explorers
- Co-op Foundation
- Monmouth Parkinson's Support Group
- Swanage And Purbeck Development Trust
- The British Red Cross
- Wadebridge Girlguiding
- Waltham Abbey Woodcraft Folk
- West Mersea RNLI

Next steps...

- Assess labelling and re-train a classifier for our data. Use this new classifier to label remaining data points



- Explore the relationships between label/theme, geographical location and amount awarded



- Create visualisations and draw conclusions of the results based on the research questions

- What are the themes of grants that The Co-op awards?

- Where are the local causes located? Is there correlation between themes and locations?

- Is there any geographical variation in the amount awarded to recipients based on theme?

Thanks!