Marketing Analytics

Alumni Donation Targeting

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Project Background

Situation:

- % Alumni donation decreased from 23% in 1999 to 16% in 2009

- Impact SCU ranking

- Impact fund for scholarship and school programs

Objective:

- Increase alumni future donation by identifying the top 40% prospects

Approach

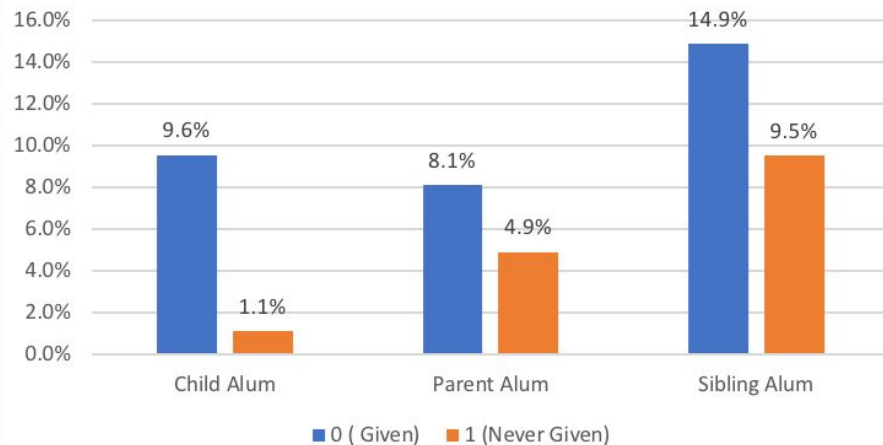**Data** — How should we prepare the data?
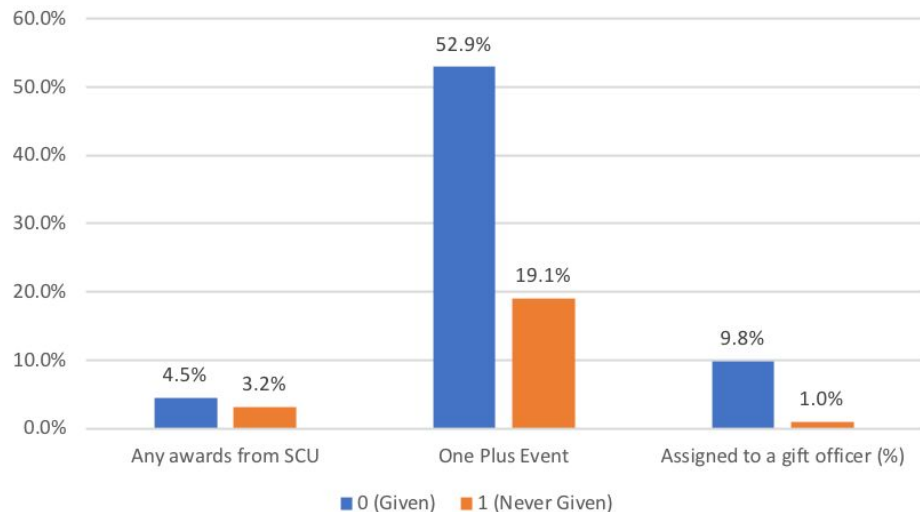
Models — What models should we try?

Features — What can we do about these features?

First Impression on the Data

Family Alumni Influence on Donation

	Child Alum	Parent Alum	Sibling Alum
0 (Given)	9.6%	8.1%	14.9%
1 (Never Given)	1.1%	4.9%	9.5%

Engagement Influence on Donation

|	Any awards from SCU	One Plus Event	Assigned to a gift officer (%)
0 (Given)	4.5%	52.9%	9.8%
1 (Never Given)	3.2%	19.1%	1.0%

Data Cleaning

- Identify Y variable: Gave2009

- Drop columns: ['CaseNum', 'State', 'Last Gift Date', 'Years Lapsed', 'BetweenRY', 'Never Given', 'WealthEngine Rating']

- Drop Null values

- Standardize unbalanced Data

Data Correlation Analysis

Give2004 ~ Give1999, Attend2004, Attend1999, ActionNotes, OnePlusEvents, TotalActions	Corr < 0.5 Keep
TotalReunions ~ Attend2004, Attend1999, Attend2009	Corr < 0.5 Keep
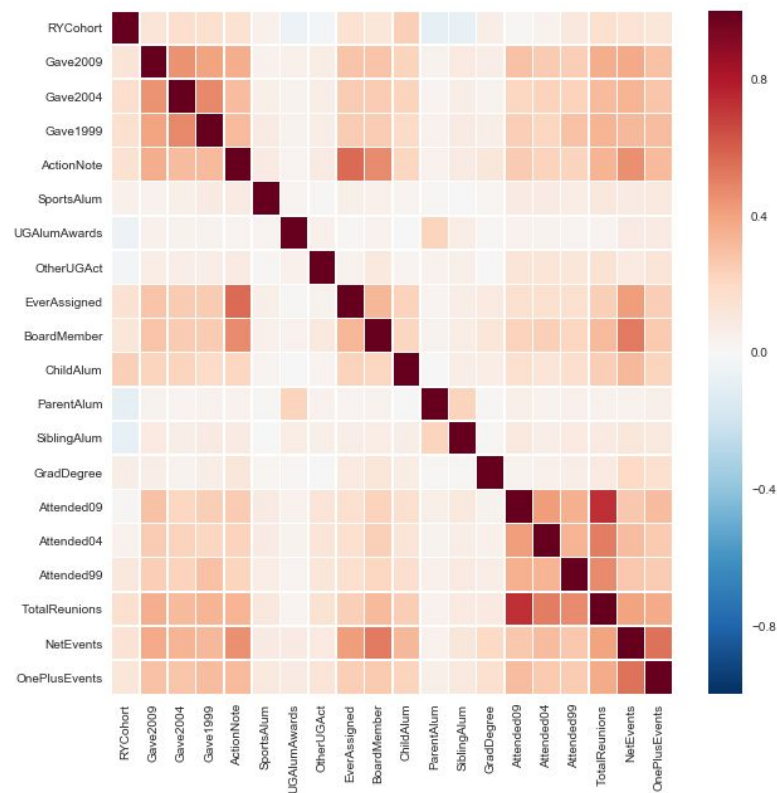
Look through Decision Tree (all data)
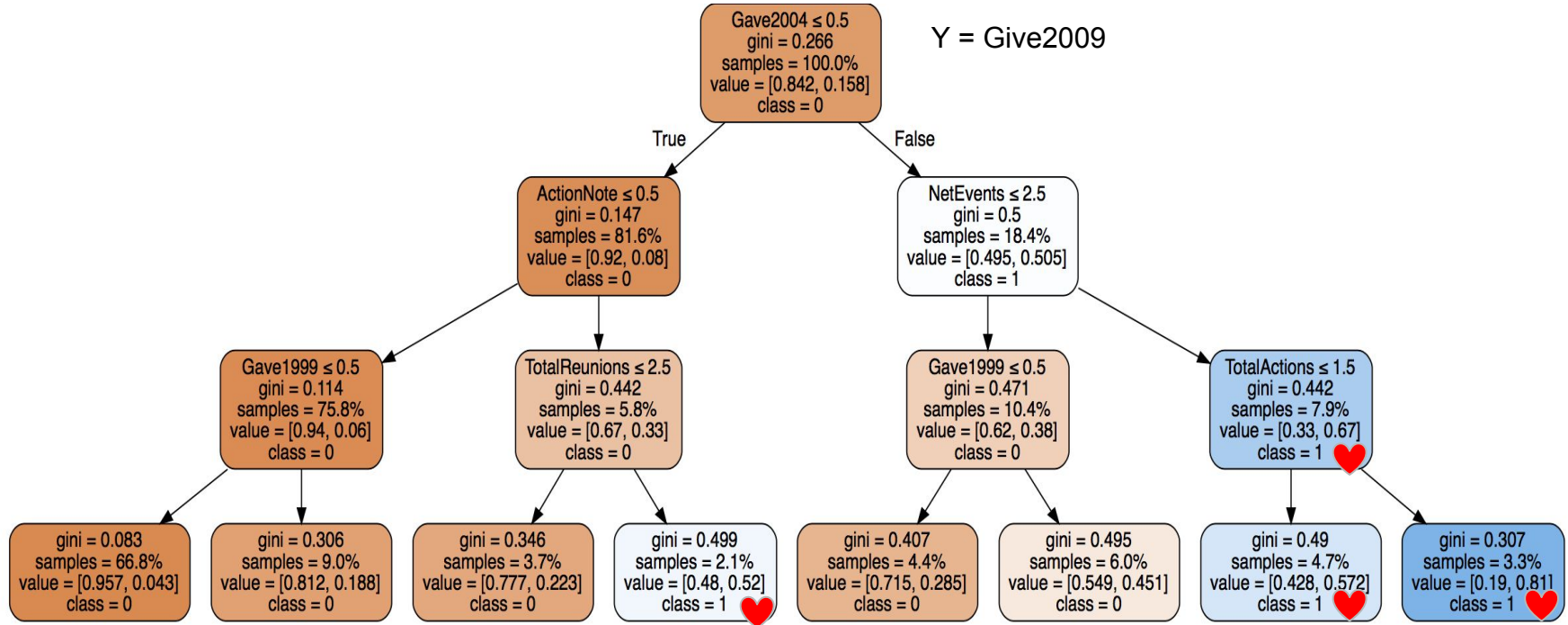
**Key Takeaway: reunion, events, and engagement are very important!**

Models Experimented

Model Name	Accuracy	What's not good about this model
Gradient Boosting	**0.876**	slow
Logistic Regression	**0.876**	
AdaBoostClassifier	0.876	
Support vector machines	0.872	
KNN	0.859	
Random forest	**0.858**	slow
Decision Tree	0.836	
GaussianNB	0.830	
Neural Network	**0.90**	Blackbox, don't know what's going on inside

Random Forest - Feature Ranking
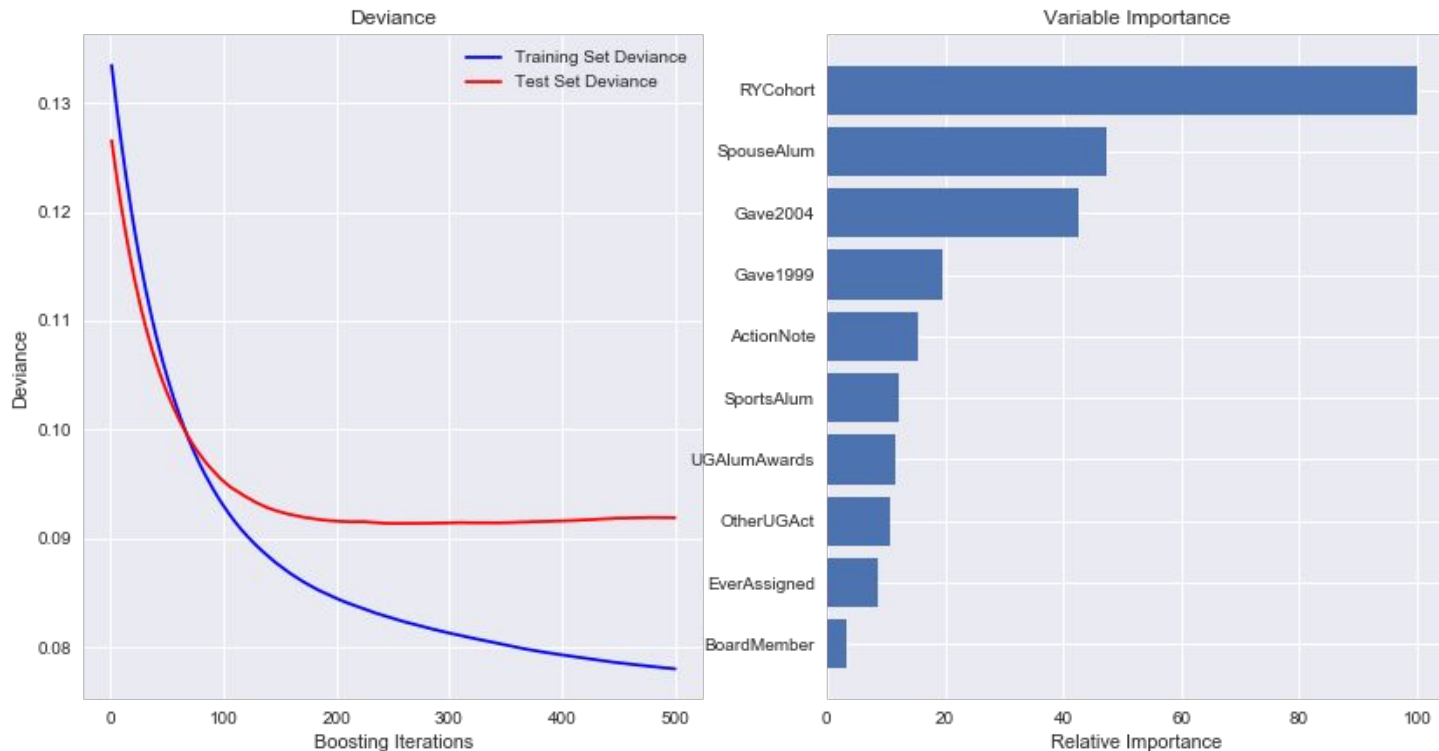
Feature ranking:
1. RYCohort (0.265925)
2. SpouseAlum (0.164315)
3. Gave2004 (0.098706)
4. Gave1999 (0.021476)
5. ActionNote (0.020831)
6. SportsAlum (0.002571)
7. UGAlumAwards (0.002045)
8. OtherUGAct (0.000196)
9. EverAssigned (0.000123)
10. BoardMember (0.000122)

Feature importances
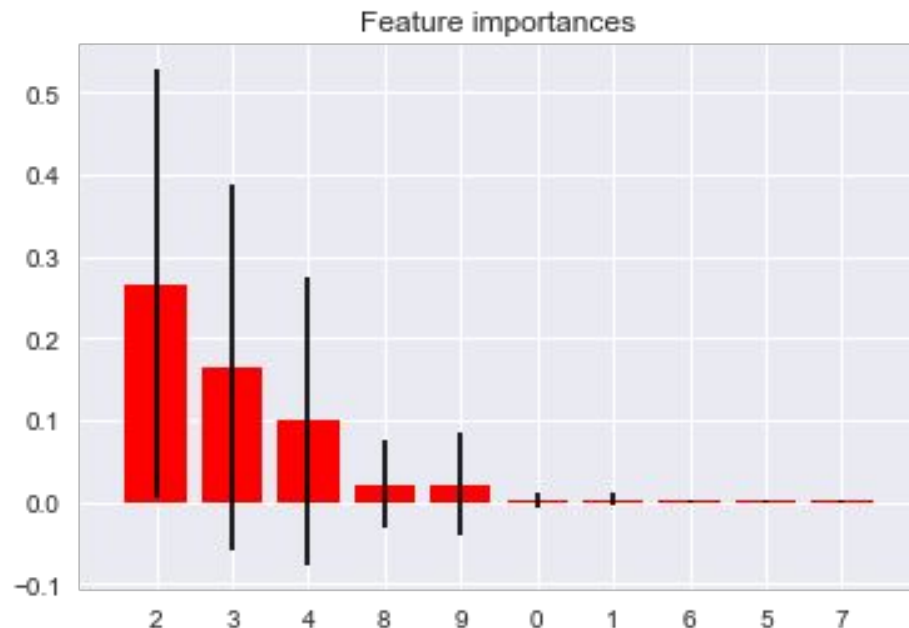
Gradient Boosting - Feature Ranking

ML Function: ensemble.GradientBoostingRegressor

MSE:

Logistic Regression – L1/L2 – Feature Ranking

Logistic Regression (L1) Coefficients
Gave2004: 0.5589
Gave1999: 0.4006
ActionNote: 0.2394
Attended09: 0.2012
OnePlusEvents: 0.18
NetEvents: 0.1677
TotalReunions: 0.1246
SpouseAlum: 0.1185
SportsAlum: -0.08
TotalActions: 0.0707
ChildAlum: 0.0638
Attended04: 0.0575
SiblingAlum: 0.0575
UGAlumAwards: 0.0381
EverAssigned: 0.0296
OtherUGAct: 0.0155
RYCohort: 0.0116
Attended99: 0.0108
ParentAlum: 0.0089
BoardMember: -0.0036
GradDegree: -0.0026

Logistic Regression (L2) Coefficients
Gave2004: 0.5583
Gave1999: 0.4003
ActionNote: 0.2394
Attended09: 0.2016
OnePlusEvents: 0.1799
NetEvents: 0.1687
TotalReunions: 0.124
SpouseAlum: 0.1193
SportsAlum: -0.0816
TotalActions: 0.0724
ChildAlum: 0.0642
Attended04: 0.0583
SiblingAlum: 0.0583
UGAlumAwards: 0.0391
EverAssigned: 0.0298
OtherUGAct: 0.0168
RYCohort: 0.0136
Attended99: 0.0113
ParentAlum: 0.0098
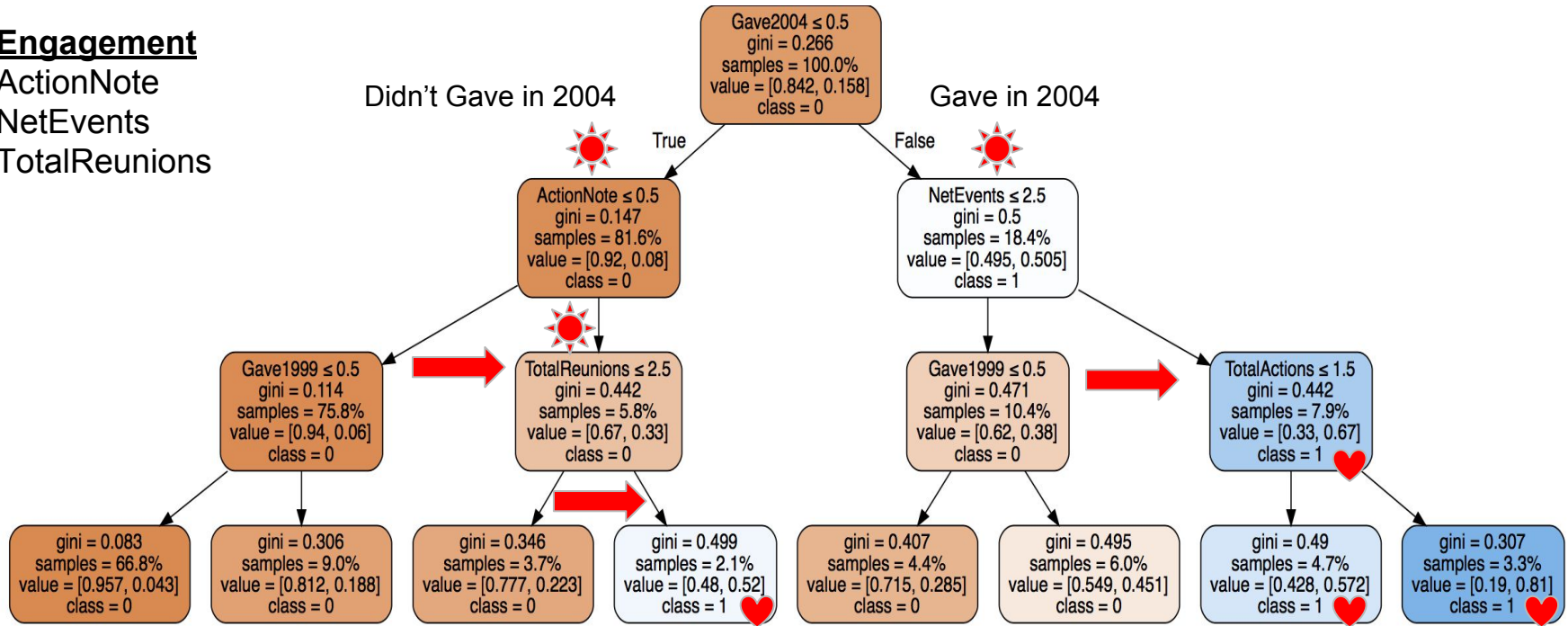BoardMember: -0.006
GradDegree: -0.0043

Targeting

Engagement
ActionNote
NetEvents
TotalReunions

Y = Gave2009

Didn't Gave in 2004

Gave in 2004

Gave2004 ≤ 0.5
gini = 0.266
samples = 100.0%
value = [0.842, 0.158]
class = 0

True

False

ActionNote ≤ 0.5
gini = 0.147
samples = 81.6%
value = [0.92, 0.08]
class = 0

NetEvents ≤ 2.5
gini = 0.5
samples = 18.4%
value = [0.495, 0.505]
class = 1

Gave1999 ≤ 0.5
gini = 0.114
samples = 75.8%
value = [0.94, 0.06]
class = 0

TotalReunions ≤ 2.5
gini = 0.442
samples = 5.8%
value = [0.67, 0.33]
class = 0

Gave1999 ≤ 0.5
gini = 0.471
samples = 10.4%
value = [0.62, 0.38]
class = 0

TotalActions ≤ 1.5
gini = 0.442
samples = 7.9%
value = [0.33, 0.67]
class = 1

gini = 0.083
samples = 66.8%
value = [0.957, 0.043]
class = 0

gini = 0.306
samples = 9.0%
value = [0.812, 0.188]
class = 0

gini = 0.346
samples = 3.7%
value = [0.777, 0.223]
class = 0

gini = 0.499
samples = 2.1%
value = [0.48, 0.52]
class = 1

gini = 0.407
samples = 4.4%
value = [0.715, 0.285]
class = 0

gini = 0.495
samples = 6.0%
value = [0.549, 0.451]
class = 0

gini = 0.49
samples = 4.7%
value = [0.428, 0.572]
class = 1

gini = 0.307
samples = 3.3%
value = [0.19, 0.81]
class = 1

Key Takeaway: reunion, events, and engagement are very important!

Segmentation (Clustering)

Cluster 0 = avg 60% Gave in 2009, 1091
Cluster 1 = avg <10% Gave in 2009, 6029

	RYCohort	Gave2009	Gave2004	Gave1999	ActionNote	SportsAlum	UGAlumAwards	OtherUGAct	EverAssigned	BoardMember
cluster		☀	☀	☀	☀				☀	☀
0	1977.528873	0.604950	0.607699	0.701192	0.587534	0.156737	0.068744	0.335472	0.356554	0.362053
1	1984.155084	0.076961	0.106983	0.148117	0.033173	0.082932	0.034666	0.185603	0.014264	0.014596

ChildAlum	ParentAlum	SiblingAlum	GradDegree	Attended09	Attended04	Attended99	TotalReunions	NetEvents	OnePlusEvents	TotalActions
☀				☀	☀	☀	☀	☀		☀
0.263978	0.109074	0.232814	0.187901	0.617782	0.449129	0.476627	4.755270	6.709441	0.932172	2.742438
0.029524	0.062697	0.111130	0.075634	0.078122	0.048433	0.063029	0.531597	0.727816	0.314314	0.056394

Recommendation

Who to Target:

Donated in 2004

Donated in 1999

Board members

Attended Reunions and Events

Family Alumni (esp. Child Alumni)

Others

How to Engage:

- Assign officers to contact alumni prospects

- Increase alumni involvement

- Analyze past events attendance and their interests & needs

- Survey prospects

- Organize more relevant events

- Use Social Media, emails to engage

Given Campaign Result on Mar. 7, 2018

$3.2 Million donation, 5,324 Gifts in a single day. Highest in history!

Go Broncos

- The Miller Center for Social Entrepreneurship: $1 million, 212 gifts
- Bronco Athletics: $272,384, 1,825 gifts
- The Jesuit School of Theology: $265,000
- The School of Law: $150,750
- The Leavey School of Business: $131,778, 356 gifts
- The Ignatian Center for Jesuit Education: $61,555, 137 gifts
- The Markkula Center for Applied Ethics: $34,384, 42 gifts.