



# Mining App Store requirements

Mark Harman, Yue Jia and Yuanyuan Zhang

University College London

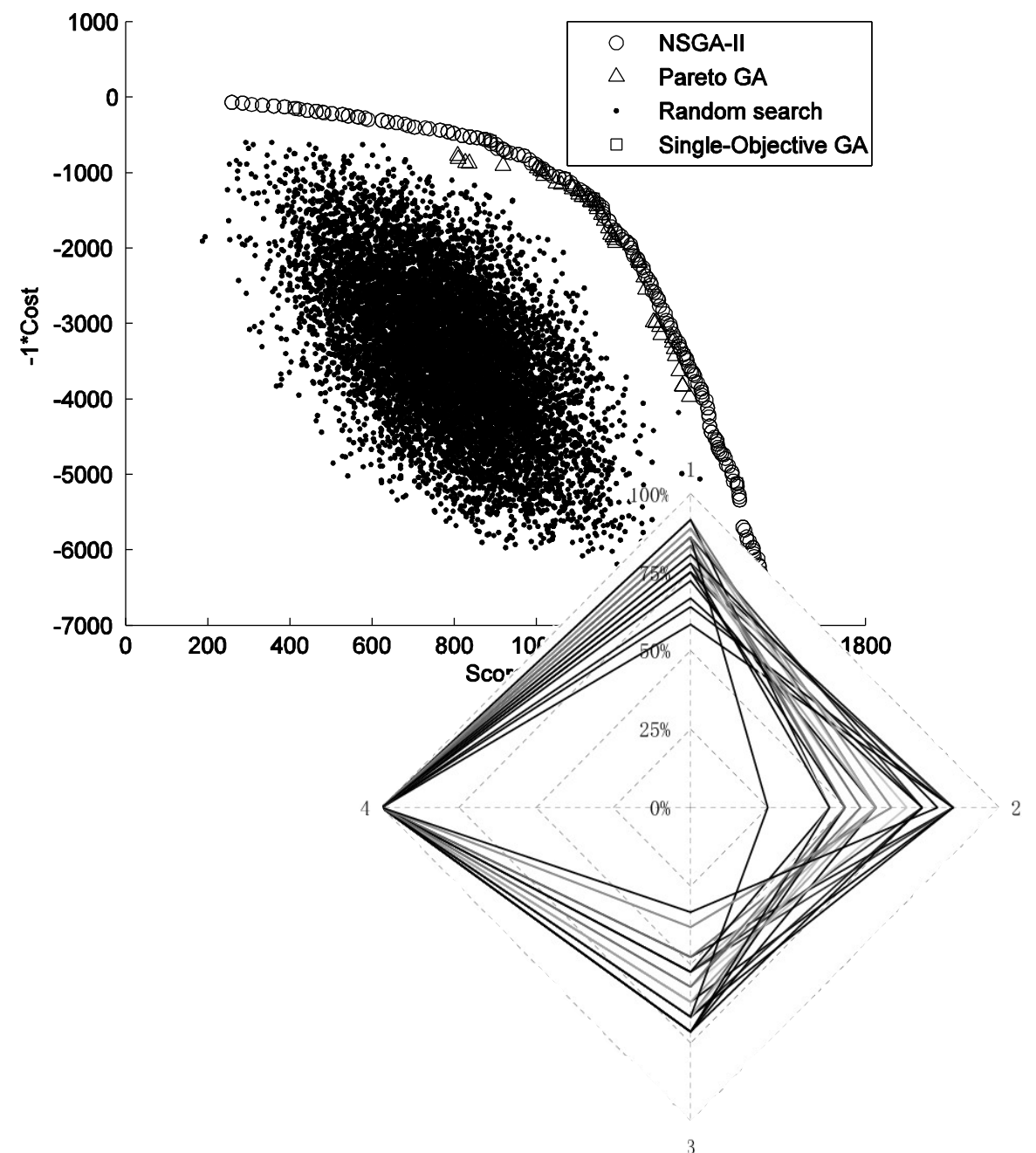
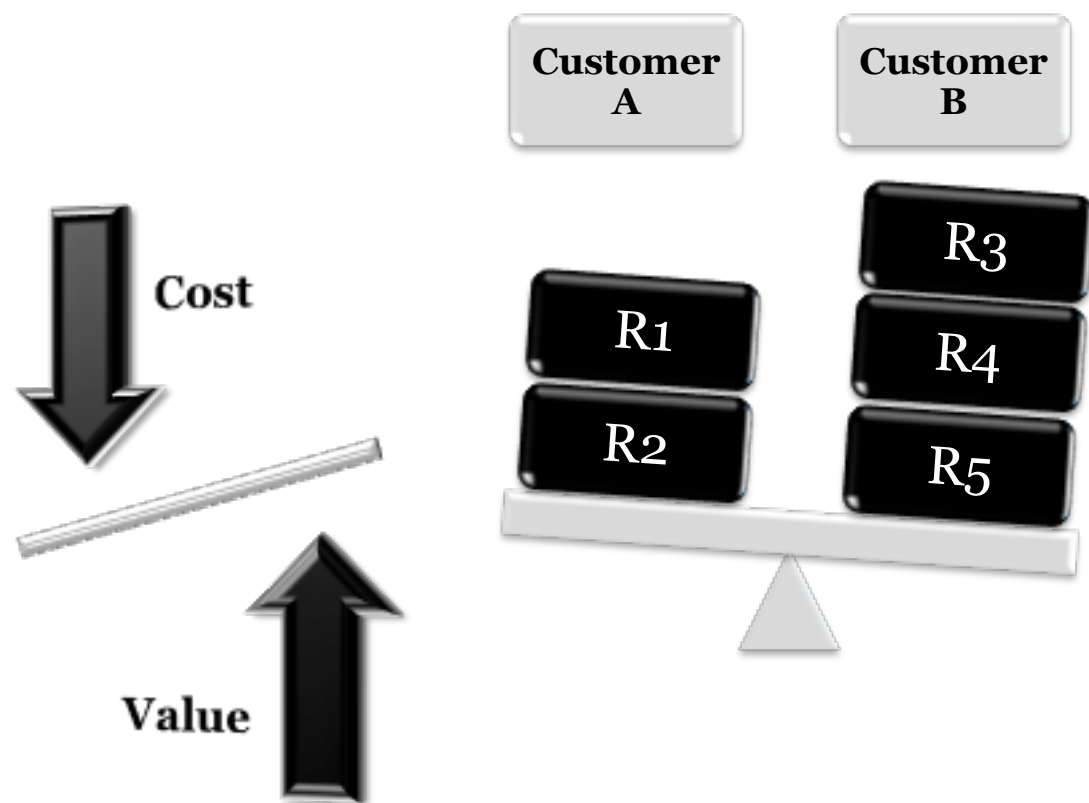
# Mining App Store requirements



Mark Harman, Yue Jia and Yuanyuan Zhang

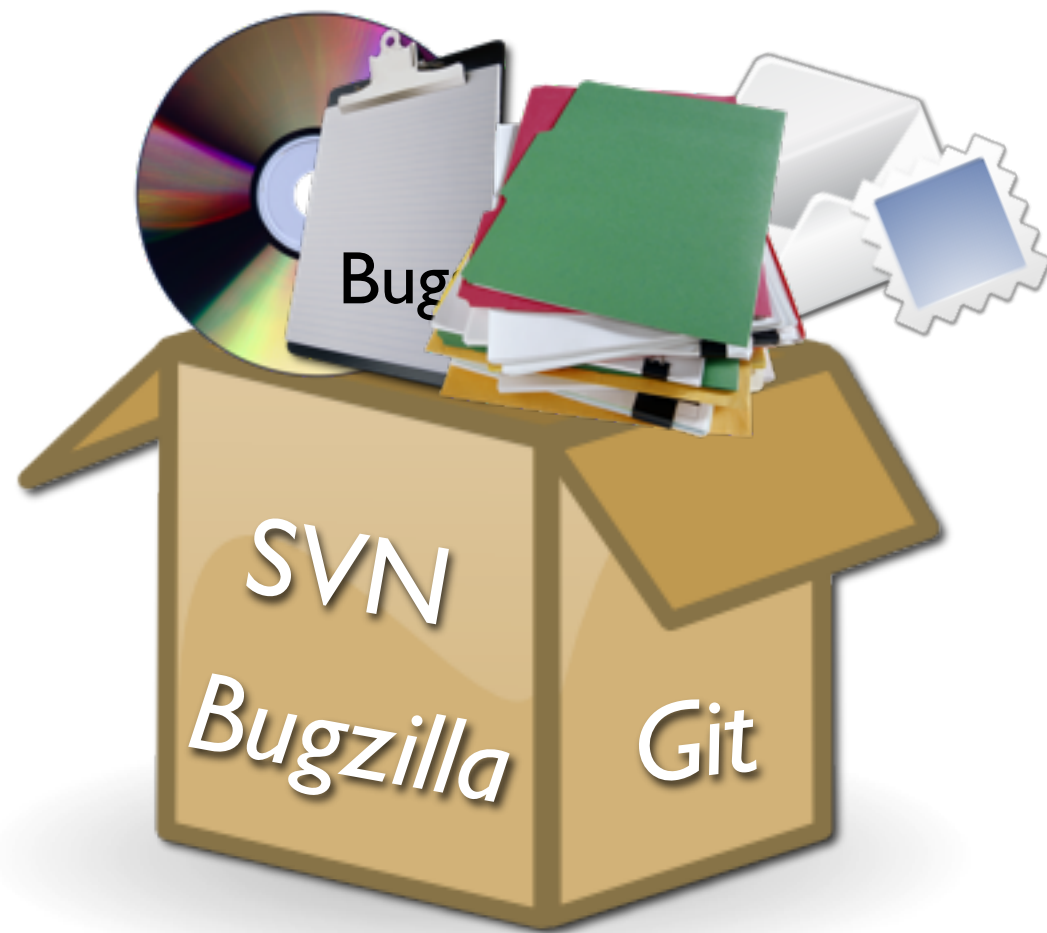
University College London

# Motivation



# Real World Data





Traditional Software  
Repository



Source Code



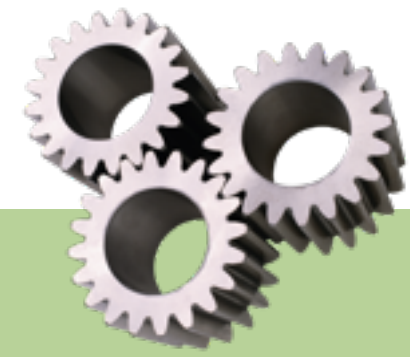
Reports



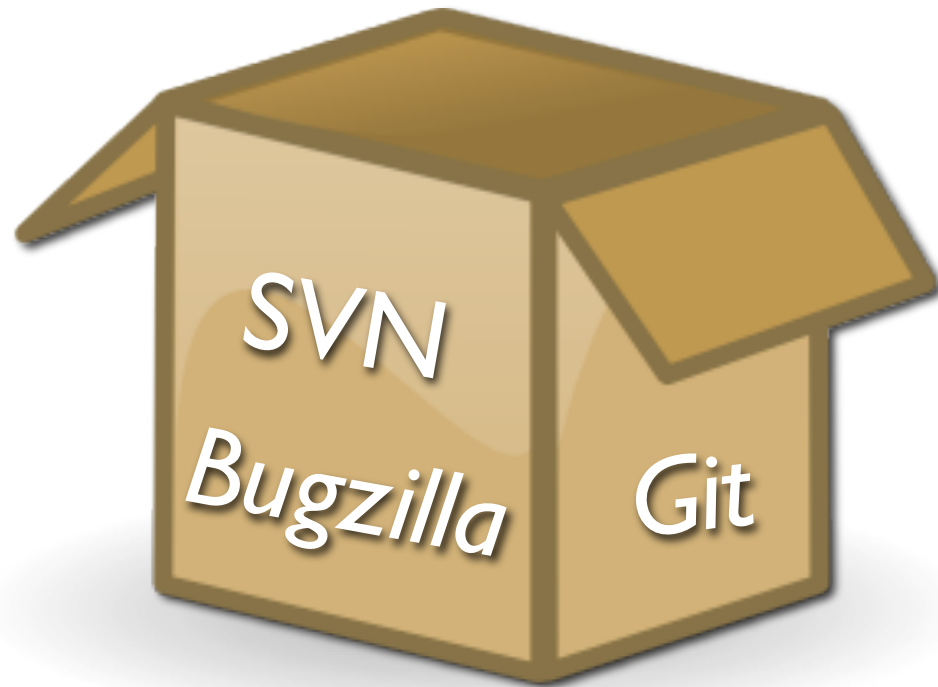
Changes



Email



Technical



Traditional Software  
Repository





Source Code



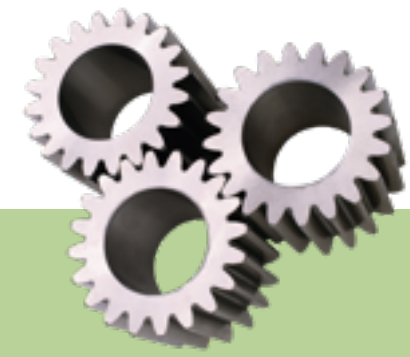
Reports



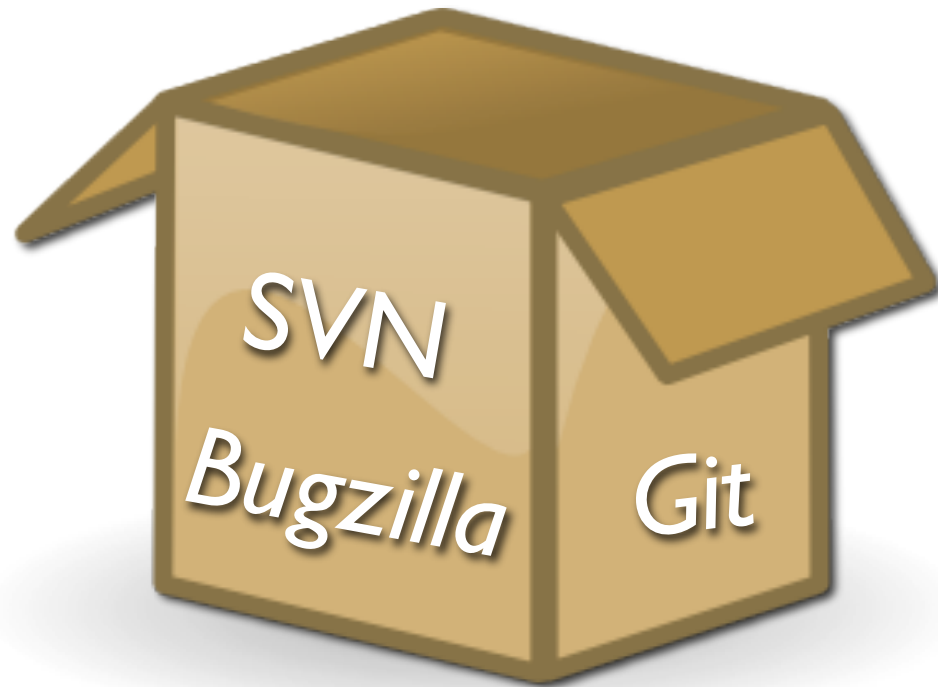
Changes



Email



Technical



Traditional Software  
Repository





Source Code



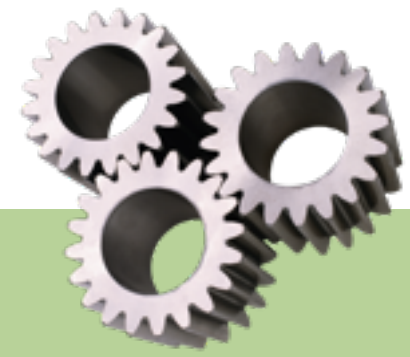
Reports



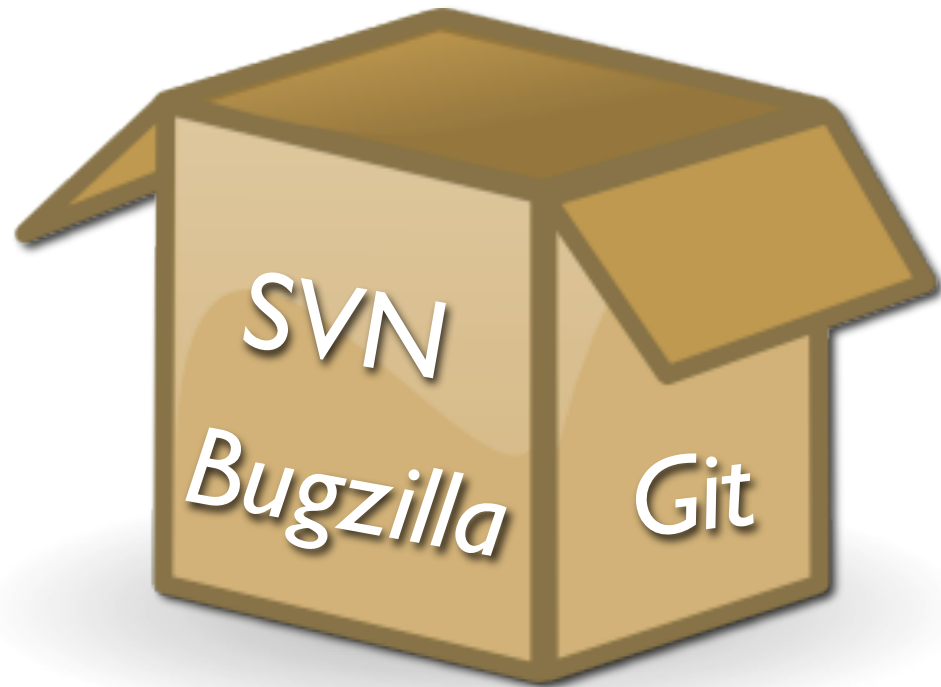
Changes



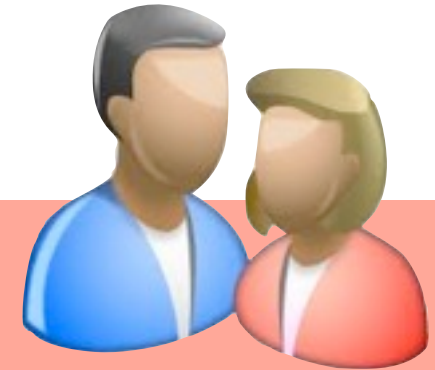
Email



Technical



Traditional Software  
Repository



Customer

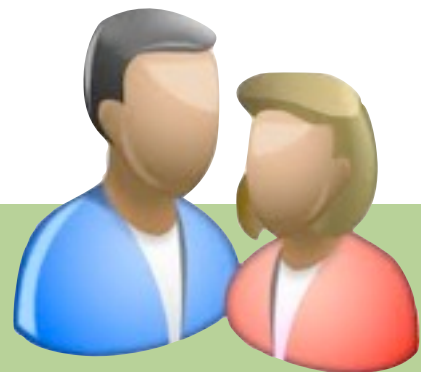


Business





## App Store Repository



Customer

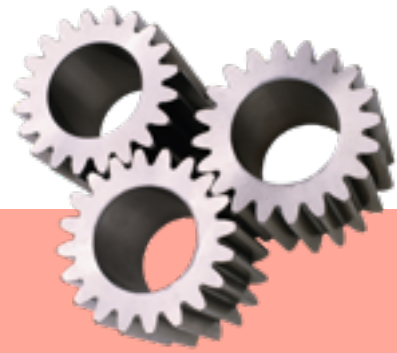
Ratings  
Popularity



Business

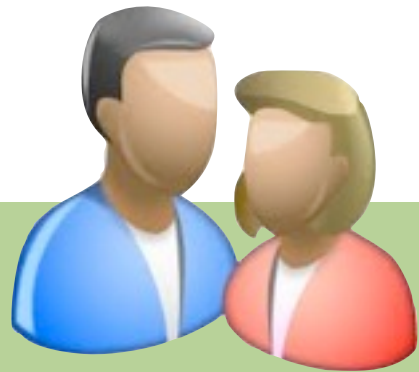
Price

App Store Repository



Technical

Features



Customer

Ratings  
Popularity



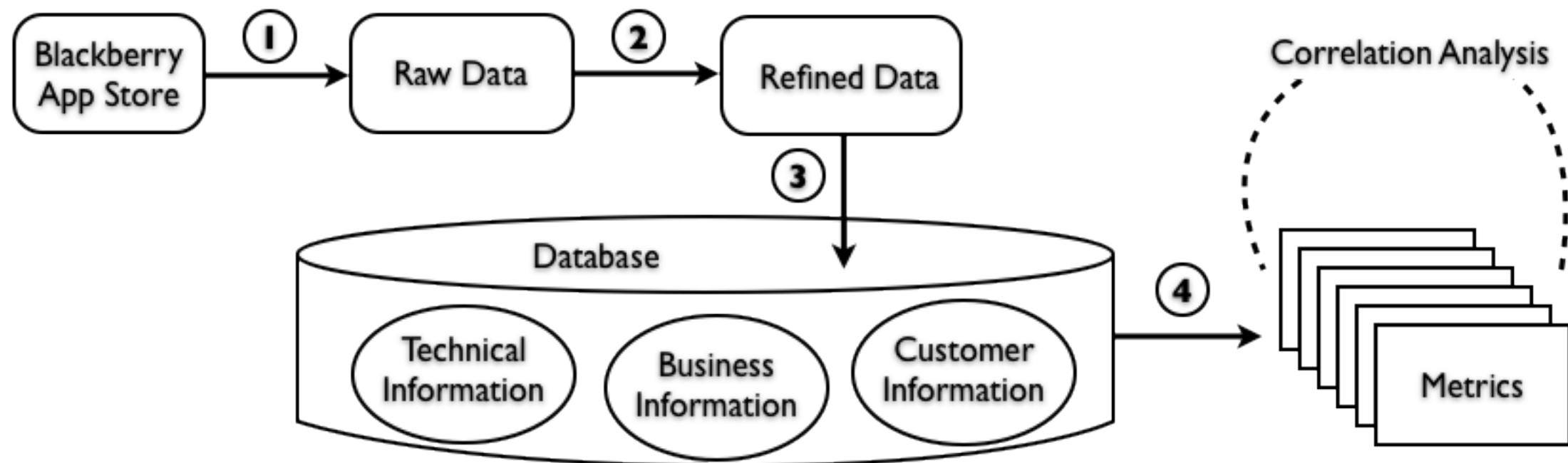
Business

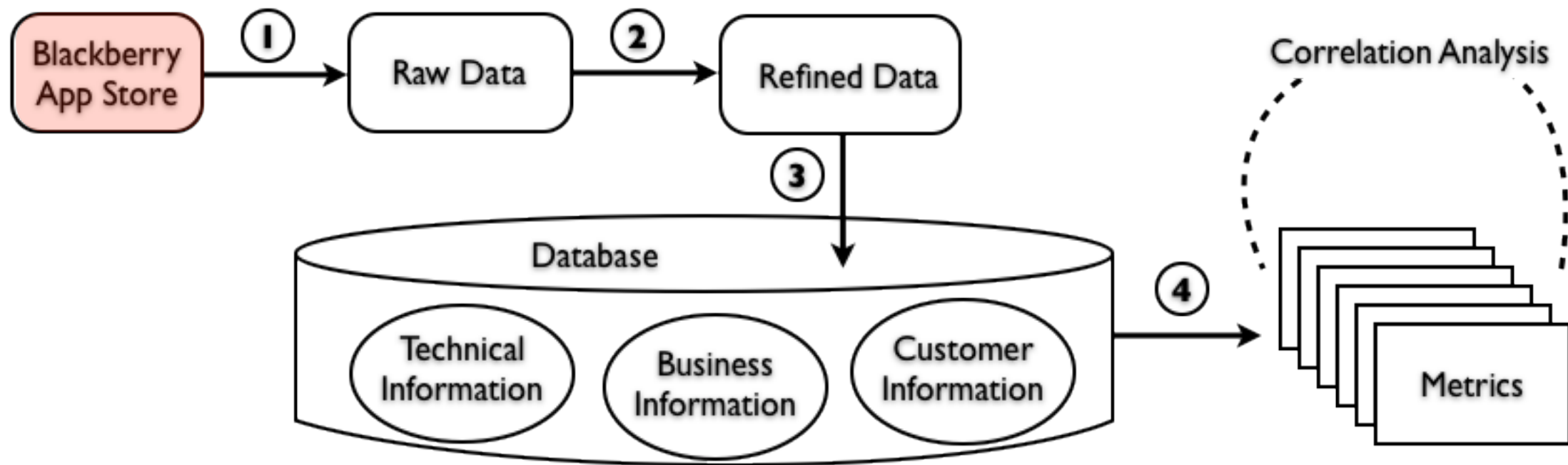
Price



App Store Repository

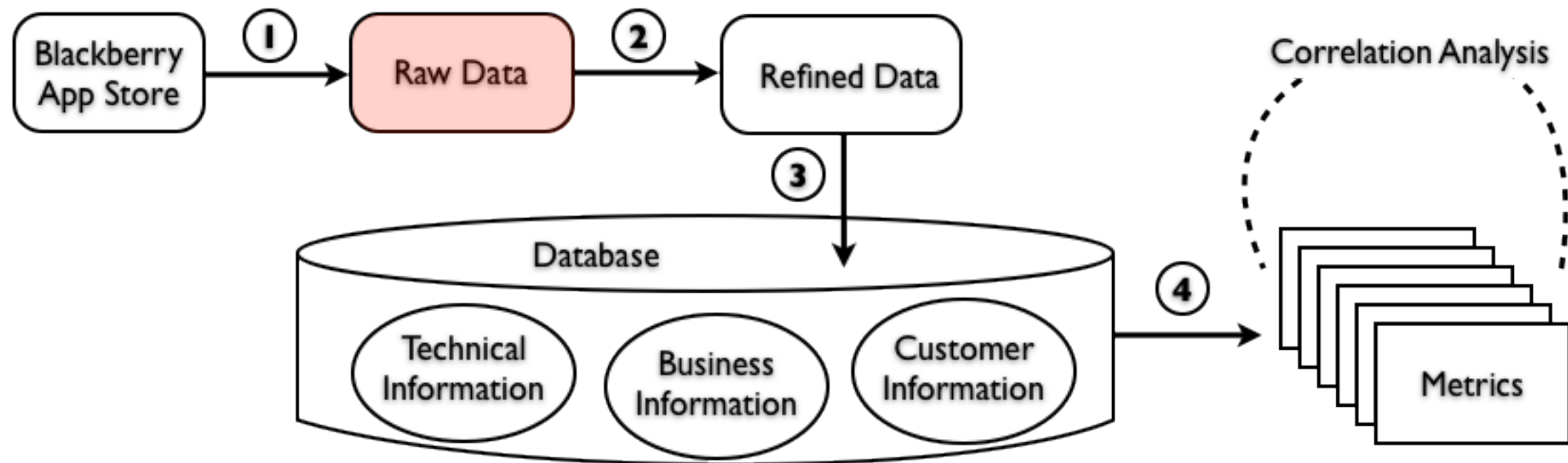






**BlackBerry  
App World™**





**BlackBerry  
App World™**

**BlackBerry App World™** Apps Games Themes Ringtones

Search

English - Help

BlackBerry App World > Apps > Finance > Financial Services >

**M Mortgage Calculator PRO**

By Devide Perm  
★★★★★ 58 reviews  
Rated: General

US\$99.99 **Purchase** **Try** **Add To Cart**

**Item Description**  
(One time buy, no subscription, free upgrade only.)  
Why is it important to have a mortgage calculator on the go?  
Mortgage Calculator Pro is a quick and easy to use calculator for brokers, realtors, and home buyers.  
When shopping for a house, comparing mortgage brokers, comparing properties, and looking over the numbers with your significant other, the most important thing to know is how much it is going to cost you.  
By knowing this information, it can help you to make important decisions while you are on the go.  
When choosing a house, make sure you can afford the property easily.  
This mortgage calculator is also quick and easy to use. All you need to do is enter the loan amount, the interest rate, and the amortization. After this is complete, the calculator will calculate your payments.  
The home mortgage refinance calculator helps you assess the impact of mortgage refinancing. Enter your current loan information as well as the proposed refinance loan information to calculate the break-even point and potential cost savings from refinancing your mortgage.  
Mortgage Calculator PRO is a professional suite and it can be used for other loans, mortgages and mortgage refinancing.  
Brief description:  
# Mortgage loan payments calculator with full amortization schedule, interest calculator, mortgage refinancing, mortgage comparison, affordability calculator, rent vs buy, tax, insurance and much more.  
# Bar chart and pie chart support.  
# Send your results via Email/SMS or export it in Excel or Word.  
# Extremely powerful but easy to use.  
# Support for different currencies and different compounding periods, US mortgages, Canadian mortgages and other international mortgages.  
# English, Français, Deutsch, Español, Italiano.  
# Stunning skinnable user interface.  
# Constantly upgrading features, free for existing customers.  
# Customers support answer in less than 24 hours.  
# You can transfer your license on new BlackBerry® devices and other Smartphones.  
Try it now!

**Latest Reviews** (5 of 58 reviews) [See all reviews](#)

Best software in the market  
May 27, 2012  
This is the best mobile software I bought on a mobile and they have an extraordinary customer service.  
★★★★★  
By: temow5012

**Item Information** [Share](#)  
Version: 5.6.2  
Release: May 14, 2012  
File Size: 445 KB  
Support: [support@devideperm.org](mailto:support@devideperm.org)  
Email:

**Screenshots**  
Mortgage Calculator PRO  
MORTGAGE PRO  
Loan Amount: \$250,000.0  
Loan Term: 25.0 years  
Interest Rate: 7.0 %  
Monthly Payment P/i: \$1,766.95  
View more screen shots

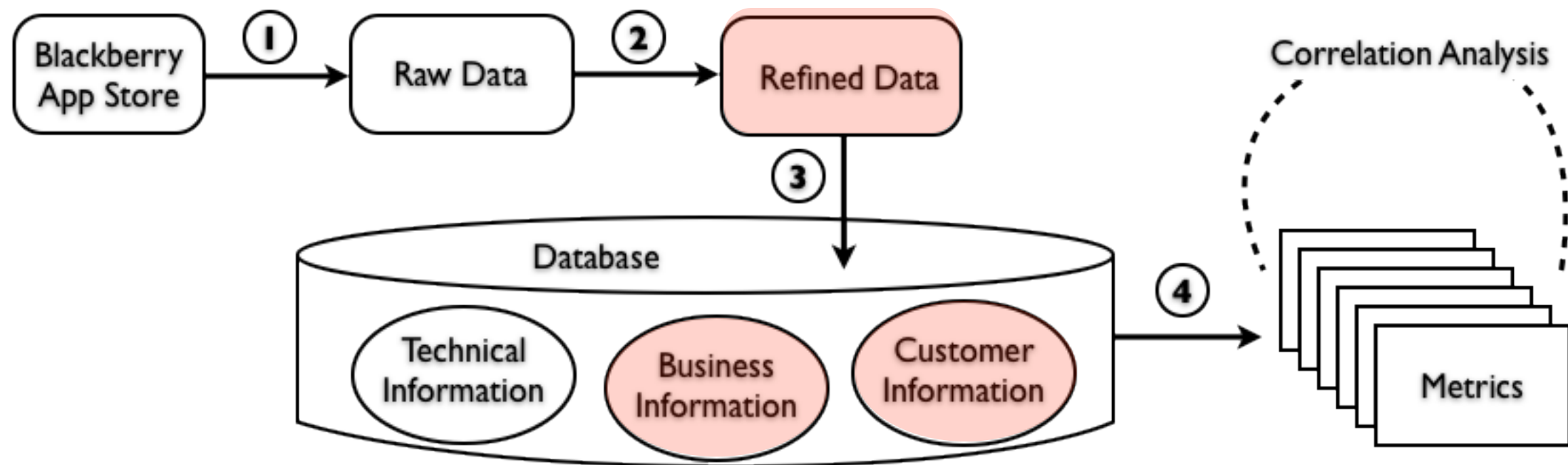
**Supported Devices**  
[View compatible BlackBerry models](#)

**Required Device Software**  
Smartphone: 4.2.0 or higher  
Tablet: 1.0.0 or higher

**Supported Countries**  
All Countries

**Supported Carriers**  
All Carriers

**Item QR Code**



BlackBerry App World > Apps > Finance > Financial Services >



## Mortgage Calculator PRO

By Davide Perini

★★★★★ 59 reviews

Rated: General

US\$7.99

Purchase >

Try >

> Add To Cart

### Item Information

Share▼

Version: 5.6.2

Release: May 14, 2012

File Size: 445 KB

Support [support@dpsoftware.org](mailto:support@dpsoftware.org)  
Email:

### Screenshots

Mortgage Calculator PRO 123



Input

Loan Amount: \$250,000.0

Loan Term: 25.0 years

Interest Rate: 7.0 %

Output

Monthly Payment PI:  
\$1,766.95

### Item Description

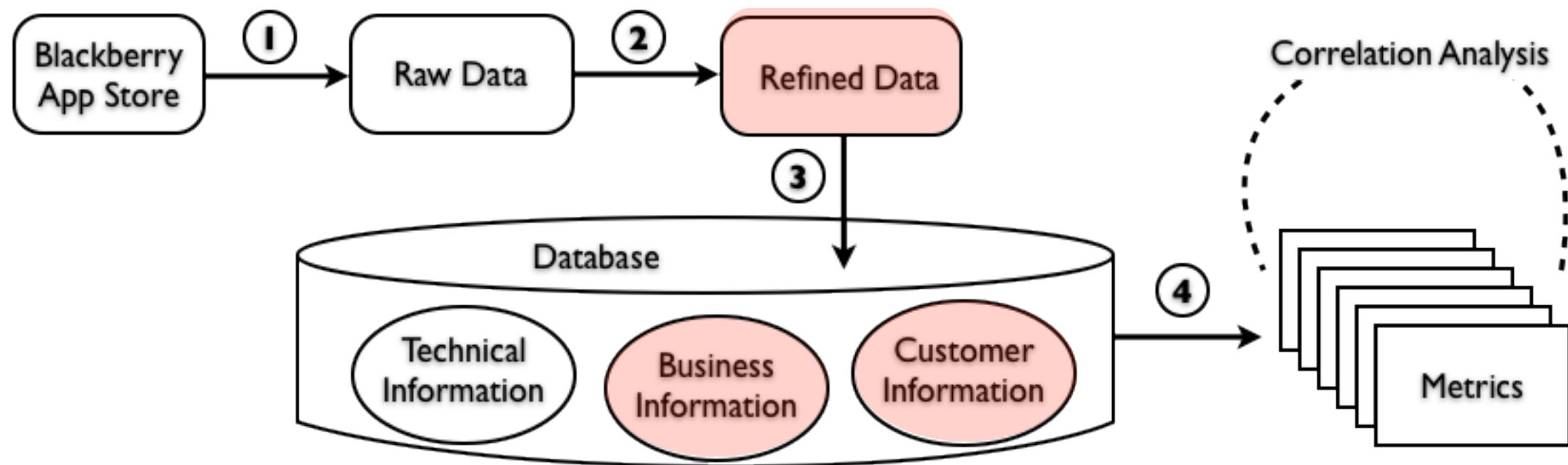
(One time buy, no subscription, free upgrade only.)

Why is it important to have a mortgage calculator on the go?

Mortgage Calculator Pro is a quick and easy to use calculator for brokers, realtors, and home buyers.

When shopping for a house, comparing mortgage brokers, comparing properties, and looking over the numbers with your significant other, the most important thing to know is how much it is going to cost you. By knowing this information, it can help you to make important decisions while you are on the go.





## Item Description

(One time buy, no subscription, free upgrade only.)

Why is it important to have a mortgage calculator on the go?

Mortgage Calculator Pro is a quick and easy to use calculator for brokers, realtors, and home buyers.

When shopping for a house, comparing mortgage brokers, comparing properties, and looking over the numbers with your significant other, the most important thing to know is how much it is going to cost you. By knowing this information, it can help you to make important decisions while you are on the go.

When choosing a house, make sure you can afford the property easily.

This mortgage calculator is also quick and easy to use. All you need to do is enter the loan amount, the interest rate, and the amortization. After this is complete, the calculator will calculate your payments.

The home mortgage refinance calculator helps you assess the impact of mortgage refinancing. Enter your current loan information as well as the proposed refinance loan information to calculate the break-even point and potential cost savings from refinancing your mortgage.

Mortgage Calculator PRO is a professional suite and it can be used for either loans, mortgages and mortgage refinancing.

Brief description:

# Mortgage loan payments calculator with full amortization schedule, interest calculator, mortgage refinancing, mortgage comparison, affordability calculator, rent vs buy, tax, insurance and much more.

> Add To Cart

## Screenshots

Mortgage Calculator PRO 123

Calculator  
**MORTGAGE PRO.**  
MORTGAGE PRO.

Input

**Loan Amount: \$250,000.0**

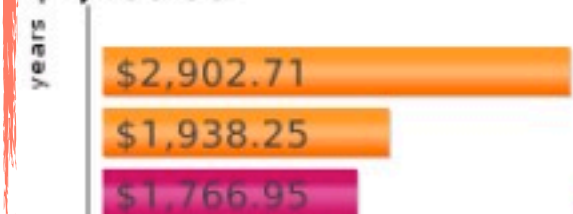
**Loan Term: 25.0 years**

**Interest Rate: 7.0 %**

Output

**Monthly Payment PI:**

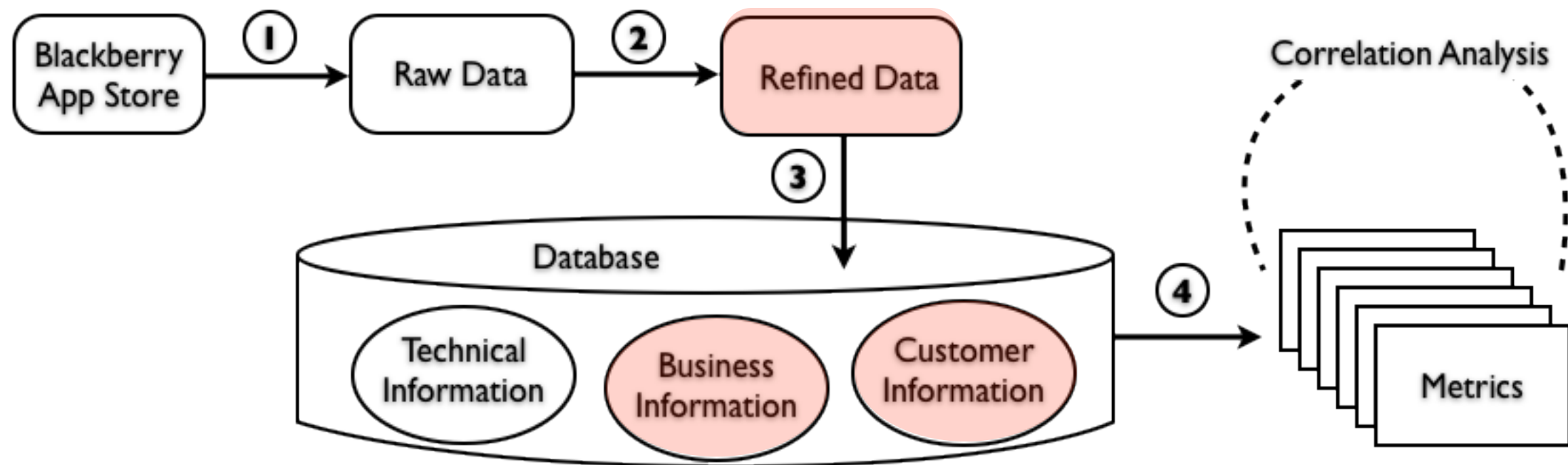
**\$1,766.95**



Menu

> View more screen shots

## Supported Devices



### Latest Reviews (5 of 59 reviews) [See all reviews](#)

#### Best software in the market

May 27, 2012

This is the best mobile software I bought on a mobile and they have an extraordinary customer service.



By: [tomcw5512](#)

#### Ok

May 18, 2012

Ok



By: [sherwinwu](#)

#### Using it since 2009.

May 17, 2012

I bought it in 2009, since 2009 I have received tons of free updates, thanks.



By: [loaner67](#)

#### It worth the money...

May 16, 2012

This is the best mortgage app of the market. They added the biweekly payment option and they now supports BB10 for future devices.



By: [giovanhotma23](#)

#### Great Tool

October 17, 2011

Excellent Tool for calculating affordability and payment terms. Is limited that only considers monthly



By: [glocke1234](#)

### Supported Carriers

All carriers

### Item QR Code

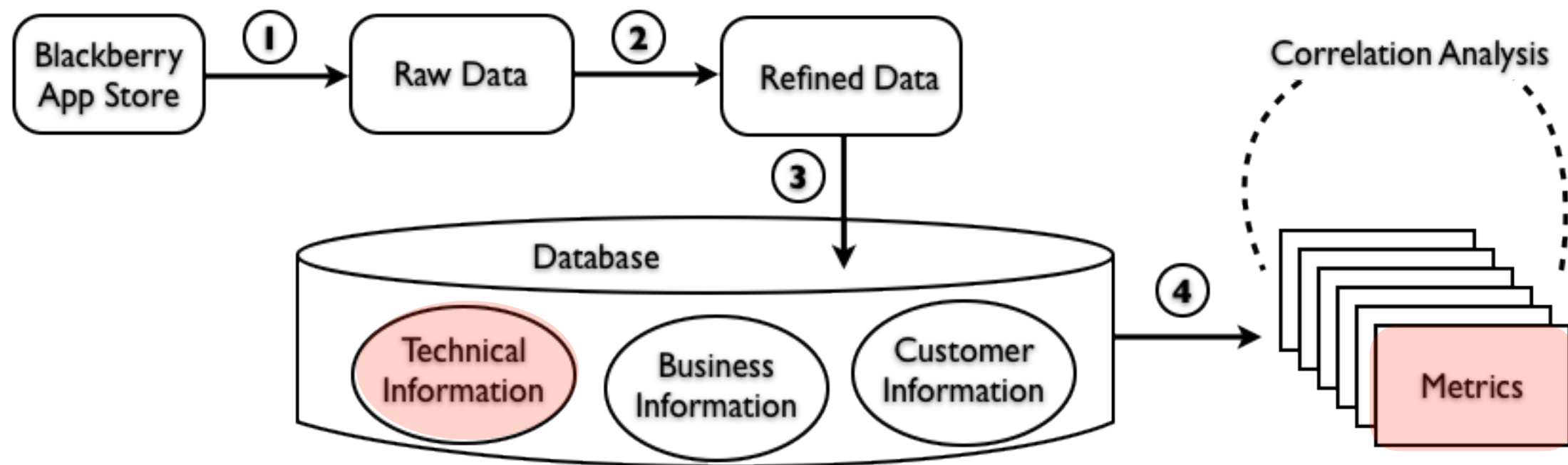


Scan the QR code above to download the app.

To scan the QR code:

1. Open the BlackBerry App World app on your smartphone.
2. Click the Menu key and select **Scan a Barcode**.
3. Click **Start Scanning**. Point your Blackberry





## Item Description

(One time buy, no subscription, free upgrade only.)

Why is it important to have a mortgage calculator on the go?

Mortgage Calculator Pro is a quick and easy to use calculator for brokers, realtors, and home buyers.

When shopping for a house, comparing mortgage brokers, comparing properties, and looking over the numbers with your significant other, the most important thing to know is how much it is going to cost you. By knowing this information, it can help you to make important decisions while you are on the go.

When choosing a house, make sure you can afford the property easily.

This mortgage calculator is also quick and easy to use. All you need to do is enter the loan amount, the interest rate, and the amortization. After this is complete, the calculator will calculate your payments.

The home mortgage refinance calculator helps you assess the impact of mortgage refinancing. Enter your current loan information as well as the proposed refinance loan information to calculate the break-even point and potential cost savings from refinancing your mortgage.

Mortgage Calculator PRO is a professional suite and it can be used for either loans, mortgages and mortgage refinancing.

Brief description:

# Mortgage loan payments calculator with full amortization schedule, interest calculator, mortgage refinancing, mortgage comparison, affordability calculator, rent vs buy, tax, insurance and much more.

> Add To Cart

## Screenshots

Mortgage Calculator PRO 123

Calculator  
MORTGAGE PRO.  
MORTGAGE PRO.

Input

Loan Amount: \$250,000.0

Loan Term: 25.0 years

Interest Rate: 7.0 %

Output

Monthly Payment PI:

\$1,766.95



Menu

> View more screen shots

## Supported Devices



# Extracting features from description of apps

A **feature** to be a property, captured by a set of words in the app description and shared by a set of apps.

# Extracting features from description of apps

A **feature** to be a property, captured by a set of words in the app description and shared by a set of apps.

e.g. Finance

- setup, bank, accounts
- calculate, monthly, expenses
- e-mail, alerts, stock
- create, watch, lists
- financial, business, news

# Extracting features from description of apps

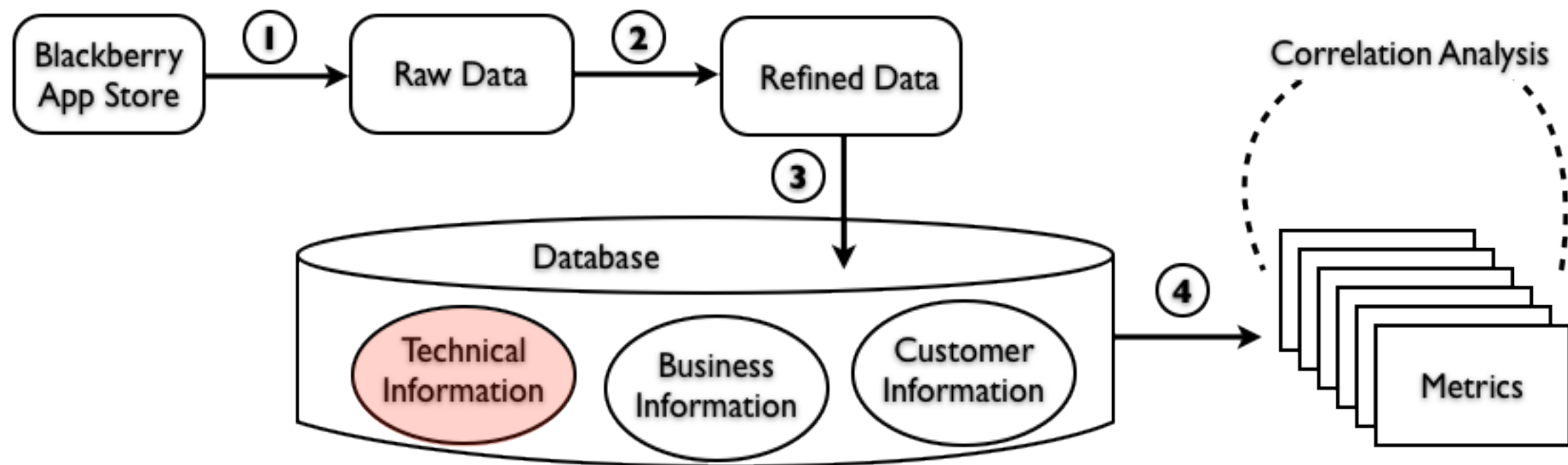
A **feature** to be a property, captured by a set of words in the app description and shared by a set of apps.

e.g. Finance

- setup, bank, accounts
- calculate, monthly, expenses
- e-mail, alerts, stock
- create, watch, lists
- financial, business, news

e.g. Travel

- free, wifi
- wifi, hotspot, near
- download, offline, use
- restaurants, plotted, map
- bus, service



## Item Description

(One time buy, no subscription, free upgrade only.)

Why is it important to have a mortgage calculator on the go?

Mortgage Calculator Pro is a quick and easy to use calculator.

When shopping for a house, comparing mortgage brokers with your significant other, the most important thing to know is the interest rate. By knowing this information, it can help you to make important decisions.

When choosing a house, make sure you can afford the price. This mortgage calculator is also quick and easy to use. All you need to do is enter the interest rate, and the amortization. After this is complete, the calculator will give you the monthly payment. The home mortgage refinance calculator helps you assess the loan information as well as the proposed refinance loan in order to determine the potential cost savings from refinancing your mortgage.

Mortgage Calculator PRO is a professional suite and it can help you with your refinancing.

Brief description:

- # Mortgage loan payments calculator with full amortization
- # mortgage comparison, affordability calculator, rent vs buy
- # Bar chart and pie chart support.
- # Send your results via Email/SMS or export it in Excel or Word.
- # Extremely powerful but easy to use.
- # Support for different currencies and different compounding periods, US mortgages, Canadian mortgages and other international mortgages.
- # English, Française, Deutsch, Español, Italiano.

## Algorithm 1 Feature Extraction Algorithm

**Require:** apps

rawFeatures = [ ]

featureLets = [ ]

**for all** apps **do**

**if** featurePattern exists in currentApp.description **then**

        rawFeatures.append (extractFeaturePattern (currentApp))

**end if**

**end for**

**for all** rawFeatures **do**

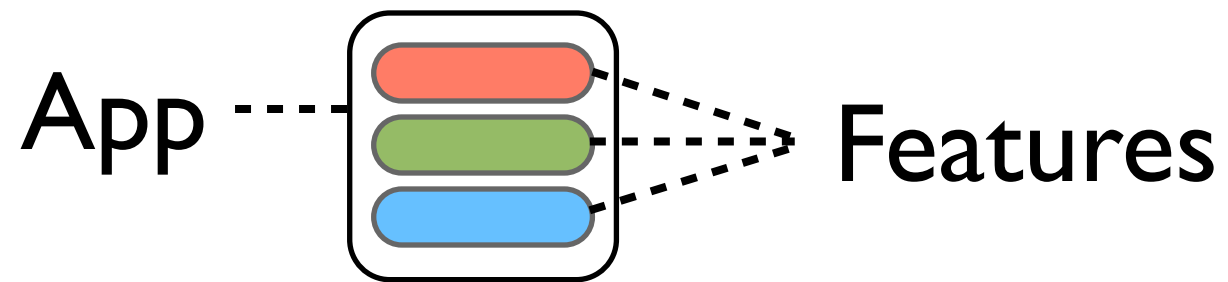
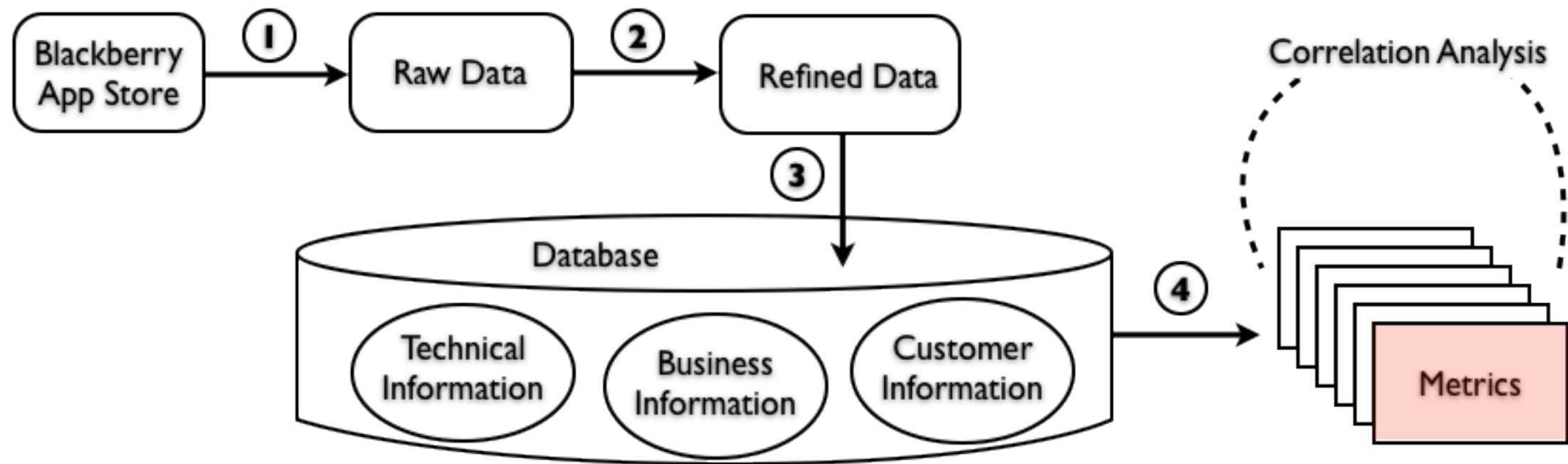
    refineRawFeatures (currentRawFeature)

**end for**

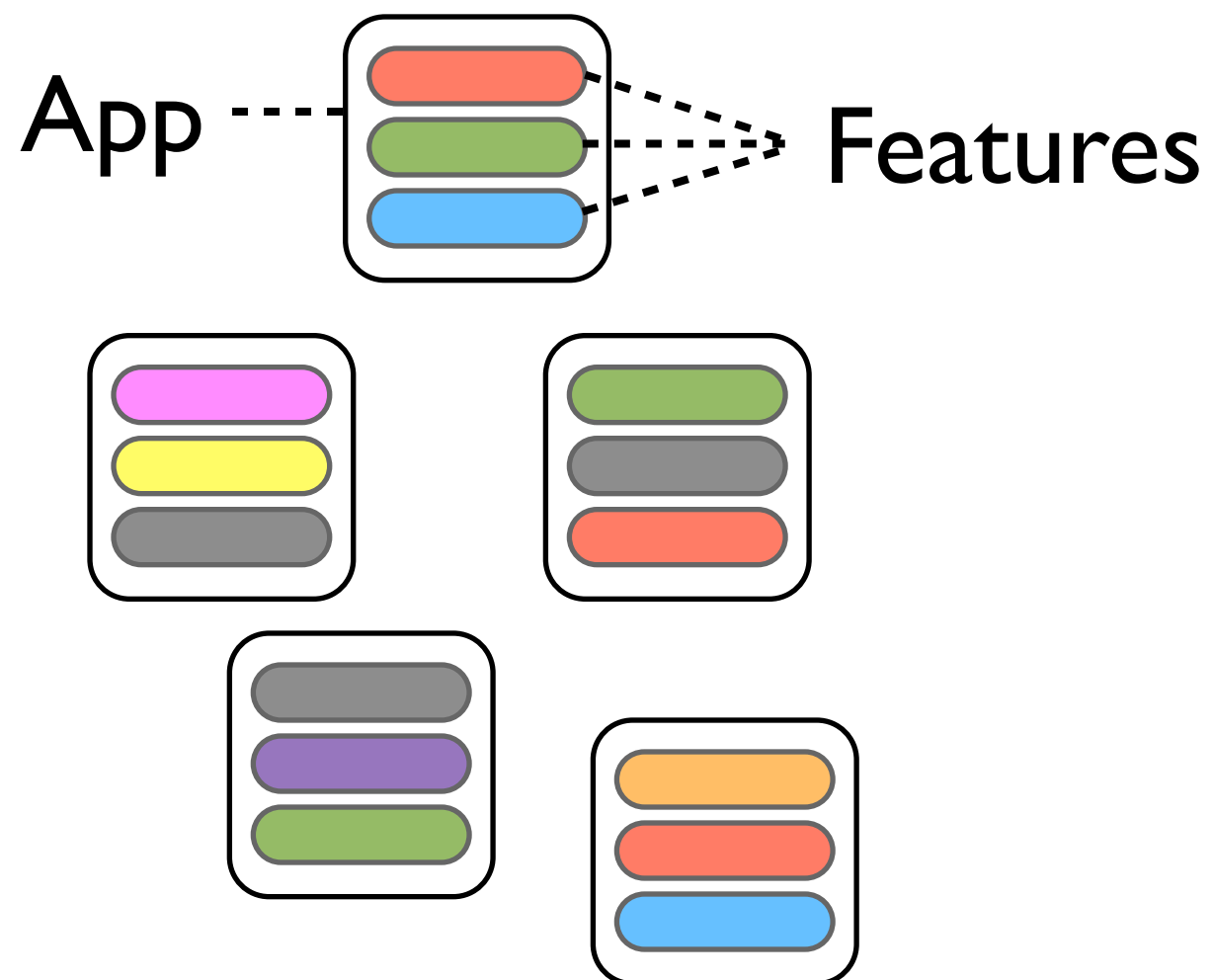
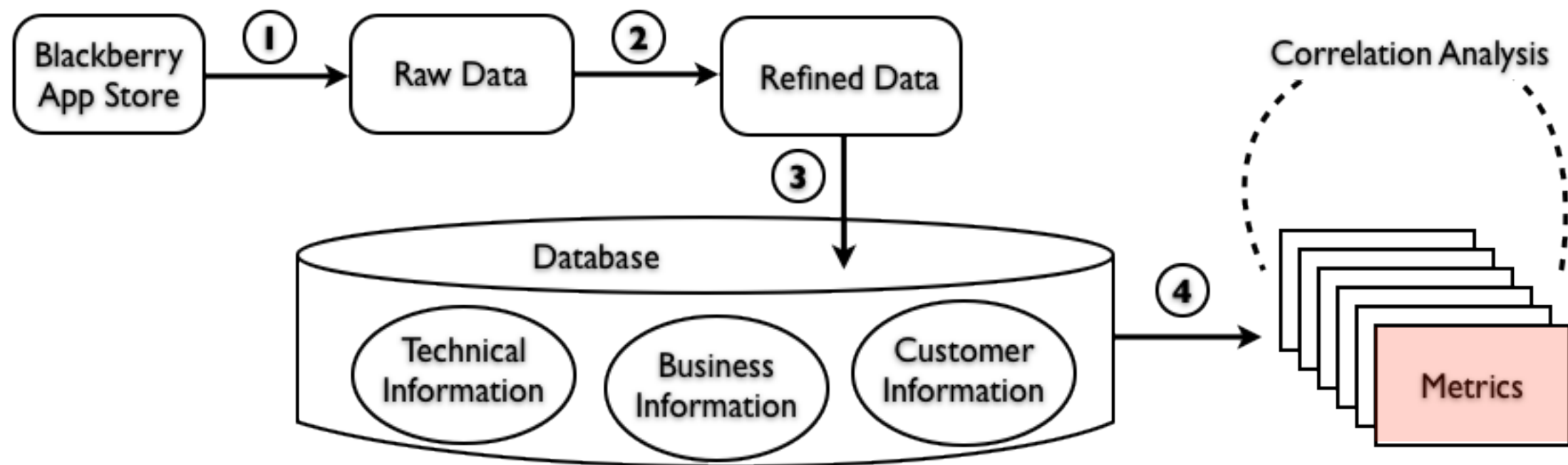
featureLets = findTrianGramCollocation (refineRawFeatures) {NLTK}

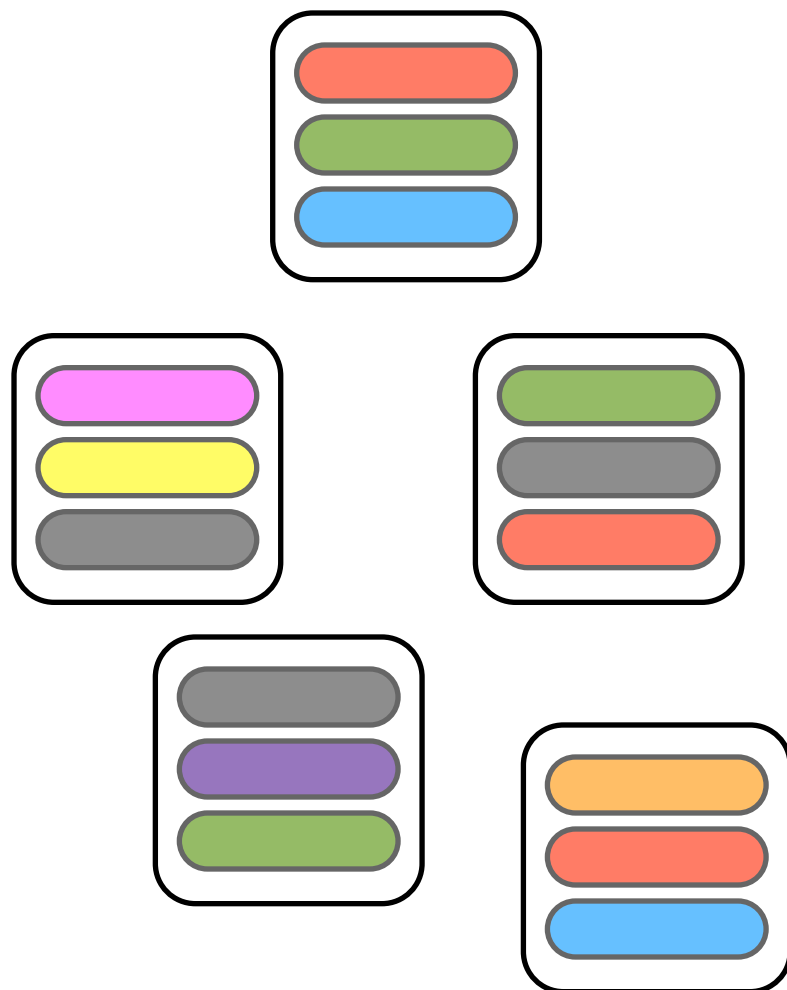
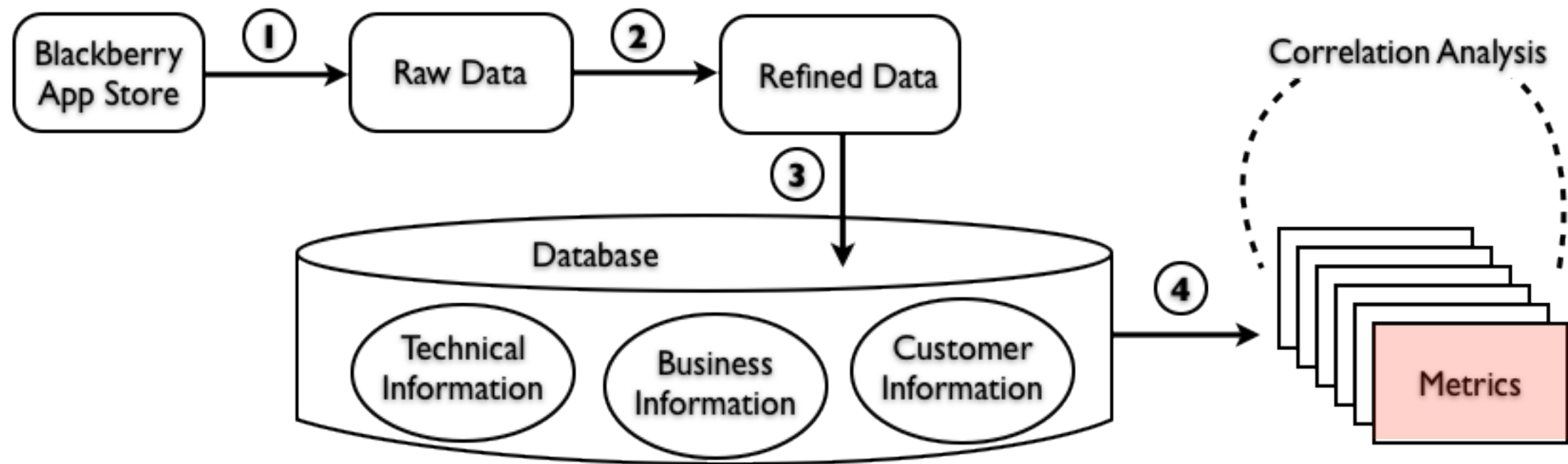
features = getGreedyClusters (featureLets)

**return** features

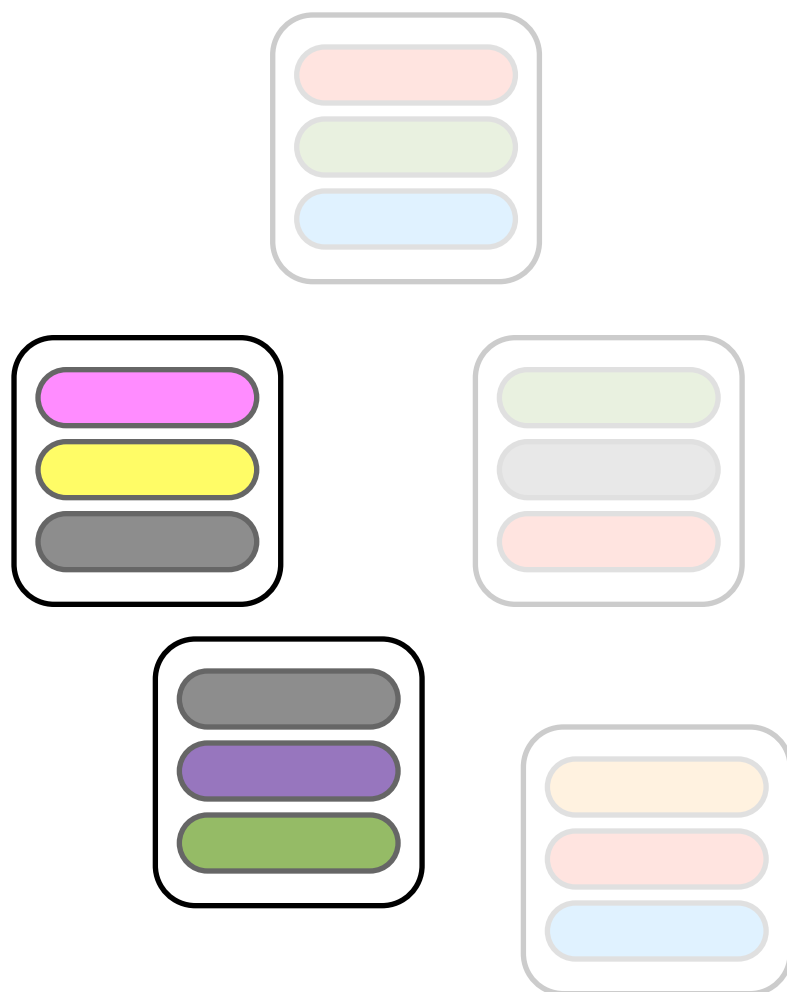
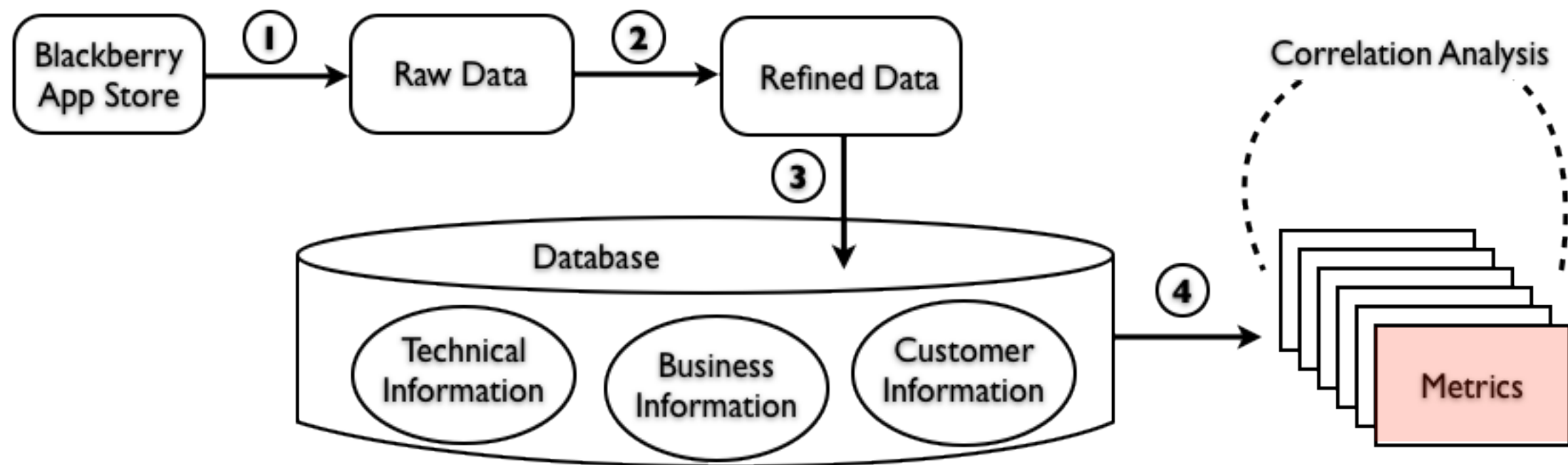






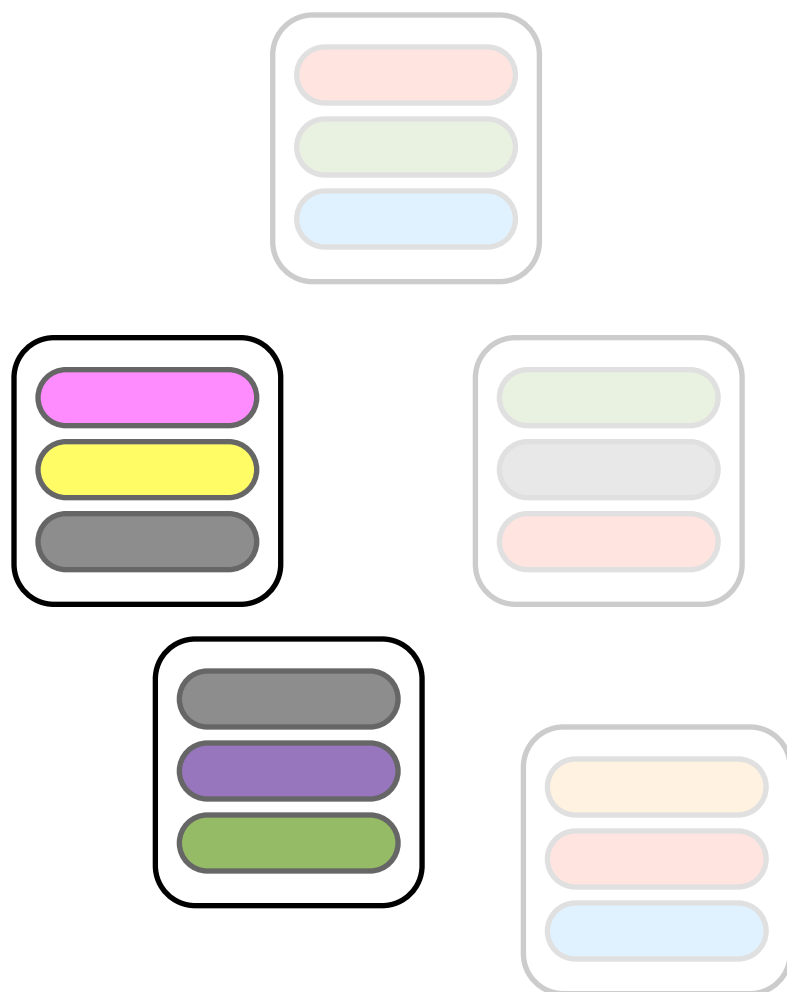
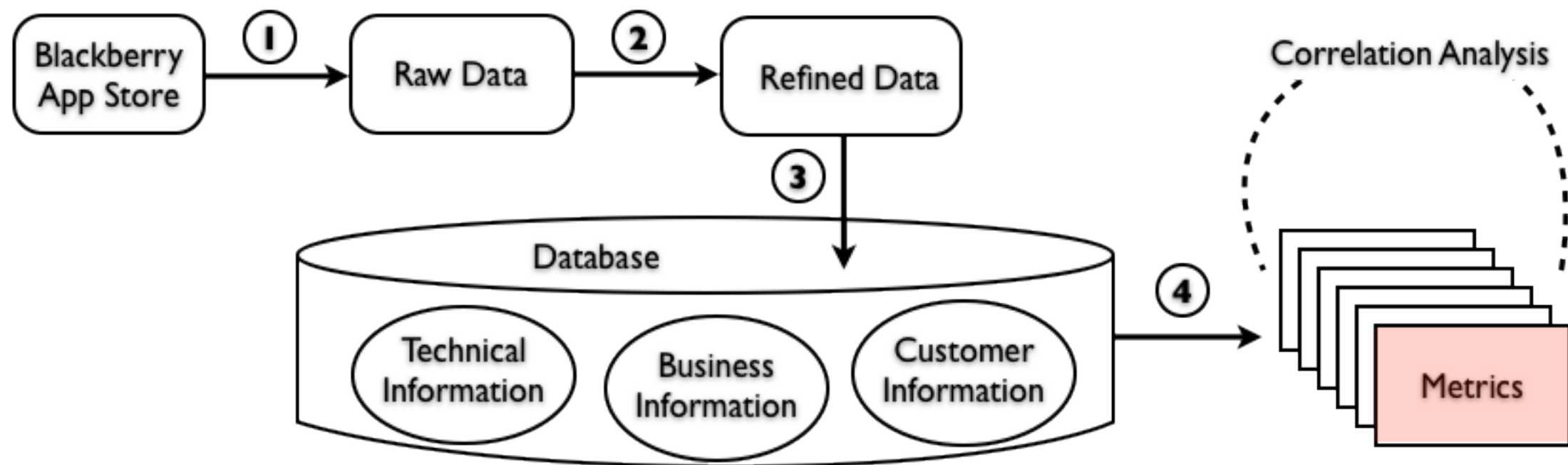


E.g cost for features ●



E.g cost for features ●

$$\frac{C(\text{●, ■, ■}) + C(\text{■, ■, ■}) + C(\text{■, ■, ■})}{3}$$



E.g cost for features 

$$\frac{C(\text{Red, Green, Blue}) + C(\text{Green, Grey, Red}) + C(\text{Orange, Red, Blue})}{3}$$

$$F(f, d) = \frac{\sum_{a_i \in S(f, d)} A(a_i, d)}{\#(S(f, d))}$$

# Do higher rated apps get more downloads?

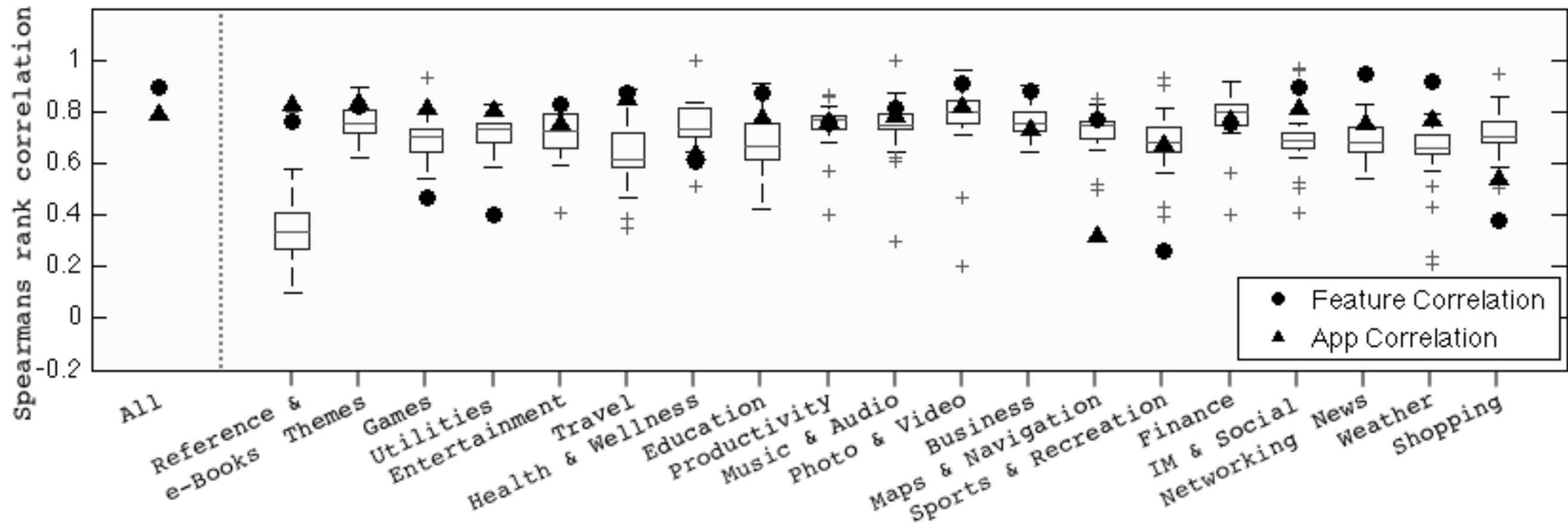


# Do higher rated apps get more downloads?

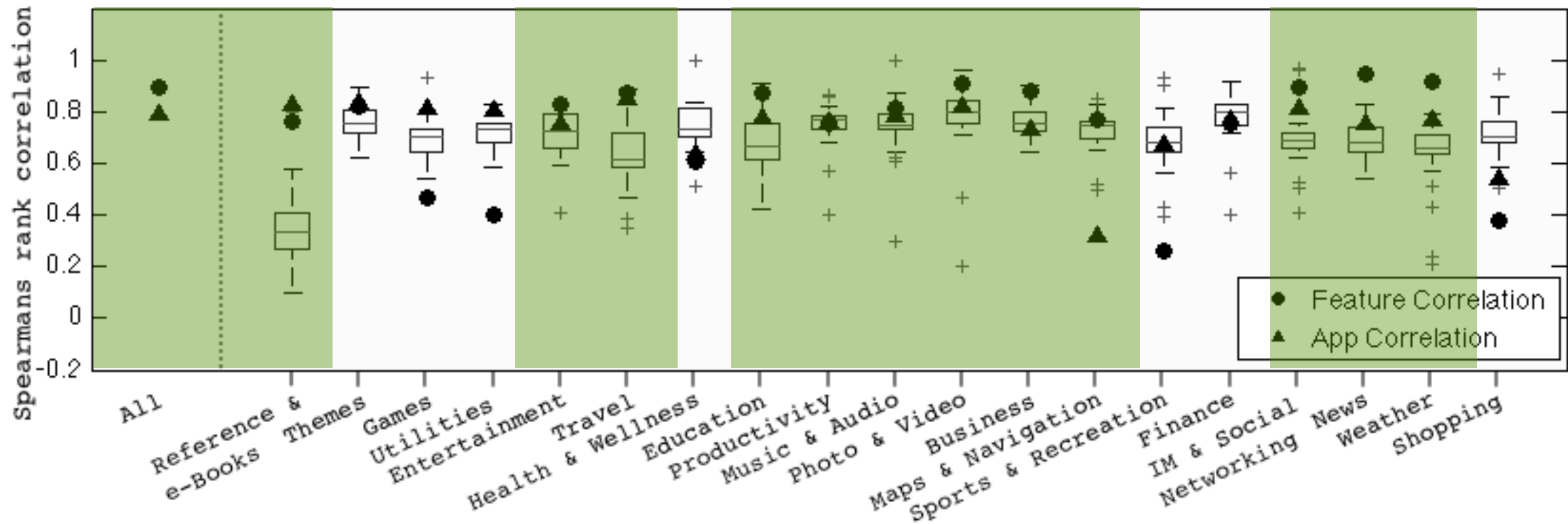
	Apps	Features
Spearman rank correlations (Ratings, Rank of Downloads)	0.79	0.89



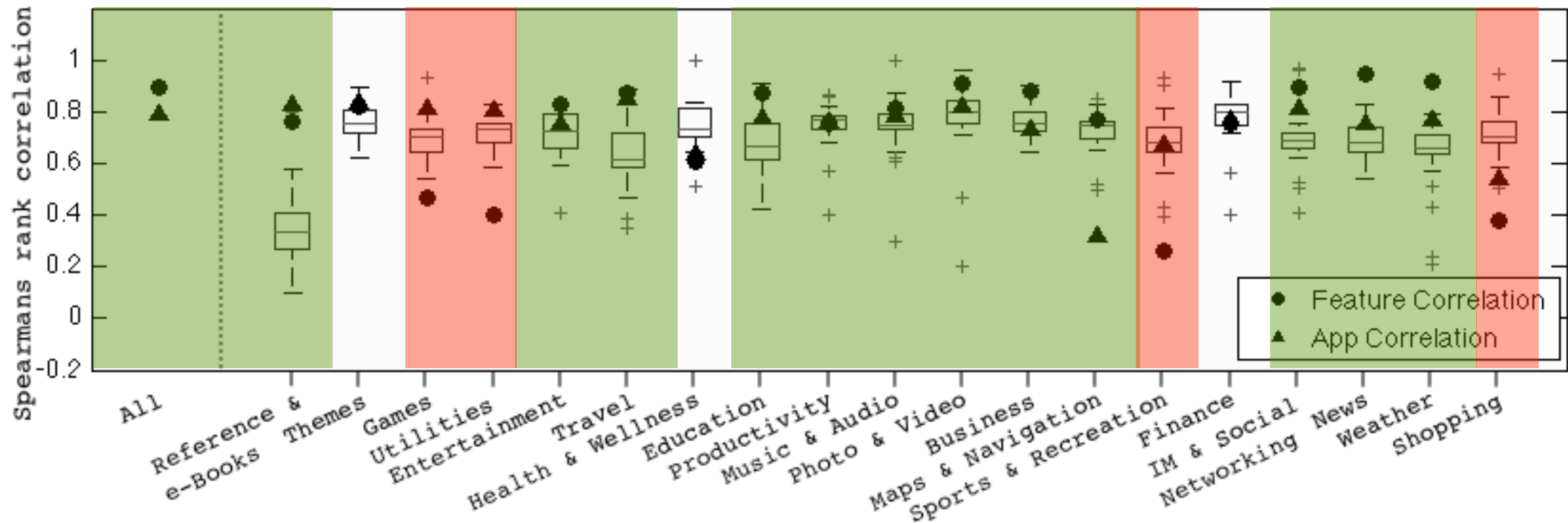
# What's the chance of producing a similar feature correlation purely at random ?



# What's the chance of producing a similar feature correlation purely at random ?



# What's the chance of producing a similar feature correlation purely at random ?




# How price sensitive are customers?

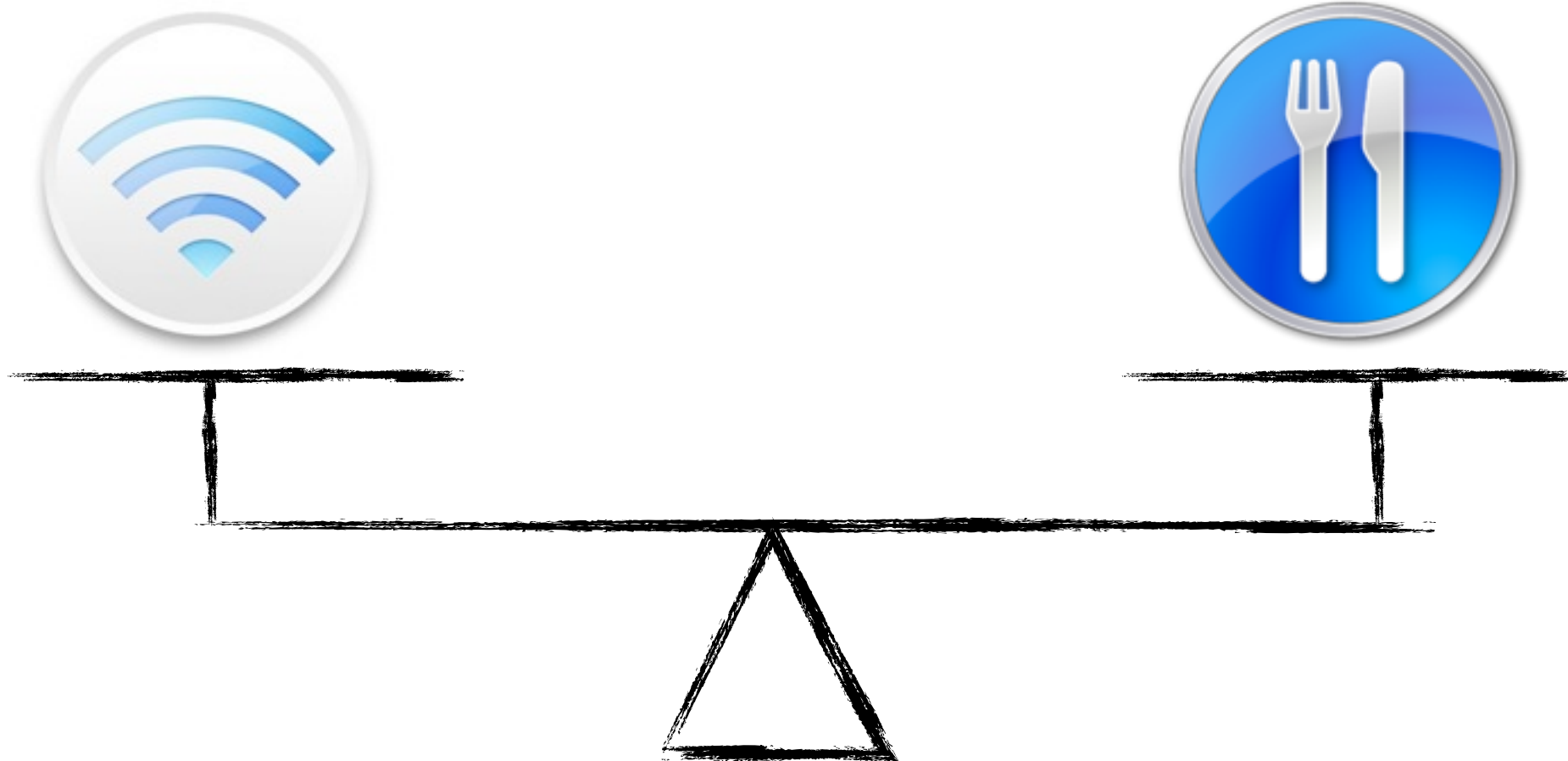


# How price sensitive are customers?

	Apps	Features
Spearman rank correlations (Price, Rank of Downloads)	0.12	-0.09



# Which feature shall I include in a travel app?



# Current work

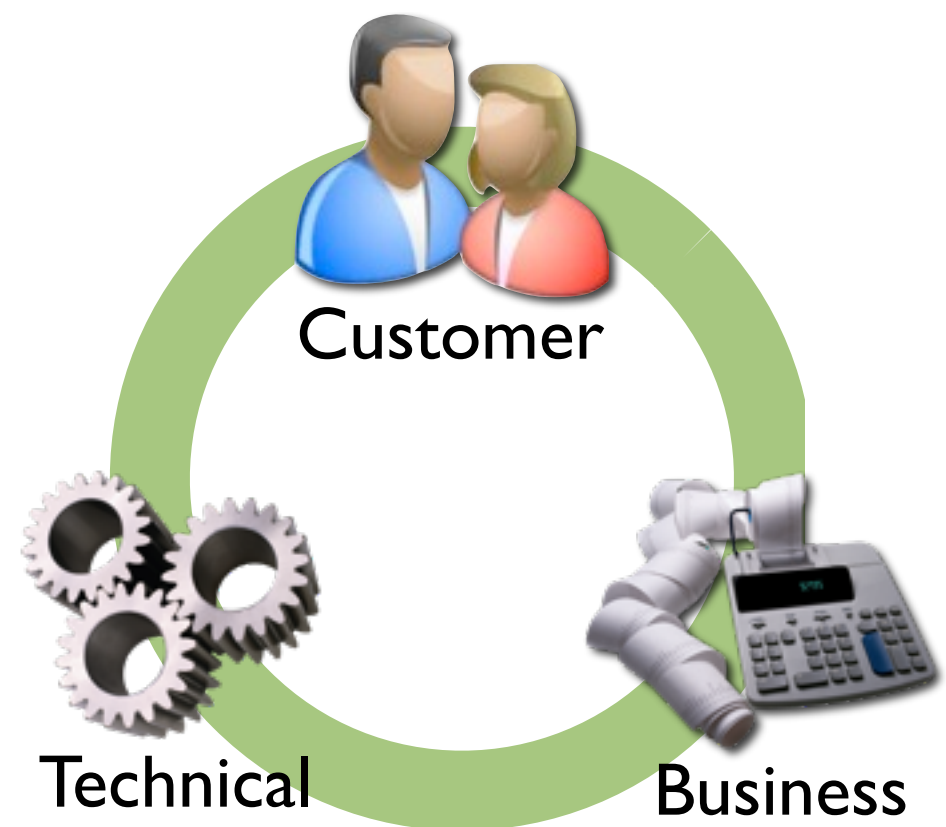
Predictive Models for App prices



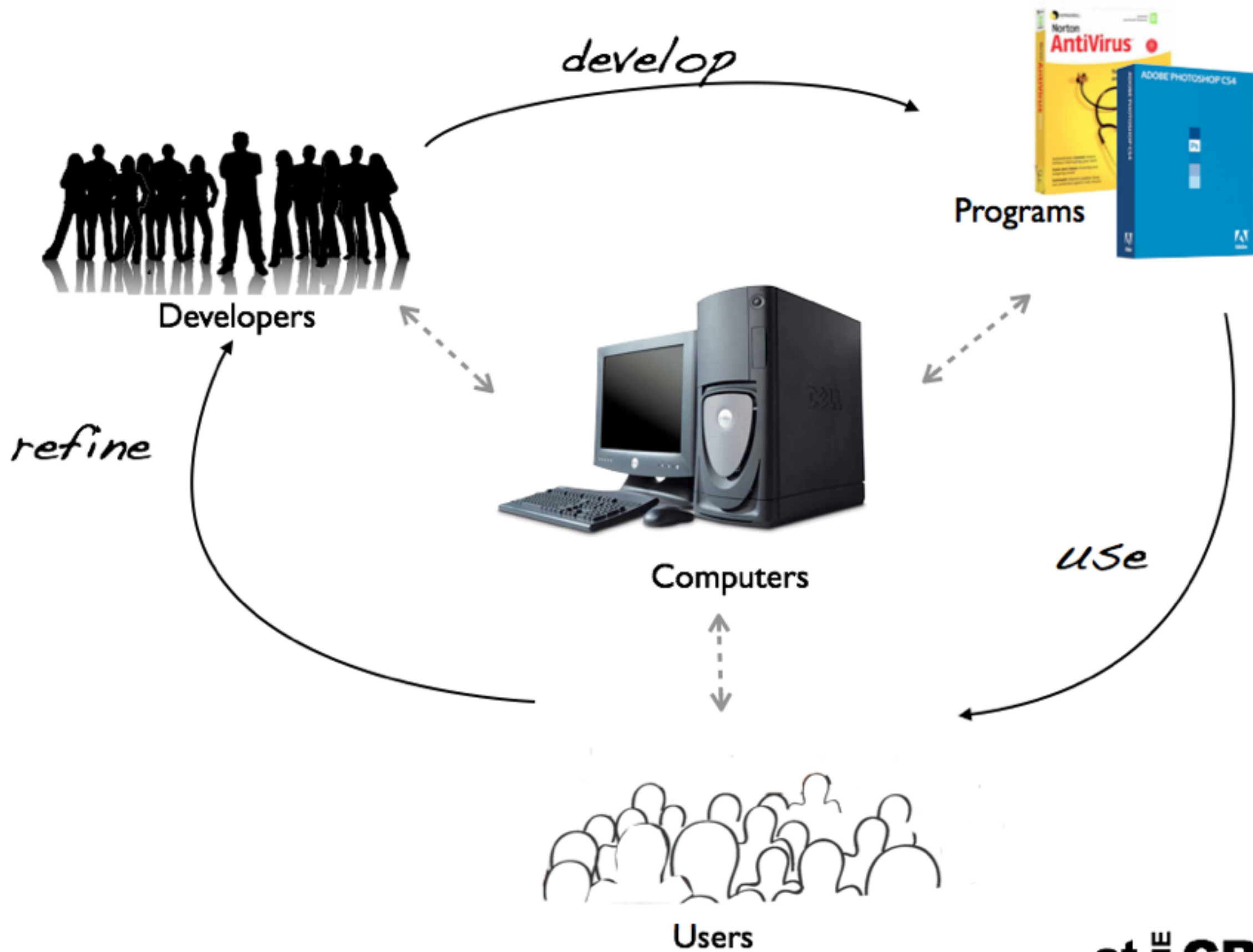
# Conclusion

App Store: a new form of software repository

Rich source of information

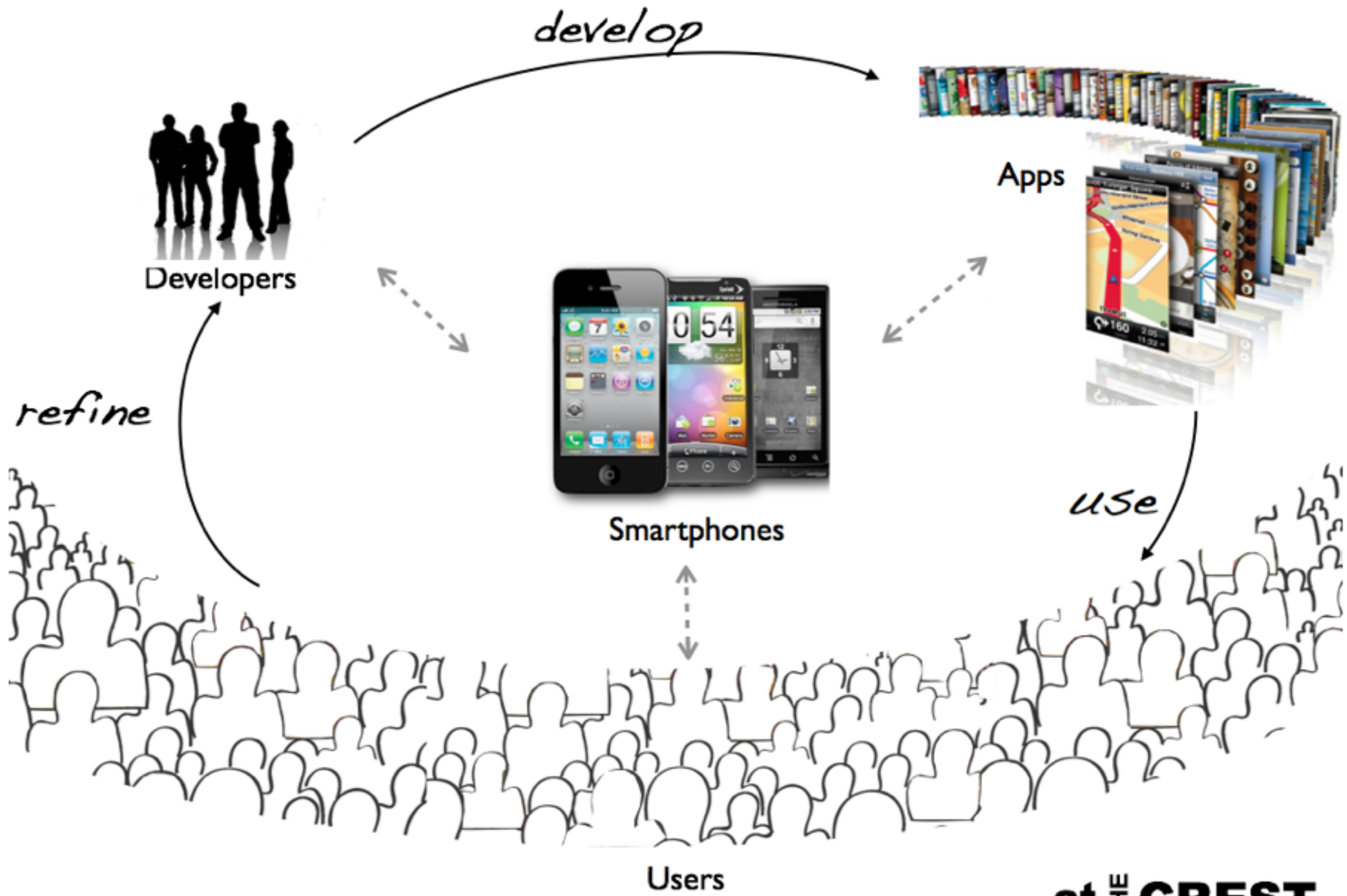


[http://www.cs.ucl.ac.uk/staff/Y.Jia/projects/app\\_store\\_mining](http://www.cs.ucl.ac.uk/staff/Y.Jia/projects/app_store_mining)



at <sup>THE</sup> **CREST**





at <sup>THE</sup> CREST