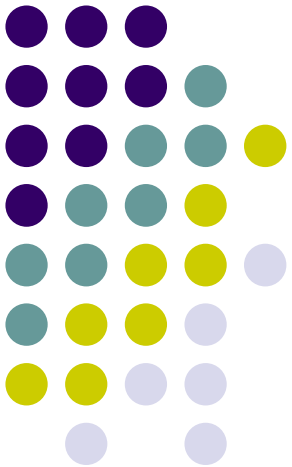
Ubiquitous and Mobile Computing CS 403x: Characterizing Smartphone Usage Patterns from Millions of Android Users

Andrew La Manna

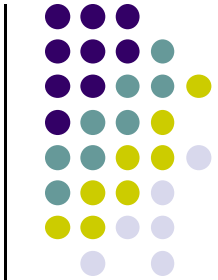
Andrew Roskuski

Computer Science Dept.

Worcester Polytechnic Institute (WPI)

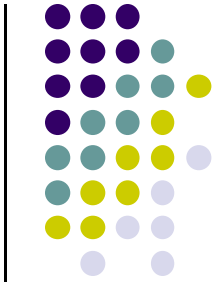


Introduction



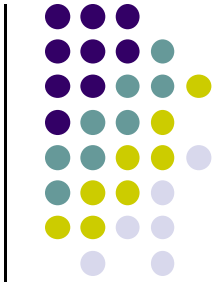
- Analysis of app usage behaviors
  - App management activities
  - Network Traffic
- Wandoujia
  - Chinese downloadable app store

Motivation



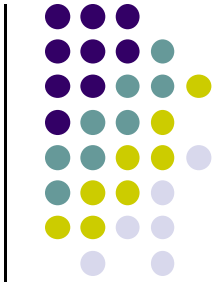
- Provide a comprehensive analysis of app usage behavior
  - Collected over millions of users
- Pervious studies were conducted on small groups and only focused on number of downloads
  - This can provide un-satisfactory results

Vision



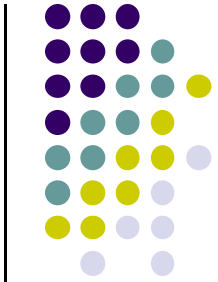
- Improve recommendation systems
- Identify problematic apps
- Improve content delivery network for apps

Related Work



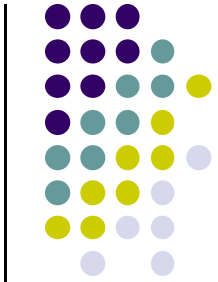
- There have been numerous studies about application popularity
  - Performed on specific groups of users or a small population
- This study is set aside from others due to:
  - Comprehensive measurement of app popularity from various aspects
  - Apps that are likely to be uninstalled
  - Why apps are installed together
  - Network traffic

Methodology



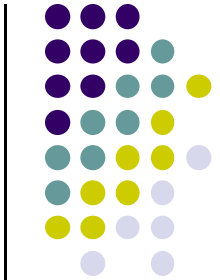
- Wandoujia has optional data collection built into their app
- Using a data from a month period and accurate data set was pulled
  - 0.2 million applications
  - 1.2 TB of data containing
    - App management activities
    - Network usage

Results



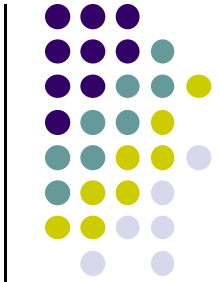
- Popularity distribution follows the “Pareto” effect
- Application that fall under the same genre or have the same vendor are usually installed together
- Installation/uninstallation ratio is positively correlated to lifecycle
  - Disliked app are installed with in two days

Results



- Network Usage
  - Apps with similar functionality had varying network usage
  - Apps that shouldn’t consume traffic will often do so in the background
  - Long lived TCP connections
- Device model effects app downloads and type of networks used

Conclusions



- The focus was the descriptive analysis of data
  - The findings were meant to raise questions and spark further research