Product Labels for Mobile Application Markets

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b.l.u.f. slide
the centralized nature of mobile application markets affords them a unique opportunity to gather and present information to eliminate information asymmetry
the problem
Information Asymmetry

• Lack of understanding between buyer and seller regarding quality of product
• One party has more or better information than the other
• Clear asymmetry in mobile application markets
• Developer knows quality, security, and privacy profile of the product
• The user only has access to noisy indicators like reviews and ratings
so what?
Information Asymmetry

• Developers can’t differentiate based on quality/security
• Differentiation drives innovation
• Markets thrive with information symmetry
• E.g., CarFax, Nutritional Labels, Safety Certifications
• Application markets in a unique position to relieve information asymmetry
Unique position of App Markets

• Complete control of installs/uninstalls:
  – Fantastic position to collect data
  – Also, to enforce labeling requirements
  – Punish mislabeling

• Often, control the user’s device too
  – Modify devices for better data and labels
Product Labels

Certification
Testing and Standards
Quantitative Analysis
Qualitative Analysis
Product Labels

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Certification

• Widely used in the real world:
  – Product Certification (e.g., fireproofing)
  – Professional Certification (e.g., Pilot’s license)

• Certify products for verifiable properties
  – E.g., Accelerometer data is used only locally
  – Encourages developers to participate

• Complex certifications fetch higher price
  – E.g., DoD willing to pay more for certified confidential apps (only talks to https://dod.gov)
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Testing and Standards

• Determine suitability for use or compliance to contract
  – E.g., Tensile strength, PCI

• Independent testing providers who test applications
  – Current comment and reviews are a rudimentary version of this

• Mobile markets can formalize testing procedures like real world regulators
Product Labels

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Quantitative Analysis

• Metrics measured via cardinal numbers
• Novel metrics possible in application markets
  – E.g., % of users who uninstalled application after
    (a) viewing permissions (b) using it for 1 day
  – Such feedback based metrics have been impossible in classic markets
• Control of the end device enables post-hoc metrics for audit of sensor data
This chart depicts how often the “CoffeeFree” application queries a user’s location. The chart is based on data gathered from thousands of devices. On average, this application queries a user’s location 2 times per day.
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Qualitative Analysis

• Cardinal numbers as measured by quantitative analysis might not be useful
• Qualitative numbers are *ordinal*
• Quantitative indicators can be bucketed
  – Low/Med/High attack surface
  – Similarly, security/privacy risk of permissions
• At install point, present other applications with a lower attack surface
• Or lower ‘uninstalls’ after sensor data audit
issues
Issues

• Sybil Attacks
  – Already a problem in reviews/ratings

• *How and How Well* can users consume this information?
  – User studies, A/B tests needed
  – How to combine labels into 1 actionable number?

• Crowdsourced metrics do not work for targeted attacks
  – Users with such a risk profile should only rely on certifications
conclusion
the centralized nature of mobile application markets affords them a unique opportunity to gather and present information to eliminate information asymmetry
thank you