Agenda

- Who am I?
- Overview
- Our Approach
- FIND System
- Application 1
- Application 2
- Lessons Learned
- Future Work
- Q&A
Who am I?

- Seung Ho Nam

Program Manager @ VIP (Value Innovation Program) Center, Samsung Electronics

What I do is...
- introduce innovative software engineering practices to the organization
- manage various projects to help team build better software faster

Backgrounds
- BS in Computer Science and Engineering from Seoul National University
- MS in Software Engineering from Carnegie Mellon University
- Served as a software engineer and consultant at Microsoft Korea for many years
- Delivered trainings and consultancies in Singapore, Thailand, and Saudi Arabia
Overview

- Why QAW?
  - The QAW provides an opportunity to **gather stakeholders together to provide input about their needs and expectations** with respect to key quality attributes that are of particular concern to them. [Quality Attribute Workshops Technical Report, Third Edition, August 2003, SEI]

- Who is the most important stakeholders for Galaxy S5?
  - Executives?
  - Architects?
  - Product Managers?
  - Sales People?
  - Developers?
  - Testers?
  - Other Engineers?
  - ...
  - Users (Consumers) ?

- Do you invite the users to your QAW’s?
We do not invite consumers...

- Even though we have done QAW’s for about 10 years, we do not for following reasons.
  - Security, Non-disclosure, Cost, Time, and so on.

- To mitigate the risks, we do
  - Consumer interviews (invitation based)
  - Home visit interviews
  - Surveys
  - Etc

- Can we trust the results? Aren’t they hiding something? Are the samples representative?
However, we need consumers...

- Can we hear consumers’ voices through social network services?
Our Approach

- Bring consumers virtually to our QAW by
  1) Modifying our QAW process to accommodate social listening
  2) Collecting and analyzing social data with a system
Our Approach – Process

Preparation Phase

Step 1. Social Analysis
Step 2. System & QA Introduction
Step 3. Seed Selection
Step 4. Social Data Analysis
Step 5. Candidate QA Elicitation

Workshop Phase

Presentation
- Step 1. QA Presentation and Introduction
- Step 2. Business / Mission Presentation
- Step 3. Architecture Plan Presentation

Investigation
- Step 4. Business / Mission Elicitation Game
- Step 5. Quality Attribute Elicitation
- Step 6. Social QA Presentation

Step 7. Quality Attribute Scenario Consolidation
Step 8. Scenario Prioritization

Is Elicited QA aligned with Business/Mission? [Yes, Step 9. Scenario Refinement] [No, Continue]

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Our Approach – FIND System Context

- FIND (Find INsight by Data)

Diagram:
- Desktop
  - Query (keyword, period, report type, etc)
  - Report
- Tweet Collector 1
  - API request
  - Tweet Stream
- Tweet Collector 2
  - API request
  - Tweet Stream
- Tweet Analyzer
  - Stream File
- Database
  - Stream File
  - Result
- Web Server
  - Query
  - Result
- Twitter Web Service
FIND System – Use cases
FIND System – Architecture (Simplified Layered)

UI Layer

WEB UI SubSystem

Business Logic Layer

Collector SubSystem

Analyzer SubSystem

Common SubSystem

Korean Morpheme Analyzer Class

Configuration Class

Logging Class

Utility Class

Data Access Layer

Data Access Subsystem
Application 1 – Experiment with Galaxy Gear

- **Problem:** We wanted to identify the QA’s people talked about Galaxy Gear a few weeks after it was released. With this initial application, we also wanted to formalize our method based on the findings and outcome.

- **Our approach:** We followed our modified process to analyze Twitter data.

- **Assumptions we made:**
  - 1) The more tweets, the more people are interested.
  - 2) Twitter might be the best option we had.
  - 3) Sentimental analysis is quite reliable, even though it is not perfect.
  - 4) Other languages do not affect the result significantly.
Application 1 – Experiment with Galaxy Gear (cont.)

• **Step 1: Social Analysis and System & QA Introduction**
  - Explain quality attribute (QA) and our social analysis system such as its purpose, working mechanism, and output to the team.

• **Step 2: Seed Selection**
  - Choose the seeds as a team. (ex. a website’s URL or an SNS).
  - Activity: Identified ‘Twitter’ as the right seed for eliciting social QA’s.
  - Reason: Twitter has a myriad of real end users’ voices with excellent API’s.

• **Step 3: Keyword Selection**
  - Discuss keywords for this QAW and select them as a team.
  - Activity: Chose three product names around smart watch: ‘galaxy gear’ and 2 other smart watch products.
  - Reason: The product is in its very early stage and there’s no general noun like smartphone or specific technology term in fashion.
**Step 4: Social Data Analysis**
- Collect and analyze the data based on the chosen seeds and the keywords with the system for specific period of time (1~2 weeks).
- Activity: Collected tweets for 10 days and analyzed them in 3 ways:
  1) Keyword frequency analysis
  2) Related word analysis
  3) Sentimental analysis

**Step 5: Candidate QA Elicitation**
- Elicit candidate QA’s from the outcome of the social data analysis as a team.
- Activity: Elicited QA’s as a team
  1) Choose some meaningful words from top words
  2) Search tweets with the keyword and related words
  3) Find the context
  4) Develop a QA based on the context
Application 1 – Experiment with Galaxy Gear (cont.)

- **Source:** Twitter
- **Collecting period:** 2013. 11. 08 ~ 2013. 11. 18

<table>
<thead>
<tr>
<th>Keyword 1</th>
<th>“Galaxy Gear”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>“note 3”, “phone”, “s4”</td>
</tr>
<tr>
<td>QA’s</td>
<td>Compatibility with other devices</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyword 2</th>
<th>Another smart watch product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>“men”, women”, “sizes”, “iphone”, “bluetooth”</td>
</tr>
<tr>
<td>QA’s</td>
<td>Supportability for different display</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyword 3</th>
<th>The other smart watch product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>“basics”</td>
</tr>
<tr>
<td>QA’s</td>
<td>Reliability with basic functions</td>
</tr>
</tbody>
</table>
Problem: We wanted to identify the QA’s that people like to have on a new robot vacuum product.

Our approach: We followed our modified process to analyze community data.

Step 1: Social Analysis System & QA Introduction

Step 2: Seed Selection
- Activity: Chose an online community and Twitter as seeds
- Reason: We wanted to hear both from actual users and the general public.

Step 3: Keyword Selection
- Activity: Chose three keywords (navibot and 2 other robot vacuum products) for an online community and three keywords (로봇청소기, navibot, and another robot vacuum product) for Twitter.
- Reason: We wanted to compare each product’s user feedback and extend to Korean feedback.

Step 4: Social Data Analysis

Step 5: Candidate QA Elicitation
### Application 2 – Eliciting Social QA’s for Robot Vacuum (cont.)

- **Source:** An online community
- **Collecting Period:** Jan. 1, 2014 ~ Apr. 8, 2014

<table>
<thead>
<tr>
<th>Keyword 1</th>
<th>“Navibot (Smart Tango)”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>Dead</td>
</tr>
<tr>
<td>QA’s</td>
<td>Reliability with the operation / Usability with error information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyword 2</th>
<th>Another robot vacuum product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>Right, Wheel, Resistance</td>
</tr>
<tr>
<td>QA’s</td>
<td>Reliability with wheel / Usability with error information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyword 3</th>
<th>The other robot vacuum product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>Problem</td>
</tr>
<tr>
<td>QA’s</td>
<td>Reliability with homing to docking station</td>
</tr>
</tbody>
</table>
Application 2 – Eliciting Social QA’s for Robot Vacuum (cont.)

- **Source:** Twitter

- **Collecting Period:** Dec. 23, 2013 ~ Mar. 28, 2014

<table>
<thead>
<tr>
<th>Keyword 1</th>
<th>“로봇청소기” (“Robot Vacuum”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>물걸레 (wet mopping), 마르지 않는 (not dried out)</td>
</tr>
<tr>
<td>QA’s</td>
<td>Extensibility with driving patterns of multiple cleaning tools</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyword 2</th>
<th>“Navibot”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>Charger</td>
</tr>
<tr>
<td>QA’s</td>
<td>Reliability with charger and battery information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyword 3</th>
<th>The other robot vacuum product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top words</td>
<td>Battery</td>
</tr>
<tr>
<td>QA’s</td>
<td>Performance of battery management and power consumption</td>
</tr>
</tbody>
</table>
Lessons Learned

- Preparation phase was applicable.
- Positive points and negative points could make us more assured.
- We could figure out which QA people are more interested in based on objective supporting data.
- Social QA’s complemented QA’s from people’s workshop.
- This approach was time-and-cost-efficient.
- Twitter might not be accurate because it gives time-specific data.
- We are not in the stage to tell if a social QA is really beneficial for a real product.
Future Work

- Context based analysis (grouping words in similar meanings)
- More advanced sentimental analysis
- Social QA elicitation technique process and automation
- A tool for filtering out what not to believe
- How to handle Twitter-specific characteristics
  - Advertisement
  - Small number of tweets on a topic
  - Retweets
  - Twitter API’s reliability
- Applying human psychological analysis technique (catching meanings behind metaphor, sarcasm, irony, and so on)
- Support more languages
References

  
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  Heeran Youn, Samsung Electronics
  

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  Heeran Youn, Seung Ho Nam, Eugene Kim, Jiyeon Lee, Heekyeong Bae, Sunmyung Lee, Dongjin Lee
  
  http://www.actapress.com/Abstract.aspx?paperId=455874
Q&A
Thank you.