Gallery D.C.: Design Search and Knowledge Discovery through Auto-created GUI Component Gallery

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What is **Design Sharing**?

*Design sharing* is a routine activity through which design knowledge and creativity is exchanged among designers.
What is **Invisible Crowdsourcing**?

**Invisible crowdsourcing** is one of the emerging Web 2.0 based phenomena and enables a broader collaboration indirectly with thousands of designers who craft the design of the world-wide popular mobile apps.
Motivation: Design Practicality

Designers need to see the **practical use** of certain GUI designs in real applications, rather than just **artworks**.
Motivation: Design Granularity

Designers want to see not only the **overall** designs but also the detailed design of the GUI **components**.
Motivation: Design Knowledge Discovery

Designers need advanced GUI design search abilities and knowledge discovery support.

TALK OUTLINE

1. Problem Definition
2. Data Collection
3. Component Wirification
4. Gallery D.C.
5. Informal Feedbacks from Designers
Problem Definition

A large-scale gallery of 11 types of GUI components for Android GUI design

Application introduction screenshots in market usually illustrates the most important features and the best-designed GUIs of an application.
<table>
<thead>
<tr>
<th>Method</th>
<th>Data Size</th>
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</thead>
<tbody>
<tr>
<td>Real-app screenshots</td>
<td>68,702</td>
</tr>
<tr>
<td>Automated GUI Exploration</td>
<td></td>
</tr>
<tr>
<td>App Introduction screenshots</td>
<td>469,177</td>
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<tr>
<td>Crawling</td>
<td></td>
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We use the real-app screenshots to train a component detection model using Faster RCNN.

The trained model is then used to wirify (i.e., decompose) components from the app introduction screenshots.
We develop a GUI-specific image augmentation method to transform the real application screenshots into similar style of introduction screenshots.
Performance of model:

- **Recall**: 0.62, **Precision**: 0.76, **mAP**: 0.51
Give designers direct access to GUI components and at the same time allow them to view actual use of the components in the whole designs.
Informal Feedbacks from Designers

Inspirational Search

Game application scenario

- **Pink reflective bubble** attract young girls
- **ranking-list icon** ranking mechanism
Informal Feedbacks from Designers

Design Demographics

Social media application scenario

- flat and wide catch attention
Comparison Shopping

Distinguished design system scenario

- **Microsoft** right angle rectangle
- **Google** white, black, gray, shadowing effects
Summary of contributions

1) Invisible crowdsourcing GUI design resources in the application market

2) Complement existing design sharing platforms
   - Design Practicality
   - Design Granularity
   - Design Knowledge Discovery

1) Qualitative study showing the usefulness of Gallery D.C.

   - Video: https://www.youtube.com/watch?v=Co5ydBLH9JA