

SENG321: CrowdRE

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Outline

What is CrowdRE

CrowdRE

How does this relate to your project?

What is CrowdRE

CrowdRe is a "a semi-automated requirement engineering (RE) approach for obtaining and analyzing any kind of `user feedback' from a `crowd', with the goal of deriving validated user requirements." (Groen 2015)

From earlier times

User requirements of mobile technology (2008)

AbstFinder -> Prototype Natural Language Text
Abstraction Finder for Use In Requirements Elicitation
(1997)

The “Crowd”

“A group of current and/or potential stakeholders, large enough in size to display group behaviour, who have a common interest in a particular service”

The “Crowd”

“A large group of **current** or **potential** users of a software product’

User Feedback from the Crowd

Needs

Wishes

Ideas

Bug reports

Clues

Etc


Importance of the Crowd

Desire and **need** to design and develop software considering the full range of human diversity

Traditional approaches (interviews, phone calls, surveys with a limited number of people) is insufficient

Reddit may force Apollo and third-party clients to shut down, asking for \$20M per year API fee



Michael Potuck | May 31 2023 - 11:17 am PT |  38 Comments



r/iOS is a private community

/r/iOS is going private in protest against Reddit's changes to API. Join:
<https://discord.gg/iPhone>

The moderators of r/iOS have set this community as private. Only approved members can view and take part in its discussions.

[Message Mods](#)

[Browse Reddit](#)

Importance of the Crowd

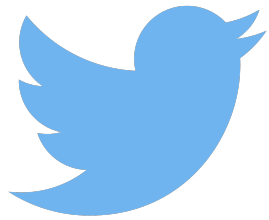
Desire and **need** to design and develop software considering the full range of human diversity

Traditional approaches (interviews, phone calls, surveys with a limited number of people) is insufficient

Considering and analyzing the needs from diverse end-users in the crowd is paramount

Sources of User Feedback

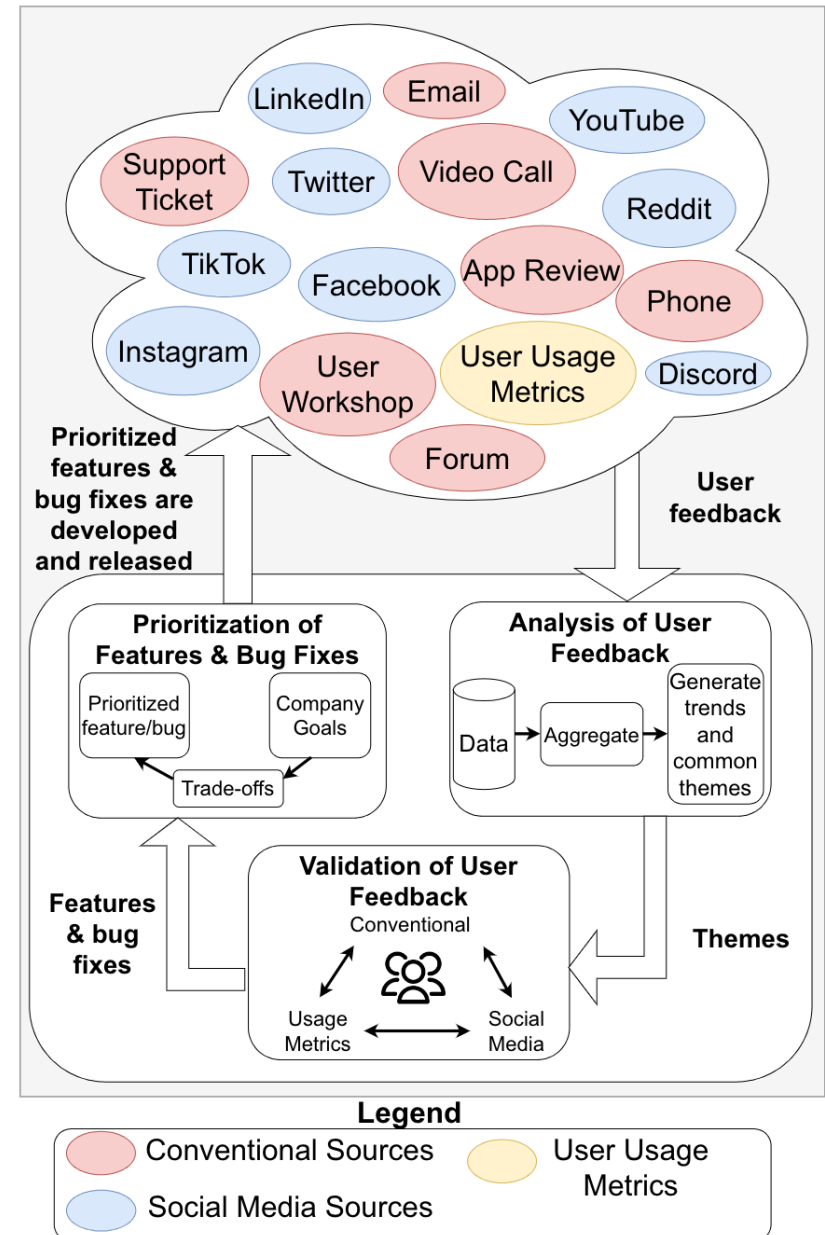
Sources of User Feedback



**What sources could be used
for your project?**

Life Cycle of User Feedback

Z. S. Li, N. N. Arony, K. Devathanan, M. Sihag, N. Ernst, and D. Damian, "Unveiling the Life Cycle of User Feedback: Best Practices from Software Practitioners," accepted in 2024 International Conference on Software Engineering (ICSE 2024)



Feedback Collection

Organization requests feedback from end users (e.g., question and answer form)

Organization collects feedback that end users provide organically (e.g., app review)

Manual Ways of Collecting Feedback from Crowd

Meeting end users in the wild (e.g., coffee house, pizza place)

Manually reading end user posts

e.g., team of analysis reading app reviews

e.g., watching video reviews of video games

How about Automation?

Publications over the last decade:

How Do Users Like This Feature?
A Fine Grained Sentiment Analysis of App Reviews

User Feedback in the AppStore: An Empirical Study

Bug Report, Feature Request, or Simply Praise?
On Automatically Classifying App Reviews

Toward Data-Driven Requirements
Engineering

On the Automatic Classification of App Reviews

A recent example...



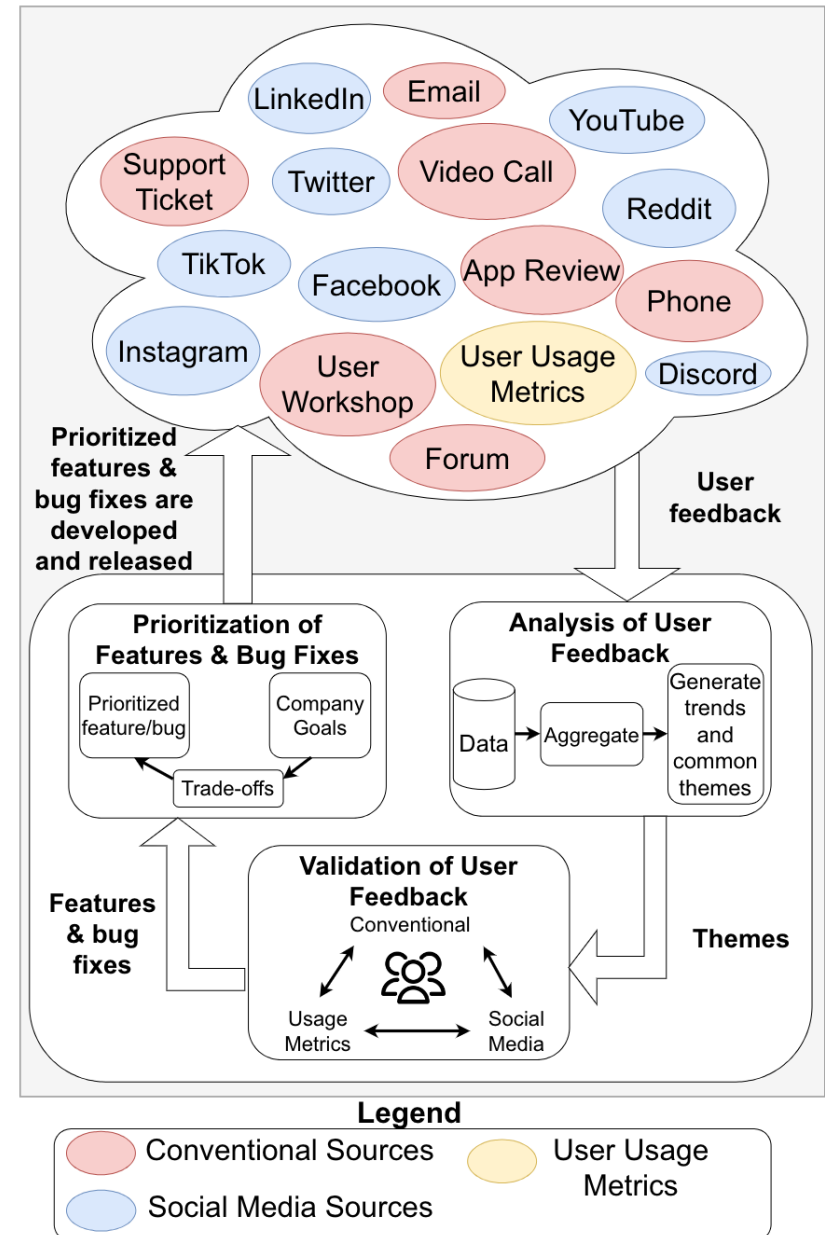
A recent example...



A recent example...



Life Cycle of User Feedback



How to Mine Requirements

Google Play Scraper: <https://github.com/JoMingyu/google-play-scraper>

Reddit Access: <https://pushshift.io/signup>

Stackexchange: <https://archive.org/download/stackexchange>

Stackexchange data explorer: <https://data.stackexchange.com/stackoverflow/query/new>

**Would you use LLMs to
conduct automatic annotation
of documents?**

Can you trust it?

Example from Research

Over 700 citations since 2013

Won "test of time" award in 2023

Paper reports on analysis of over 1M app reviews from App Store

Feedback is often provided after new releases

Example from Research

Downloaded app reviews from 22 app categories

- » Books
- » Business
- » Travel
- » Weather
- » Music
- » Etc

Example from Research

Over 600K from free apps and 400K from paid apps

1100 apps from App Store

General topics

- » Praise, helpfulness, bug report, other app, recommendation, noise, etc

Example from Research

General types of feedback

- » Community
 - » Refers to other feedback and other apps, etc (community aspects)

Example from Research

General types of feedback

- » Requirements
 - » Feature
 - » Content
 - » Improvement request
 - » Bug reports

Example from Research

General types of feedback

- » Rating
 - » Praise
 - » Dispraise
 - » Promise

Example from Research

General types of feedback

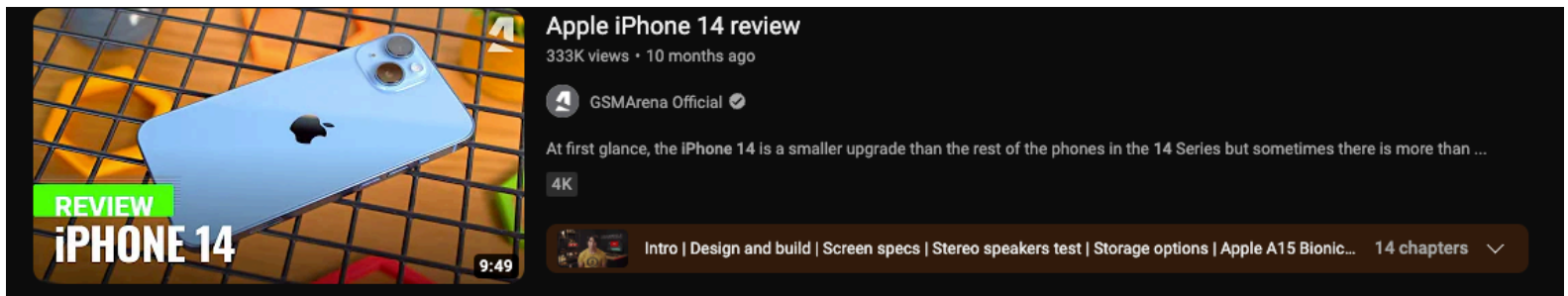
- » User Experience
- » Description of app in action

Example from our Recent Research

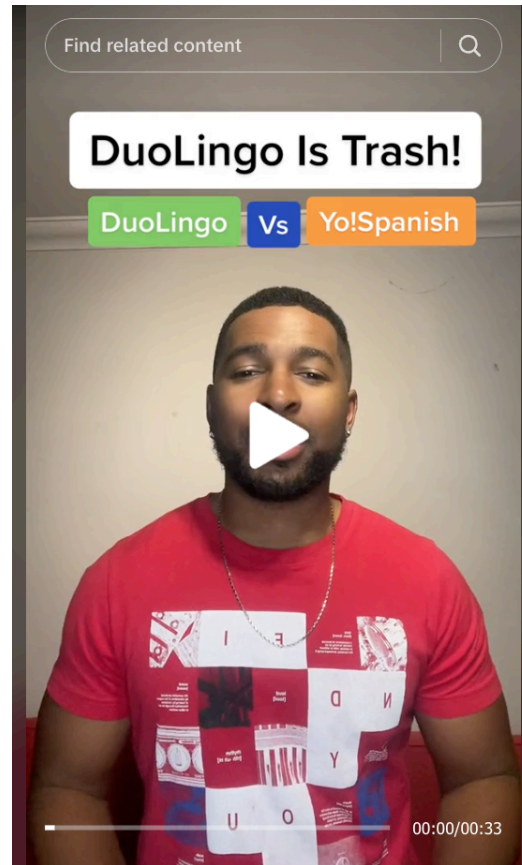
Finding requirements relevant feedback from TikTok and YouTube

“Feedback that is significant for the company's requirements and product development activities”

Example from our Recent Research



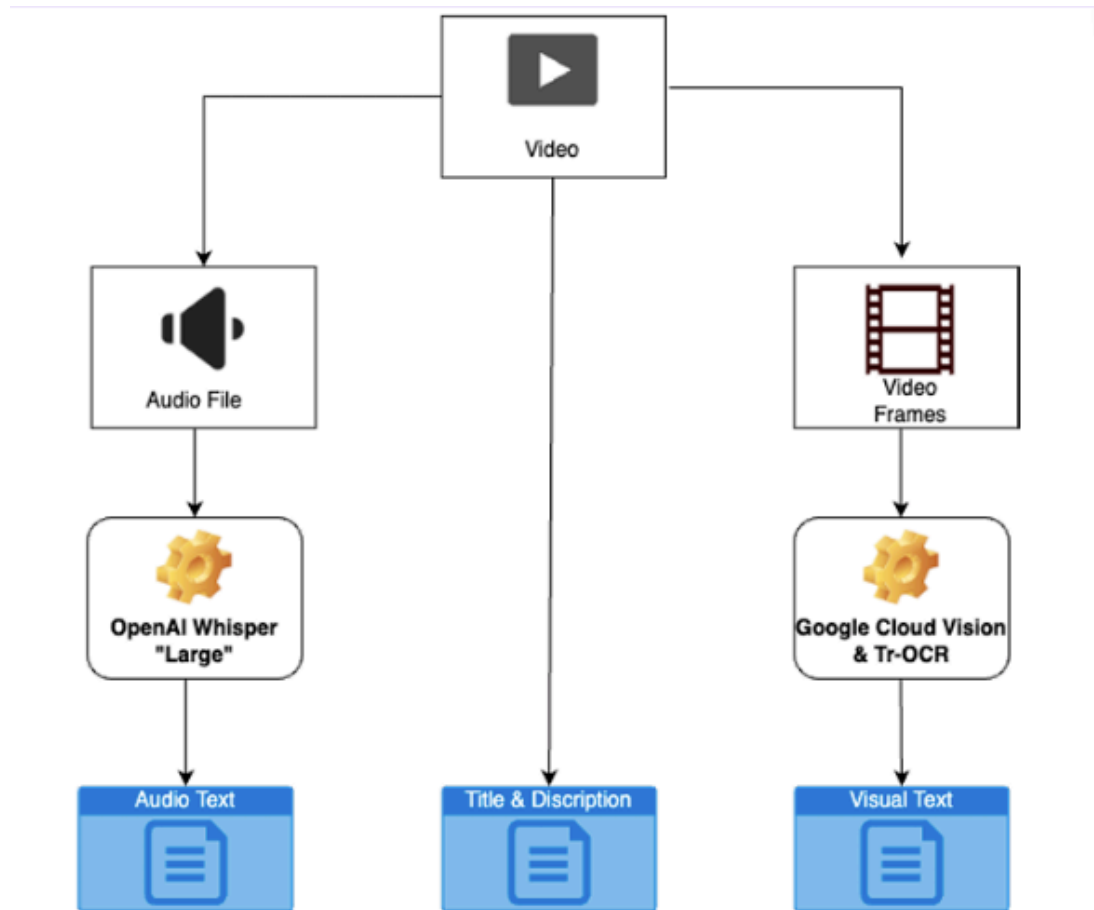
Example from our Recent Research



Example from our Recent Research

"The new Duolingo update is seriously messing me up I can't even get back into the lesson I was actively working on. Please revert it... Goodbye Duo it was fun... Also note that this person has super Duolingo which means they pay for a subscription"

Example from our Recent Research



Example from our Recent Research

Text extraction using audio was effective for classifying (0.94 AUC for YouTube)

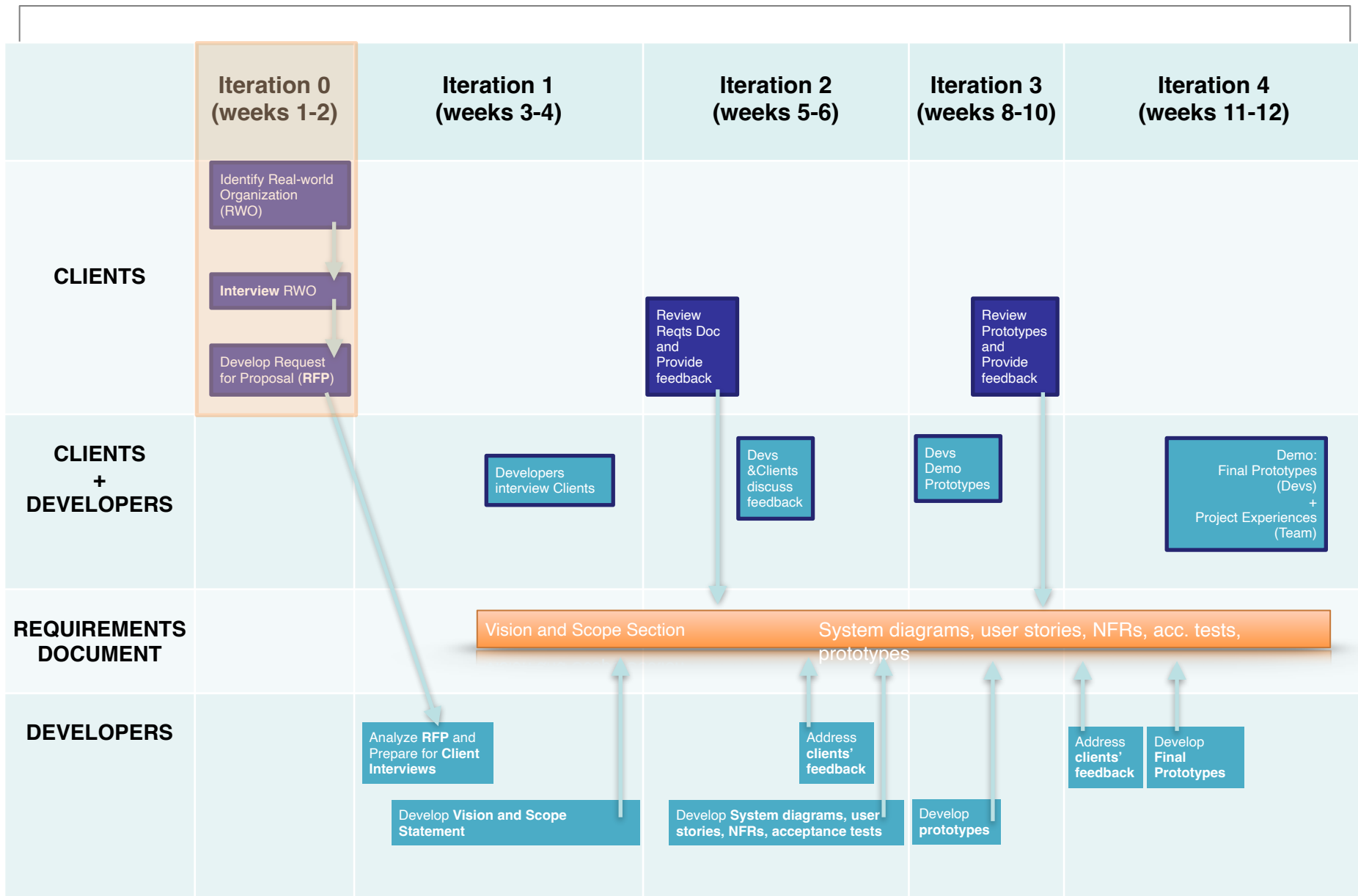
Text extraction using visual text was not as effective for classifying (0.71-0.79 AUC)

Combination of the tool was effective for TikTok (0.97 AUC)

Example from our Recent Research

Major themes from the analysis

- » Feature ratings, matching competition, bug report, performance ratings, modification suggestions, etc



Interested in working in CrowdRE or User Feedback research?

Want to try some research analysis and need a course?

You could join our research team this summer and do a directed studies course