Emotion Recognition in Instant Messaging Applications

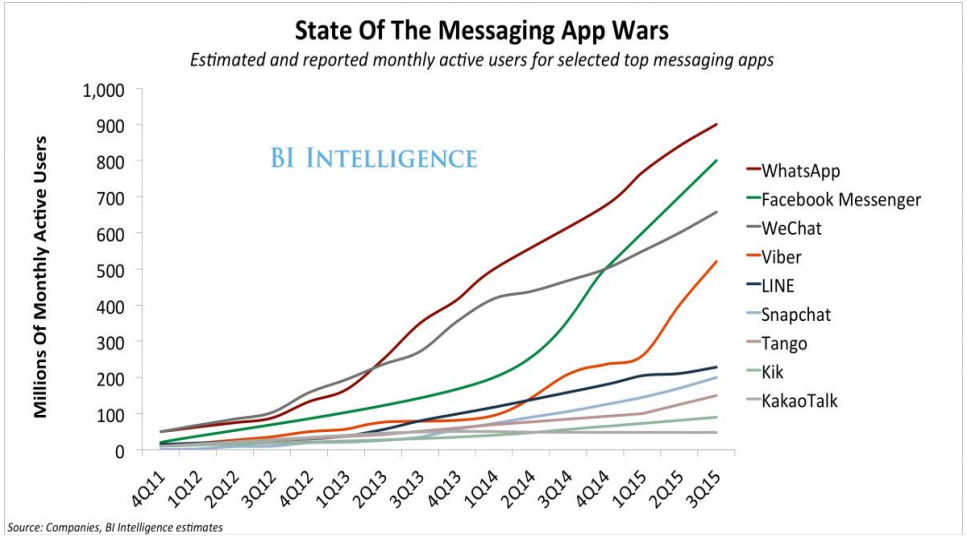
Nabiha Asghar

CS 886 - Affective Computing

Motivation

Need to be able to detect/classify emotions in short-text conversations in real-time

Conveying emotions over text messages is hard (unless you use lots of emojis)



EmotionPush: a Mobile App

References:

Challenges in Providing Automatic Affective Feedback in Instant Messaging Applications (AAAI Spring Symposium 2017)

Sensing Emotions in Text Messages: An Application and Deployment Study of EmotionPush (COLING 2016)

Authors/Developers:

Academia Sinica, Taiwan
Carnegie Mellon University

EmotionPush

- **A:** Aww thanks!!
- **A:** How's being home?
- **B:** Studying, haha
- OBJ **B:** But it doesn't feel like I have been away for one year
- **B:** Nothing has changed here
- **B:** Time is running so slow now
- **B:** And I'm still jetlagged, haha

Emotion	Emotions in LJ40K	RGB
Anger	Aggravated, Annoyed, Frustrated, Pissed off	(247, 10, 10)
Joy	Happy, Amused, Cheerful, Chipper, Ecstatic, Excited, Good, Loved, Hopeful, Calm, Content, Crazy, Bouncy	(255, 255, 0)
Sadness	Sad, Bored, Crappy, Crushed, Depressed, Lonely, Contemplative, Confused	(40, 26, 122)
Fear	Anxious	(0, 255, 0)
Anticipation	Accomplished, Busy, Creative, Awake	(255, 154, 23)
Tired	Cold, Exhausted, Drained, Tired, Sleepy, Hungry, Sick	(211, 43, 252)
Neutral	Okay, Blah, Blank	(No Color)

EmotionPush

- **A:** Aww thanks!!
- **A:** How's being home?
- **B:** Studying, haha
- OBJ **B:** But it doesn't feel like I have been away for one year
- **B:** Nothing has changed here
- **B:** Time is running so slow now
- **B:** And I'm still jetlagged, haha

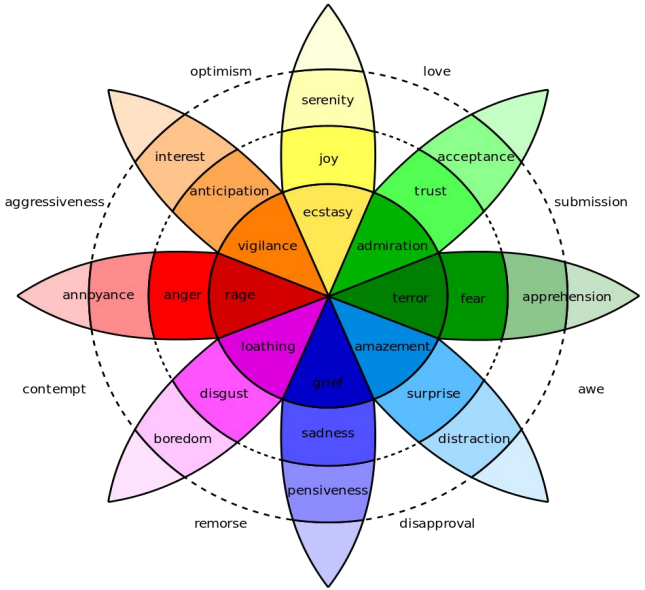
Emotion	Emotions in LJ40K	RGB
Anger	Aggravated, Annoyed, Frustrated, Pissed off	(247, 10, 10)
Joy	Happy, Amused, Cheerful, Chipper, Ecstatic, Excited, Good, Loved, Hopeful, Calm, Content, Crazy, Bouncy	(255, 255, 0)
Sadness	Sad, Bored, Crappy, Crushed, Depressed, Lonely, Contemplative, Confused	(40, 26, 122)
Fear	Anxious	(0, 255, 0)
Anticipation	Accomplished, Busy, Creative, Awake	(255, 154, 23)
Tired	Cold, Exhausted, Drained, Tired, Sleepy, Hungry, Sick	(211, 43, 252)
Neutral	Okay, Blah, Blank	(No Color)

Robert Plutchik's Wheel of Emotions

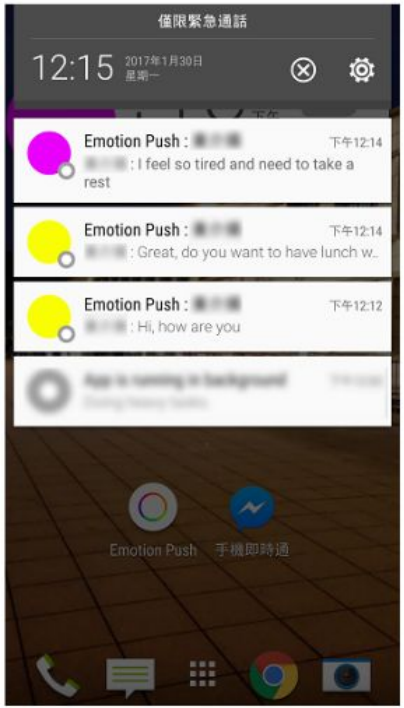
8 primary emotions: anger, disgust, fear, joy, sadness, surprise, anticipation, trust

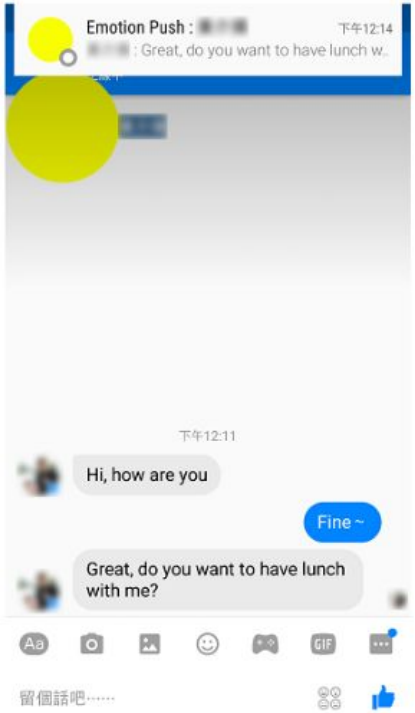
versus

Ekman's 6 emotions: anger, disgust, fear, happiness, sadness, surprise



EmotionPush User Interface





Emotion Detection/Classification Problem

- Sentence/Paragraph classification problem (8 classes)
- Labeled Dataset: 40,000 blog posts with emotion labels
- Machine Learning Algorithm: Support Vector Machines
- Model Accuracy: 68% (comparable to humans)

App Evaluation

- User study: 20 participants, 2 weeks, ~60k messages recorded, ~10k conversations

- Questionnaire:
  - Can EmotionPush predict emotions correctly? 25% agreed
  - Did EmotionPush enhance your social interaction experience? ~45% agreed
  - If Facebook Messenger added this feature, would you use it? 80% agreed

App Evaluation

Use cases:

- Emotion management: choose whether to read/ignore a message
- Interacting with people of little acquaintance

App Evaluation

Use cases:

- Emotion management: choose whether to read/ignore a message
- Interacting with people of little acquaintance

Challenges:

- The continuum of emotions: emotions don’t change a lot in consecutive messages
- Multi-user conversations: bad user experience, the big colored blob becomes meaningless
- Misclassification of Emotions: ambiguous language e.g. sarcasm
- Unconventional Content: multiple languages, emojis/stickers (¯_(ツ)_/¯), long messages

Discussion Points

- User modeling over time instead of single-text modeling
- Learn from emojis, add them to your training dataset
- Split the colors to accommodate ambiguous statements
- Incorporating online learning: let the users correct the model in real time
- Allow users to see how the model classified their own messages
- An interesting use case: develop better, emotionally cognizant chatbots

Discussion Points

- User modeling over time instead of single-text modeling
- Learn from emojis, add them to your training dataset
- Split the colors to accommodate ambiguous statements
- Incorporating online learning: let the users correct the model in real time
- Allow users to see how the model classified their own messages
- An interesting use case: develop better, emotionally cognizant chatbots

OVERALL: interesting ideas, nice baseline, in need of significant improvement