# Louisiana State University

## Affect Corpus 2.0: An Extension of a Corpus for Actor Level Emotion Magnitude Detection

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# Objectives

- Interest in emotion detection and emotion prediction:
  - Advertisements
  - Human-computer interactions
  - Social media mining

- Resources are needed to train and test emotion prediction models

- Current corpora focus on:

  - Sentence level emotion classification.

- Need for annotation at the actor level that includes:

  - Actors per story
  - Actor presence in a sentence and location in a story
  - Emotion magnitudes per actor

# What was done

- New annotations for Actor level affect magnitude detection
  - Actors per story
  - Emotion magnitudes per actor per sentence
  - Sentence parse for each sentence
  - For speech annotated stories:
    - Librivox used to obtain audio recordings
    - Additional recordings were produced by a professional reader
    - Praat text grids were used to annotate sentence boundaries
- Results of inter-annotator agreement analysis

# Annotation Tool

# Text corpus Statistics

- 176 stories by 3 authors.
  - 15,302 sentences
- Neutral class: all emotion class magnitudes are zero
- About 45,120 NPs that did not include pronouns

# Speech corpus characteristics

|  | Number of audio recordings | Male | Female | Number of speakers |
|---|---|---|---|---|
| Grimms | 59 | 38 | 21 | 32 |
| Potter | 18 | 11 | 7 | 15 |
| H. C. Andersen | 12 | 5 | 7 | 9 |

# Corpus Structure

- Emotion Magnitudes
  - Annotator
    - Actors
      - StoryName.actors
    - Magnitude vectors
      - StoryName.vectors
- Speech
  - StoryName.textgrids
- UIUC
- XML markup
  - StoryName.bart.xml

# Emotion vector

- [84,mrs. Rebecca puddle-duck,0,0,0,0,0,0,Jemima became much alarmed.]
- [84,jemima puddle-duck,0,0,0,42,66,1,Jemima became much alarmed.]
- [84,Kep,0,0,0,0,0,0,Jemima became much alarmed.]

# Emotion signal per actor



Emotion signals for Tom Thumb
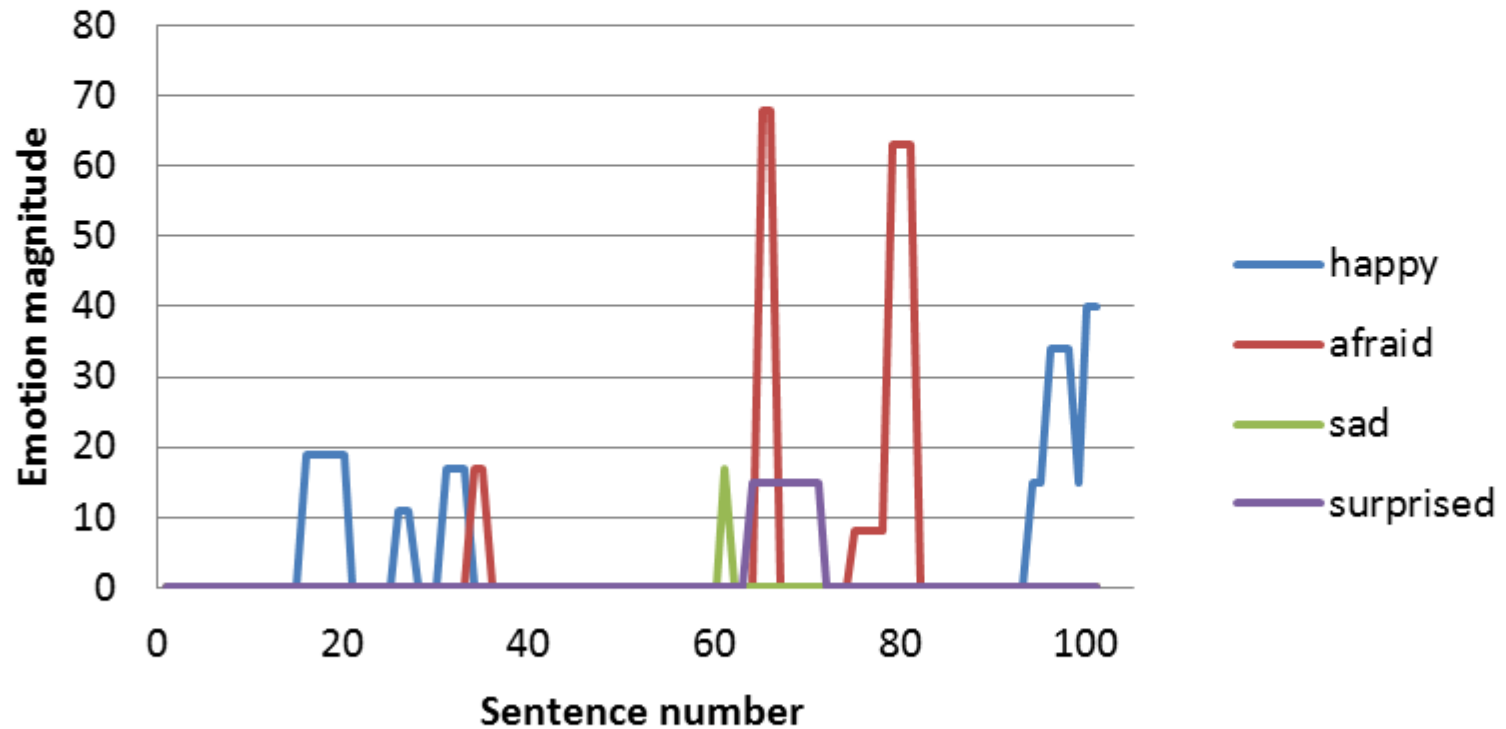
# Emotion signal information

- Visualization of emotion magnitudes per actor through story
- Examples:
    - Tom Thumb started out happy
    - Then, something happened that caused him sadness, surprise and a lot of fear.
    - These problems were resolved because the final emotion is happy

# Inter-Annotator Agreement

- 19 stories were annotated by 2 people
- Class: data set with all emotion magnitude assignments including neutral
  - Evaluate emotion class assignment: five classes vs. neutral
- Magnitude: data set limited to annotations where actor received at least one emotion magnitude assignment other than zero
  - Evaluate annotator agreement on emotion magnitude assignment
- The metrics used to evaluate inter-annotator agreement: Average observed agreement, Pi, alpha, S, Kappa.
- For categorical metrics, magnitude data was categorized into four groups:
  - 0-25 as low
  - 26-50 as medium low
  - 51-75 as medium high
  - 76-100 as high

# Inter-annotator metrics for emotion assignment

| | Happy | Angry | Sad | Surprised | Afraid |
|---|---|---|---|---|---|
| Avg_Ao | 0.897 | 0.867 | 0.872 | 0.794 | 0.742 |
| $\pi$ | 0.222 | 0.463 | 0.280 | 0.086 | 0.089 |
| S | 0.863 | 0.823 | 0.829 | 0.725 | 0.657 |
| Kappa | 0.223 | 0.464 | 0.289 | 0.128 | 0.129 |
| Alpha | 0.222 | 0.463 | 0.280 | 0.086 | 0.089 |

| | Happy | Angry | Sad | Surprised | Afraid |
|---|---|---|---|---|---|
| Avg_Ao | 0.586 | 0.412 | 0.555 | 0.551 | 0.475 |
| $\pi$ | 0.090 | 0.164 | 0.318 | 0.126 | 0.139 |
| S | 0.448 | 0.216 | 0.407 | 0.402 | 0.300 |
| Kappa | 0.096 | 0.186 | 0.332 | 0.186 | 0.182 |
| Alpha | 0.091 | 0.166 | 0.321 | 0.128 | 0.141 |

# Applications

- Speech/Text-to-Scene processing
- Text-to-Speech processing
- HCI
- Calibration of emotion recognition within multimedia systems
- Social media content analysis and Twitter dialog censoring of inappropriate language.
- Email content analysis
- Speech analysis of emotional cues, antiterrorism, and hate speech detection.
- Automatic virtual world synthesis or text-to-speech implementations

# On-going work: renderings that can use emotion magnitudes



Open mouth and happy pose
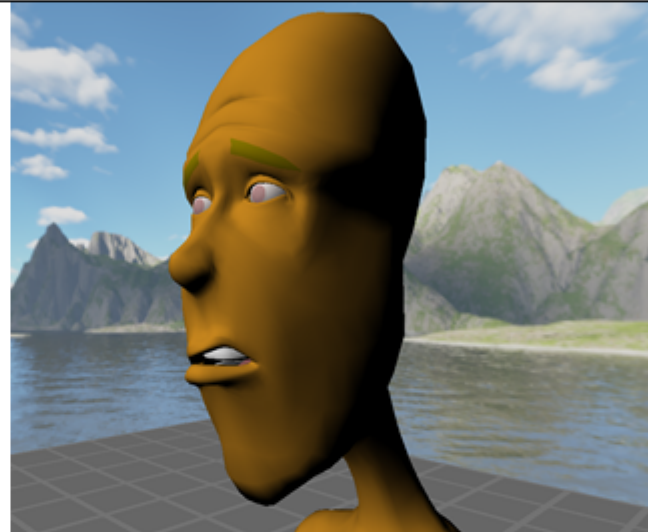
Sad pose

Afraid pose

Angry pose

# On-going work: 3-D rendering of a scene with emotion context and actors

# Conclusions

- New annotations for a well known set of children's stories for:
  - Emotion magnitude per actor
  - Actor detection
  - Actor presence in story
  - Speech
- Inter-annotator agreement metrics
- Multimodal resources that link NLP approaches to multimedia synthesis in speech and computer graphics are useful

# Future Work

- Speech extension

- 129 of 176 stories are already recorded and available from Librivox. 89 have text grid annotations

Questions?