POETRY GENERATION SYSTEM WITH AN EMOTIONAL PERSONALITY

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Objectives

- „Empathic” system
  - Mood affected by reading
  - Poem expressing feelings

- Cognitive architecture design

- Application: artistic enrichment of blogs
Outline

1. Blackboard architecture
2. Emotional model and expressions
3. Poetry generation process
4. Results
5. Conclusions
Blackboard model

- Solution for ill-defined, complex problems
- Experts - diverse computational models
- Global Workspace Theory:
  - Consciousness - large number of autonomous specialized modules working on the Global Workspace
- Cognitive processes simulation - creativity
Blackboard model

Poetry generation system with an emotional personality
Blackboard model

Poetry generation system with an emotional personality
Blackboard model

Poetry generation system with an emotional personality

As whole as a country

Common Blackboard

Whol e

Control Component

As whole as a country
Blackboard model

Common Blackboard

Whole

As whole as a country

Control Component

As whole as a country

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Common Blackboard

Whol little

As whole as a country

Big

Control Component

Independent experts

Big
Blackboard model

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Poetry generation system with an emotional personality

Common Blackboard

Whol little world

Big

As whole as a country
Blackboard model

Poetry generation system with an emotional personality
Blackboard model

Poetry generation system with an emotional personality
Blackboard model

Common Blackboard

Whol little world
e

Universe

Universe

Great world

Big

As whole as a country

Control Component

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Independent experts

Poetry generation system with an emotional personality
Experts

- Analyzing experts – Information extraction from the text
- Words-generating experts – Generating words related to the topic
- Poem-making experts – Producing new lines for the poem using poetical stylistic
- Selection experts – Selecting the best solutions according to their heuristics.

Poetry generation system with an emotional personality
**Dimensional model of emotions**

**Valence** – how pleasant the experience is

**Arousal** – how likely the person is to perform an action in this state

Russel’s Circumplex model of emotions

+ Simplicity

- Representing complex emotional states

Poetry generation system with an emotional personality
Valence and arousal of the text

- **Text valence**
  - Senti Strength positive/negative rate
  - Optimism rate

- **Text arousal**
  - ANEW mean value
  - Punctuation analysis
Defining emotional state

Poetry generation system with an emotional personality
Defining emotional state

- Text valence and arousal are calculated

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- Text valence and arousal are calculated.
- Coordinates are input to the emotional model.

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- Text valence and arousal are calculated
- Coordinates are input to the emotional model
- The closest emotional state is defined considering an optimism rate
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Poetry generation system with an emotional personality.
Defining emotional state

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Text

<table>
<thead>
<tr>
<th>Valence</th>
<th>Arousal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Love</td>
<td>Love</td>
</tr>
<tr>
<td>Anger</td>
<td>Anger</td>
</tr>
<tr>
<td>Calmness</td>
<td>Calmness</td>
</tr>
<tr>
<td>Sadness</td>
<td>Sadness</td>
</tr>
</tbody>
</table>

Optimism rate

Poetry generation system with an emotional personality
Defining emotional state

- Text valence and arousal are calculated
- Coordinates are input to the emotional model
- The closest emotional state is defined considering an optimism rate

Optimism rate

<table>
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<td>Sadness</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

Poetry generation system with an emotional personality
Emotional expressions

- Emotional state - expressed by the affective words
- WordNet Affect - hyponyms of emotional categories names

- Love
  - Worship
  - Loyalty
  - Lovingness

- Anger
  - Choleric
  - Frustration
  - Fury

- Compassion
  - Forgive
  - Merciful
  - Terder

- Calmness
  - Peacable
  - Easy
  - Cool

- Sadness
  - Miserably
  - Sorrow
  - Depresss

Poetry generation system with an emotional personality
Poetry generation process

1. System initialization with input text and constraints.
2. Input text analysis:
   a) Key phrases extraction,
   b) Topic selection,
   c) Emotions extraction.
3. Words generation.
4. Phrases construction.
5. Phrases evaluation.
6. Poem lines selection.

Poetry generation system with an emotional personality
Text:

When someone leaves you, apart from missing them, apart from the fact that the whole little world you’ve created together collapses, and that everything you see or do reminds you of them, the worst is the thought that they tried you out and, in the end, the whole sum of parts adds up to you got stamped REJECT by the one you love. How can you not be left with the personal confidence of a passed over British Rail sandwich?

Constraints:

Number of syllables in lines:

[8,8,8,8]

Grammar form:

Person: she; Tense: present.
Topic selection

- Key phrases:
  [someone, end, whole little world, whole sum, british rail sandwich, parts, personal confidence, fact]

- Inspirations:
  - whole little world: 6920,
  - personal confidence: 3920,
  - whole sum: 3880,
  - someone: 2324,
  - parts: 1918,
  - fact: 1512,
  - end: 910.
Sentences containing topic phrase:

*When someone leaves you, apart from missing them, apart from the fact that the whole little world you’ve created together collapses(...).*

- Valence: -0.94,
- Arousal: 2.0,
- Emotional state: *despair*.
Words generation

- **Nouns** – [macrocosm, existence, universe, cosmos, world, creation]
- **Adjectives** – [whole, little, small]
- **Verbs** – existence: [loses, reflects, becomes, fails, is, belongs], world: [centered, admired], universe: [is, had, are, was], creation: [is, does, prevents]
- **Epithets** – world: [little, contemporary, real, previous], existence: [happy, celestial, historical], universe: [interdependent, entire], creation: [own, inventive, artistic]
- **Comparisons** – whole: [lines, block, incident, country]
- **Hyponyms** – existence: [state], world: [natural object], creation: [activity]
- **Antonyms** – whole: [fractional], little: [big]
- **Emotional words** – [pessimistic, cynical, resignation, discourage, hopeless]

Poetry generation system with an emotional personality
Phrases generation

- Phrases:
  - 
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  - 
  - 
  - 
  - 
  - 
  - 
  -
Phrases generation

- Phrases:
  - Epithet Expert: *corporate existence, great world*
Phrases generation

- Phrases:
  - Epithet Expert: corporate existence, great world
  - Apostrophe Expert: oh world the little natural object
Phrases generation

- **Phrases:**
  - **Epithet Expert:** corporate existence, great world
  - **Apostrophe Expert:** oh world the little natural object
  - **Sentence Expert:** the creation prevents abjectly, she likes the hopeless, she loves the pessimistic cosmos
Phrases generation

- **Phrases:**
  - **Epithet Expert:** corporate existence, great world
  - **Apostrophe Expert:** oh world the little natural object
  - **Sentence Expert:** the creation prevents abjectly, she likes the hopeless, she loves the pessimistic cosmos
  - **Comparison Expert:** as whole as a story, whole like a convocation
  - **Metaphor Expert:** she is like the human existence
  - **Exclamation Expert:** as whole as a story!
  - **Rhetorical Expert:** why is the existence so nonfunctional?
  - **Oxymoron Expert:** whole but fractional
  - …
Generating line 4. Target syllables number: 8 Poem:
line 1: *what is the jewish cosmos?* (Rhetorical Expert)
line 2: *o existence the daily state* (Apostrophe Expert)
line 3: *perceptual physical world* (Epithet Expert)

- **Syllables expert – best phrases candidates:**
  - *happy corporate existence* (Epithet Expert) : 8,
  - *she sees the pessimistic world* (Sentence Expert): 8

- **Control module – selecting less active experts in former lines generation:**
  - Epithet Expert: 1 line,
  - Sentence Expert: 0 lines.

- **Line phrase selection:** *she sees the pessimistic world* (Sentence Expert)
With the holiday craziness yesterday, and having to work, I didn’t get to finish posting all of my thankfulness pictures. So you might see them pop up over the next few days. This morning I am thankful for the adult men in my life. My dad and Mr. P. I am fortunate to have both of them in my life to encourage me, support me, take care of me, and love the kids with all of their hearts.

I remember being endlessly entertained by the adventures of my toys! Some days they died repeated, violent deaths, other days they traveled to space or discussed my swim lessons and how I absolutely should be allowed in the deep end of the pool, especially since I was such a talented doggy-paddler.

Compassion

**Life**
what was the orderly life?
the *merciful* life makes her forgive
heavenly life
she liked the *excusable* life!

Anger

**Deep end**
I knew the undisrupted end
I was like the various end
As deep as a transformation
O end the left extremity
Objective undisrupted end
I hated the *choleric* end
O end the dead extremity
Conclusions

- Emotional poems generation

- Blackboard architecture for creativity modelling
  - Easy to extend – new linguistic resources and constraints
  - Possible to combine diverse poetry generating systems

- Future improvements:
  - Emotional model
  - Stylistic constraints
  - Lexical resources
Thank you for your attention.