

POETRY VISUALIZATION

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ABSTRACT: Poetry is a form of literature that uses artistic and rhythmic qualities of language to evoke meanings in addition to, or in place of, the simple apparent meaning. Poetry uses forms and conventions to suggest differential interpretation to words, or to suggest emotive responses. In this paper, we propose a method to extract features like nature, theme and visualize a poem as a flower. The extracted features from a poem are used to generate a flower for visual representation. We propose a mapping between the features of a poem to the type and color of a flower. We have tested the proposed method over four hundred poems from Purananuru. Also we are visualizing those poems using Word Cloud Visualization to show weighted words in the poems visually.

KEYWORDS: Poetry, language, poem, visualization.

INTRODUCTION

Tamil is one of the longest-surviving classical languages in the world. ^[1] Tamil language having rich and large number of literary works. These include a corpus of 2,381 poems collectively known as Sangam literature. The Purananuru is one of the eight books in the secular anthology of Sangam literature. The secular anthology is entirely unique in Indian literature, which nearly all religious texts during this era. The Purananuru contains 400 poems of varying lengths and more than 150 poets wrote the poems. ^[2]

Visualization is a popular technique used to represent complex data as simple readable visual representations. Starting from visualizing simple 2 dimensional data into line graphs, we have complex multi-dimensional data visualization techniques in data warehousing applications. ^[3]

In this paper, we propose visualization of Purananuru poems by mapping the statistical features of poem to type and color of a flower. Primary objective of this paper is to illustrate the poem and its relation to other poem by showing flower.

Natural language processing is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human languages and, in particular, concerned with programming computers to fruitfully process large natural language corpora.

BACKGROUND

To visualize text readability using a few readability metrics^[4]. The technique provides means for readers to see which sections of text are hard to read with complicated words. Investigating various data visualization techniques such as Tag cloud, musical Sparkline's, Wattenberg's Shape of Song for visualizing song lyric^[5]. To extract Tamil song lyric features such as rhymes, similes, metaphors, pleasantness, freshness, genre, mood etc. and visualize a lyric as a flower by mapping the statistical features of the lyric to the features of the parts of a flower^[6].

In this paper, we propose visualization of poem using twelve types of theme and seven types of nature. Both nature and theme used to find the related poems and its unique flower representation.

THEME OF THE PURANANURU POEM

A poem is usually a small piece of a work compared to new articles. The following are the twelve features that are used to identify songs and introduce to use for the visualization in the next section. From the subject matter of the poems they accompany each can be said to represent the following themes:

1. *vetchi* - the provocation of war through attack and cattle raids
2. *karanthai* - defending against cattle raids
3. *vanchi* - invasion of the enemy's territory
4. *kanchi* - transience and change, the fragility of human life, against the backdrop of war
5. *uzhingi* - attacking the fort
6. *nochchi* - defence of the fort or territory
7. *thumpai* - the frenzy of battle
8. *vaakai* - victory
9. *paadaan* - praise of a king's heroism or generosity, asking for gifts
10. *pothuviyal* - general heroism (mostly philosophical musings and elegies for heroes).
11. *kaikkilai* - unrequited love
12. *perunthinai* - unsuitable love

NATURE OF THE PURANANURU POEM

It is not known exactly how many authors wrote the poems in Purananuru. There are 147 different names found from the colophons. However, some of these could denote the same author. For example, Mangudi Kizhaar and Mangudi Maruthanaar could denote the same person. Some of the authors of the poems, such as Kapilar and Nakkirar, have also written poems that are part of other anthologies.

As its name suggests, Purananuru poems deal with the puram (external or objective) concepts of life such as war, politics, wealth, as well as aspects of every-day living. Some of the poems are in the form of elegies in tribute to a fallen hero. These poems exhibit outpourings of affection and emotions. Purananuru principally revolves around three themes - the king and his powers over the environment, power of women's purity, namely karpu (chastity), and the system of caste, which is not too different from the current system prevalent among Tamil society.

There are also a few poems in Purananuru, which are classified as attruppatais. Attruppatai poems read like travelogues in which poets who were returning with gifts, received from a king, encourage other poets to do the same by describing the glory of the king and his country. This gives an opportunity to the poet, among other topics, to describe in great detail the natural beauty, fertility, and resources of the territory that has to be traversed to reach the palace of the patron.

There are 400 poems in Purananuru including the prayer poem. Poems 267 and 268 are lost and some of the poems exist only in fragment. Of the poets who wrote these poems, there are men and women, kings and paupers. The oldest book of annotations found so far has annotations and commentary on the first 266 poems. The commentator Nachinarkiniyaar, of the eleventh – twelfth century Tamil Nadu, has written a complete commentary on all the poems^[10].

Nature of poems are classified as below,

- Praise of the God
- Praise of the king
- By poets for their patrons
- Ethical and moral poems
- The death of the kings
- The ephemeral nature of life
- War poems
- Their generosity
- Drummer poems

TAG CLOUDS

A tag cloud (word cloud, or weighted list in visual design) is a visual representation of text data, typically used to depict keyword metadata (tags) on websites, or to visualize free form text. Tags are usually single words, and the importance of

each tag is shown with font size or color [7]. This format is useful for quickly perceiving the most prominent terms and for locating a term alphabetically to determine its relative prominence.

PERCEPTION OF TAG CLOUDS:

The following summary is based on an overview of research results given by Lohmann et al.: [8]

- Tag size:** Large tags attract more user attention than small tags (effect influenced by further properties, e.g., number of characters, position, neighboring tags).
- Scanning:** Users scan rather than read tag clouds.
- Centering:** Tags in the middle of the cloud attract more user attention than tags near the borders (effect influenced by layout).
- Position:** The upper left quadrant receives more user attention than the others (Western reading habits).
- Exploration:** Tag clouds provide suboptimal support when searching for specific tags (if these do not have a very large font size).



Figure: Typical Tag cloud diagram

In principle, the font size of a tag in a tag cloud is determined by its frequency. For smaller frequencies one can specify font sizes directly, from one to whatever the maximum font size. For larger values, a scaling should be made. In a linear normalization, the weight t_i of a descriptor is mapped to a size scale of 1 through f , where t_{min} and t_{max} are specifying the range of available weights.

$$s_i = \left\lceil \frac{f_{max} \cdot (t_i - t_{min})}{t_{max} - t_{min}} \right\rceil \text{ for } t_i > t_{min}; \text{ else } s_i = 1$$

- s_i : display fontsize
- f_{max} : max. fontsize
- t_i : count
- t_{min} : min. count
- t_{max} : max. count

We are using synonym words computed from each poem to determine tag cloud to show poem visually.

IMPLEMENTATION OF VISUALIZATION AND MAPPING

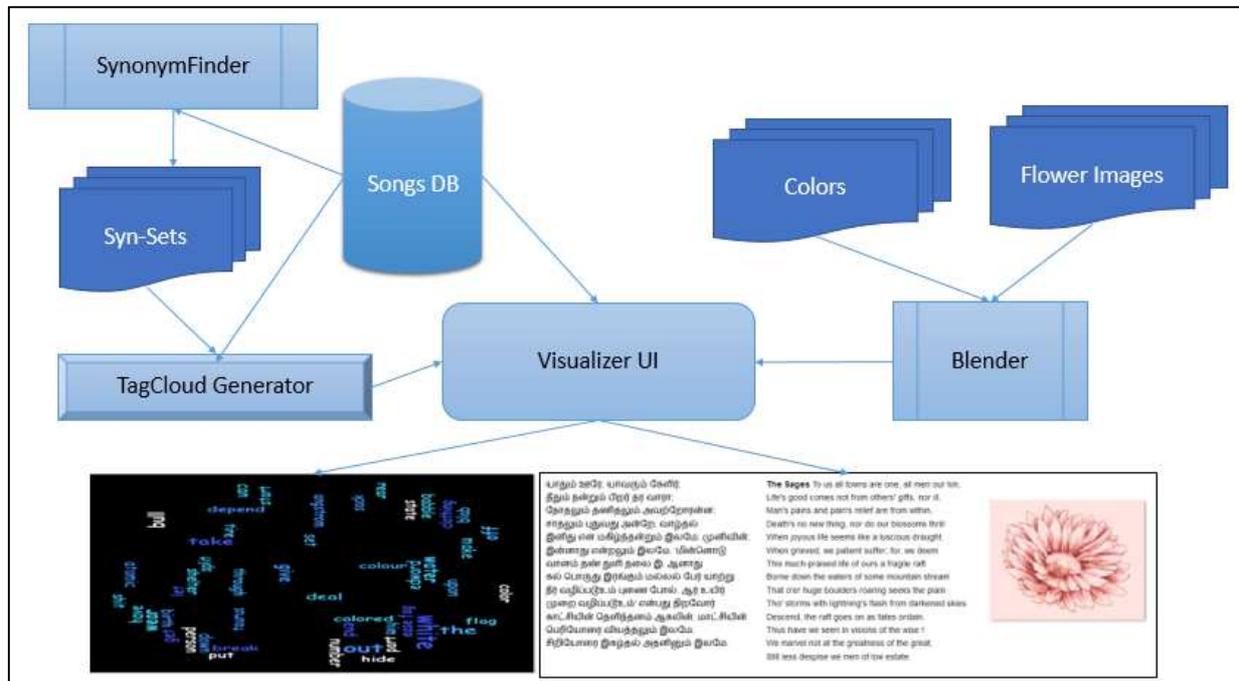


Figure 1: Flow Diagram

The Synonym sets for each poem will be used to map the Nature and Theme of a poem using its words frequency. We are using WordNet to find synonym sets.

We have different types of flower images to represent different types of Theme. This is illustrated in Figure 1.

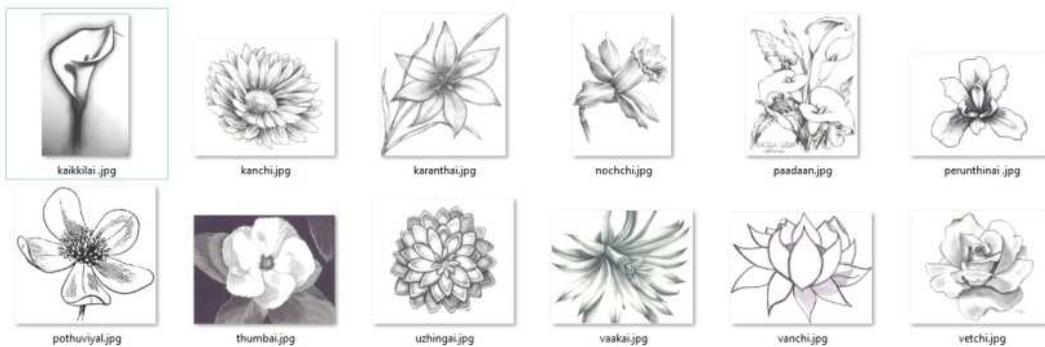


Figure 2: Types of Flower based on Theme

There are nine different natures in Purananuru songs. The nature is visualized using nine different colors as below,

ID	Nature	Color
1	Praise Of The God	GRAY
2	Praise Of The King	GREEN
3	By Poets For Their Patrons	ORANGE
4	Ethical And Moral Poems	PINK
5	Their Generosity	YELLOW
6	Death Of The Kings	RED
7	War Poems	MEGENTA
8	The Ephemeral Nature Of Life	CYAN
9	Drummer Poems	BLUE

The illustration of Colors depicted in Figure 3.



Figure 3: Colors of Flower based on Nature

BLENDING ALGORITHM

“Colour blending mixes two colours together to produce a third colour.the first color is called source color.which is new color being added. Second color is called the destination color which the color that already exists”.

We are blending the Color with Flower image using below method,

$$\text{blend}(P_{xy}, \text{Color}, r, ir) = [[P_{xy} * ir] + [\text{Color} * r]] \text{ for } \begin{cases} x \geq 1, x \leq n \\ y \geq 1, y \leq m \end{cases}$$

- “n” = Width of Flower Image which is determined using Theme of the Poem
- “m” = Height of Flower Image which is determined using Theme of the Poem
- “Pxy” = ARGB components of Pixel(x,y) of Flower Image which is determined using Theme of the Poem
- “Color” = ARGB components of Color which is determined using Nature of the Poem
- “r” = blending ratio %
- “ir” = value of (1-r) ie inverse of ratio %

We have used kumo Package^[9] to determine tag cloud for each poem. Implementation of tag cloud also include text parsing and filtering out unhelpful tags such as common words, numbers, and punctuation.

The entire flow of implementation is depicted in Figure 1. The Synonym Finder will fetch the poem from database and for every word in the poem it will find synonym set and consolidate without duplicates. The Tag cloud generator will use the generated synonym sets to generate Tag Cloud for each Poem. The Blender will blend the Flower Image which corresponds to Theme Type and Color which corresponds to Nature Type. The Visualizer will show each Poem with following details,

- Tamil version of the Poem
- English version of the Poem
- Nature and Theme
- Blended Flower Image
- Tag Cloud

RESULTS

The visualization presented in this paper was implemented for all 400 Purananuru poems. They were analyzed and visualized using Poem theme and Nature.

யாதும் ஊரே, யாவரும் கேளிர்;
 தீதும் நன்றும் பிறர் தர வாரா;
 நோதலும் தணிதலும் அவற்றோரன்ன;
 சாதலும் புதுவது அன்றே; வாழ்தல்
 இனிது என மகிழ்ந்தன்றும் இலமே; முனிவின்,
 இன்னாது என்றலும் இலமே; 'மின்னொடு
 வானம் தண் துளி தலை இ. ஆனாது
 கல் பொருது இரங்கும் மல்லல் பேர் யாற்று
 நீர் வழிப்படுஉம் புணை போல், ஆர் உயிர்
 முறை வழிப்படுஉம்' என்பது திறவோர்
 காட்சியின் தெளிந்தனம் ஆகலின், மாட்சியின்
 பெரியோரை வியத்தலும் இலமே;
 சிறியோரை இகழ்தல் அதனினும் இலமே.

The Sages To us all towns are one, all men our kin,
 Life's good comes not from others' gifts, nor ill,
 Man's pains and pain's relief are from within,
 Death's no new thing, nor do our blossoms thrill
 When joyous life seems like a luscious draught.
 When grieved, we patient suffer; for, we deem
 This much-praised life of ours a fragile raft
 Borne down the waters of some mountain stream
 That o'er huge boulders roaring seeks the plain
 Tho' storms with lightning's flash from darkened skies.
 Descend, the raft goes on as fates ordain.
 Thus have we seen in visions of the wise !
 We marvel not at the greatness of the great;
 Still less despise we men of low estate.



Figure 4: Sample Result, Poem# 196

வால் வலந்தர மறுப்பட்டன செவ்வானத்து வணப்புப்
 போன்றன தாள் களங்கொளக் கழல் பறைந்தன கொல்
 ஏற்றின் மருப்புப் போன்றன தோல் தலைத்து அம்பின் துளை
 தோன்றுவ நிலைக்கு ஓராஅ இலக்கம் போன்றன மாவே எறி
 பத்தான் இடங் காட்டக் கழல் பொருத செவ்வாயன் எடுத்து
 வல்லிய புலி போன்றன களிதே கதவ எறியாச் சிவந்து
 உராஅய் நுதி மழுங்கிய வெண் கோட்டான் உயிர் உண்ணும்
 கூற்றுப் போன்றன நீயே அவங்கு உளைப் பரீஇ இவளிப்
 பொலந்தேர் மிசைப் பொலிவு தோன்றி மாக்கடல் நிவந்து
 எழுதரும் செஞ்சாயிற்றுக் கவினை மாதோ அணையை
 ஆகன் மாறே தாயில் துவாக் குழவி போல ஓவாது கூஉம் நின்
 உடற்றியோர் நாடே.

The swords that have brought victory are
 stained like the beautiful red sky, war
 anklets on feet are worn down in the
 battlefield looking like horns of killer
 bulls, shields are riddled with bullet
 holes as though they are mobile training
 targets, mouths of horses are red with
 blood, chafed by the bridles that direct
 them, and looking like the necks of prey
 gripped by tigers, and elephants assaulting
 gates in rage have blunted the tips of
 their white tusks and appear like Death
 that eats lives. You in your golden chariot
 drawn by fast horses with waving plumes are
 splendid like the red sun that rises up
 high into the sky from the huge ocean.
 Because of you being who you are, the
 countries of your enemies wail without end,
 like hungry, motherless infants!



Figure 5: Sample Result, Poem# 4

CONCLUSION

In this paper, we proposed a visualization technique that extracts twelve features from a songs and map it to the visual features of a flower. We implemented the visualization in a lyric portal, paadal. With this technique, users will be able to find their favourite type of poem just by seeing at the flower in the search results, rather than reading textual descriptions.

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