

# NETWORK DYNAMICS OF GHALIB'S THEMATIC EXPRESSION



{ SYED AFFAN ASLAM AND ABDUL WAHID KHAN }

## OBJECTIVE

It is generally hypothesized that Ghalib's poetry is diverse and randomly distributed. We offer a different methodology, which is based upon graph properties, to study the structural dynamics in Ghalib. The three basic questions we ask in this research are:

1. How to identify themes in Ghalib?
2. Are the themes in Ghalib randomly distributed without any bias?
3. Asgari et al.[1] recognized through topic modelling that *Interpretive unity* is found at the level of *ghazal* not at the level of couplets (a conventional view). Do our results adhere to this principle?

## DATA COLLECTION

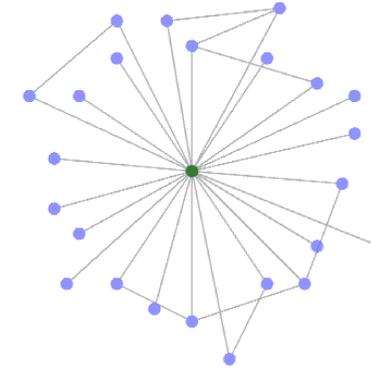
We relied upon the thematic analyses performed by Prof. Emerita Frances W. Pritchett, Columbia University in her magnum opus *Desertful of roses* that contains the *Divan of Ghalib* and the pertinent hermeneutics.

The overall data collection methodology is the following:

1. Relevance: using our self-made web-crawler, we crawled through the entire site, and collected the *urlids* of the related verses
2. Size: We collected all 1373 verses (nodes) that are related with each other using 5634 verses.
3. Meta-data: The verses in Roman English.

## TRANSITIVITY AND DEGREE

We identify the verses with maximal transitivity. There are 699 triangles in our network. We define our measure called *transitiveness* :  $\frac{\text{number of triangles node } u \text{ is in}}{\text{total number of triangles}}$ . Following is the transitivity of the verse numbered 9\_01



The other measure is degree. We identified the verses with maximal degree. Following are the three top verses with maximal degree.

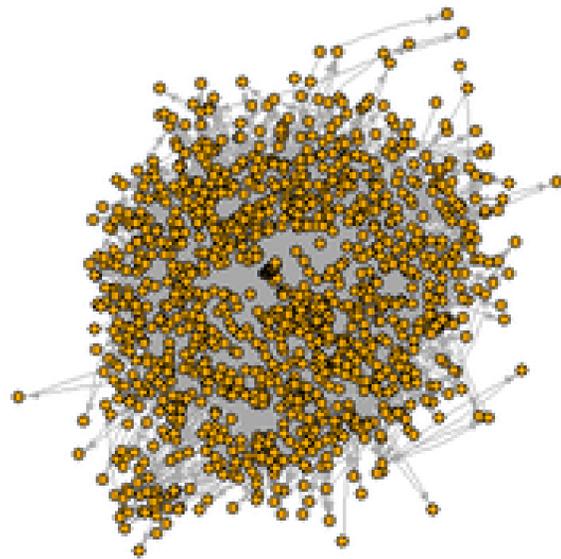
نظر میں ہے ہماری جاوہ راہ فنا غالب  
کہ یہ شیرازہ ہے عالم کے اجزائے پریشاں کا

پھر ہوا وقت کہ ہو بال کشا موج شراب  
دے بٹے کو دل و دست شنا موج شراب

جز قہیں اور کوئی نہ آیا بہ روئے کار  
صحرا مگر بہ تنگی چشمِ حسوود تھا

We are choosing *eight* verses/themes as per the suggestion of Asgari et. al [1] that there are eight general themes.

## NETWORK CONSTRUCTION

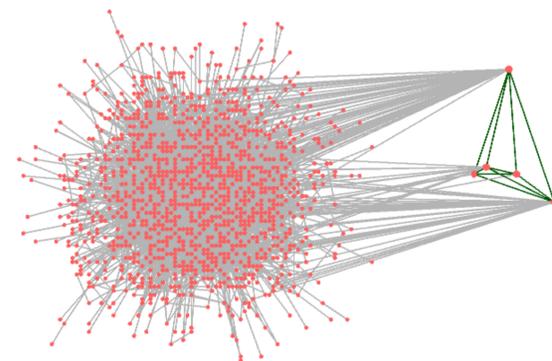


The 1373 nodes correspond to the verses whereas the 5634 edges correspond the relations amongst the verses. As we can see, the verses are highly clustered.

## INTERPRETIVE UNITY

It is suggested by Asgari et al.[1] that on average, the ghazal has interdependent couplets and should be seen as whole correlated unit as compared to the individual couplets.

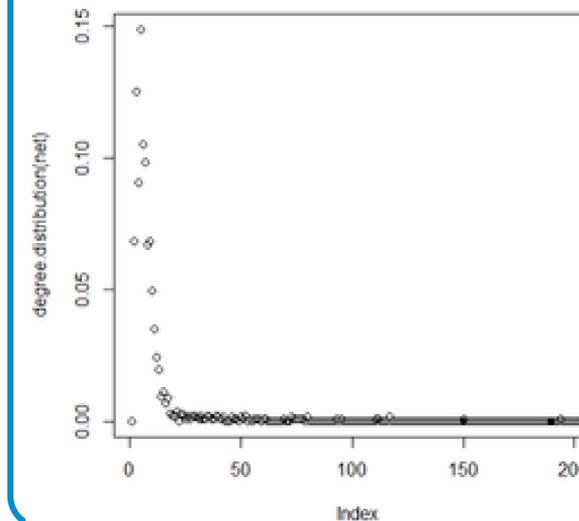
We found that the scrambled verses are more correlated (at individual level) than the ghazal in itself through studying cliques



The figure shows the largest clique with no verse from the same clique

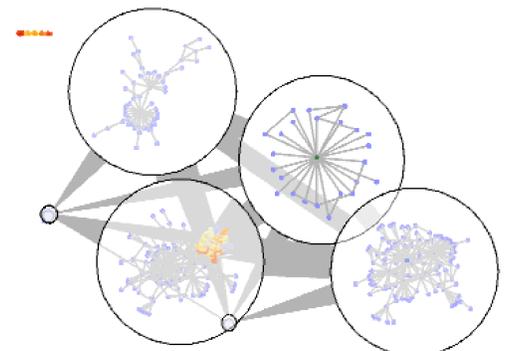
## HUBS AND COMMUNITIES

To answer the question two, we surprisingly found hubs in Ghalib's poetry, which cohere with the power-law.



If Ghalib were alive today, these hubs would most likely be contributing to his poetic generation. The themes are not randomly distributed in a disjoint way but are influenced by some hubs.

The low modularity gives us components that are not so dense and sparse across their respective components.



## REFERENCES

- [1] E. Asgari, M. Ghassemi and M. A. Finlayson. Confirming the themes and interpretive unity of Ghazals using Topic Modeling, NIPS, 2012-13.
- [2] F.W.Pritchett. Desertful of roses. <http://www.columbia.edu/itc/mealac/pritchett/00ghalib/>

## HOMOPHILY/DEGREE ASSORTIVITY

Intuitively, there should be positive degree-assortivity in the graph, that is so say if some verse is (un)popular, it should be connected to the verses that are un(popular) because of the lack of dense components

We found that graph has negative assortivity (in terms of degrees). Thus, the popular terms/themes in Ghalib tend to attract other verses having rare themes in a metaphorical manner. The assortivity is -0.2680744.

## SOURCE CODE

The source code and compiled executables with all results can be made available upon request. it is not public due to some privacy constraints.