

# Quantifying Writer Variance Through Rainbow Triangle Graph Decomposition

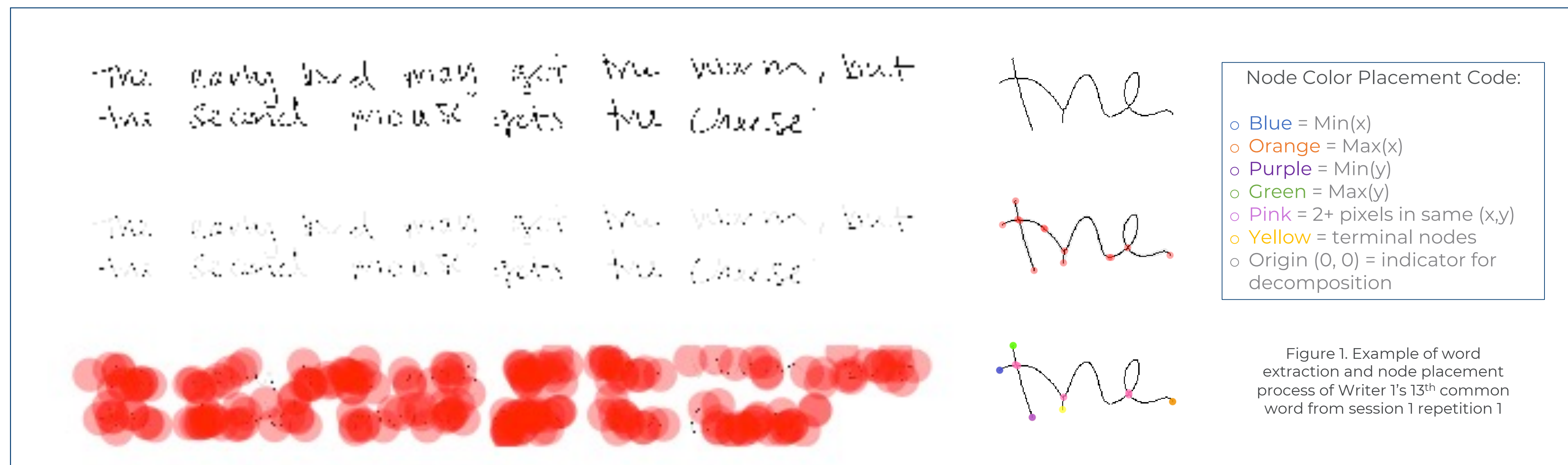
Alexandra Arabio, Alicia Carriquiry, Danica Ommen | Iowa State University



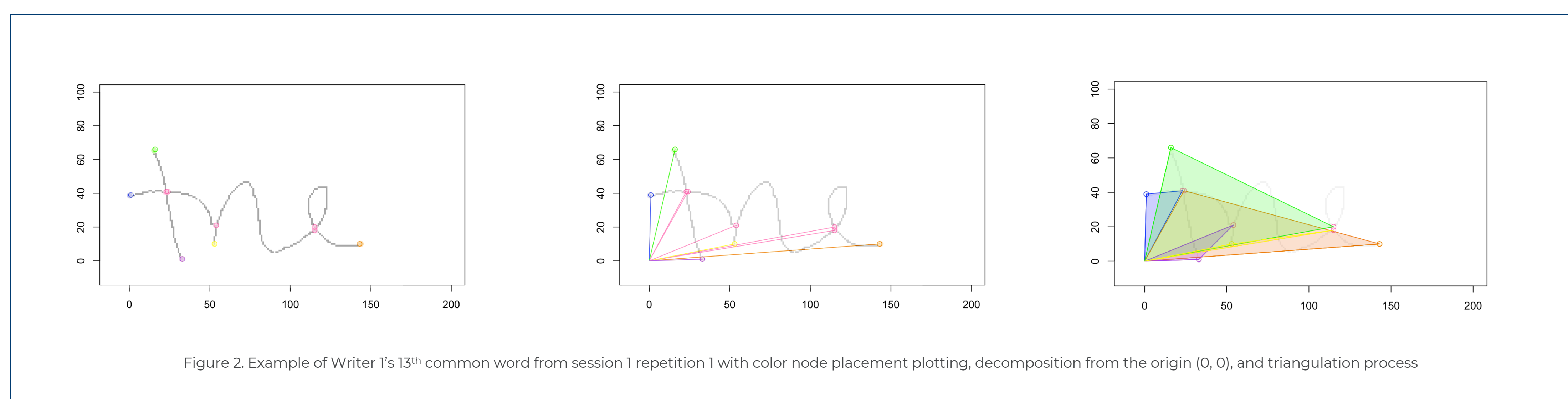
**Principle:** No two individual can produce the same writing, nor can an individual exactly reproduce their own writing  
**Goal:** Assess and quantify the natural variation produced by a distinct writer

## Project Background

- Common phrase writing exemplar from the CSAFE online, open-source repository (provides 27 the repetitions per writer)
- Indicate important landmark features
- Decompose from the landmarks to build framework to construct numerical variables to quantify the shape of the word



## Rainbow Triangle Method



## Feature Extraction & Data

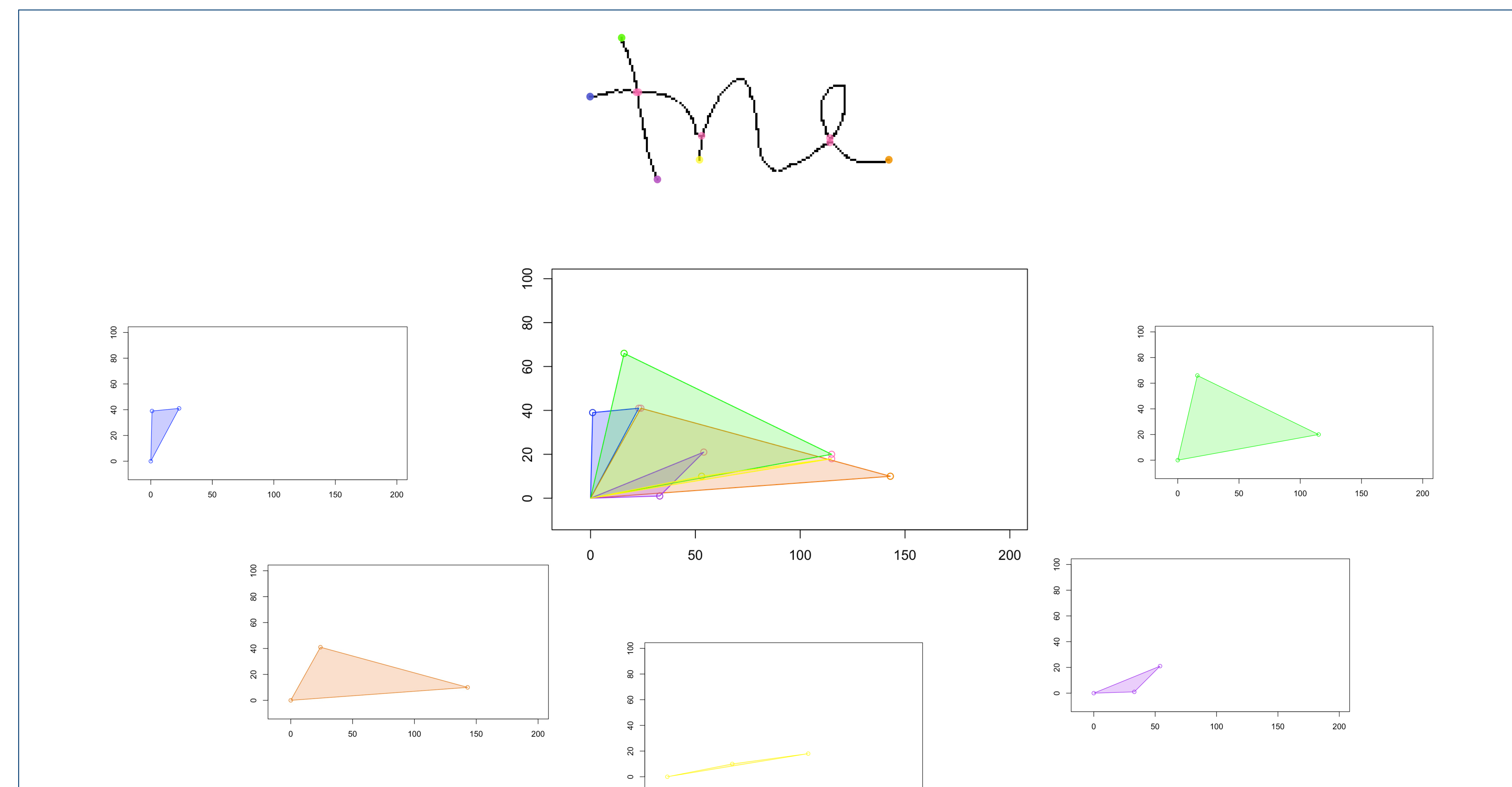


Figure 3. Writer 1's 13<sup>th</sup> common word from session 1 repetition 1 depicting the amount of information we obtain from each common word

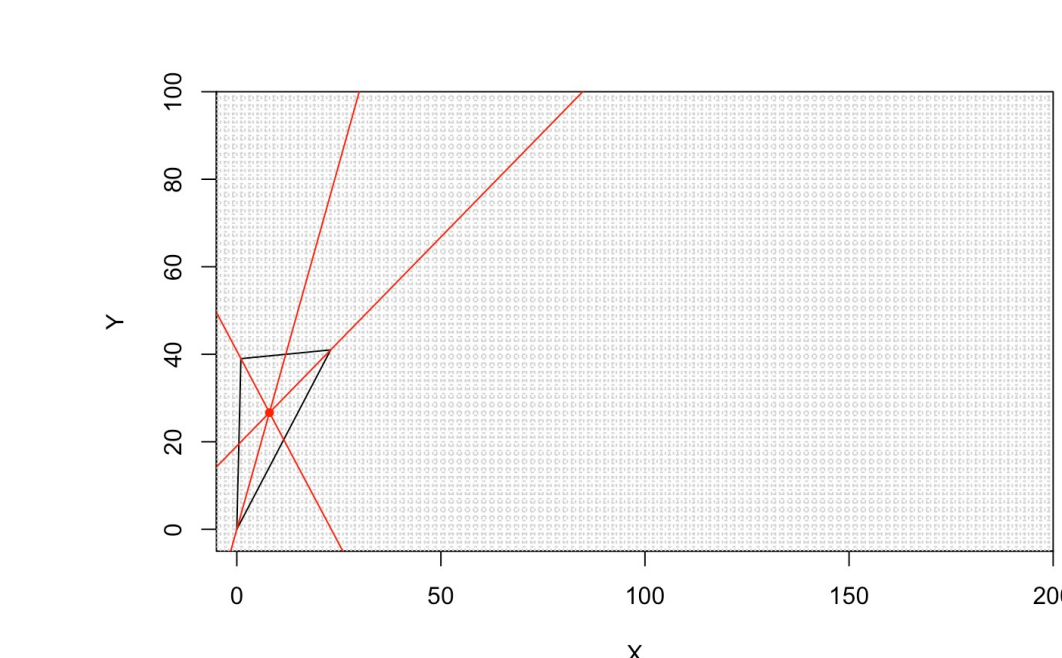


Figure 4. The in center of the blue triangle depicted in figure 3

Feature	Value	Unit/Description
nodes	list [8]	List of length 8
triangles	list [6]	List of length 6
angles	list [5]	List of length 5
area	list [3 x 5] (S3: data.frame)	A data.frame with 3 rows and 5 columns
edge_length	list [1 x 5] (S3: data.frame)	A data.frame with 1 row and 5 columns
in_center	list [3 x 5] (S3: data.frame)	A data.frame with 3 rows and 5 columns
midpoint	list [1 x 10] (S3: data.frame)	A data.frame with 1 row and 10 columns
perimeter	list [3 x 10] (S3: data.frame)	A data.frame with 3 rows and 10 columns
perimeter	list [1 x 5] (S3: data.frame)	A data.frame with 1 row and 5 columns

Edge Lengths	Value	Color
edge_distances.df	47.01064	hotpink1
	47.50789	hotpink1
	57.93962	hotpink1
	116.72618	hotpink1
	116.40017	hotpink1
	39.01282	yellow
	67.91171	yellow
	33.01515	yellow
	53.93515	yellow
	143.34922	yellow
	39.01282	blue
	143.34922	darkorange2
	67.91171	green
	33.01515	purple

Perimeter	Value
blue	27.82256
orange	313.8287
purple	119.9548
green	293.8029
yellow	232.8493

Angle Measures	Value
blue	1 27.82256
orange	55.65657
purple	19.51480
green	66.50720
yellow	1.789055
	2 96.66323
	18.60146
	138.13289
	78.70522
	176.667467
	3 55.51421
	105.74198
	22.35231
	34.78758
	1.543478

Figure 5. List of information obtained from Writer 1's 13<sup>th</sup> common word from session 1 repetition 1