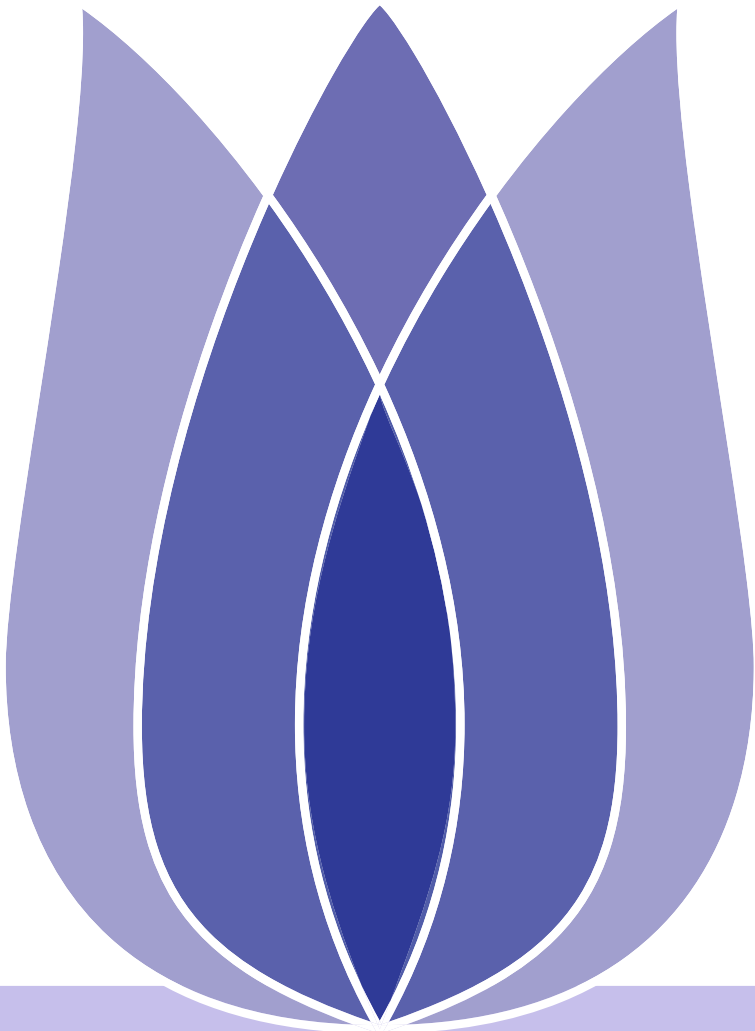


FLIP00 Interim Inspection

Cong Ma

(None)





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Defn

Kobe Bryant marked his retirement from the NBA by scoring 60 points in his final game as a Los Angeles Laker on Wednesday, April 12, 2016. Drafted into the NBA at the age of 17, Kobe earned the sport’s highest accolades throughout his long career.



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Related Work and Challenges



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- How to **represent** the group features.
 - ◆ Can be affected by outlier values.
 - ◆ Can **Not** reflect the overall distribution of group features.



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Step One - Group Feature Extraction

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■ Suppose f_1, f_2, f_3 are three features of G_q .

$$f_1: \{x_1, x_2, x_3, x_4, x_5, x_2, x_3, x_4, x_1, x_2\}$$

$$f_2: \{y_2, y_2, y_1, y_2, y_3, y_3, y_5, y_4, y_4, y_2\}$$

$$f_3: \{z_1, z_4, z_2, z_4, z_5, z_3, z_1, z_2, z_4, z_2\}$$

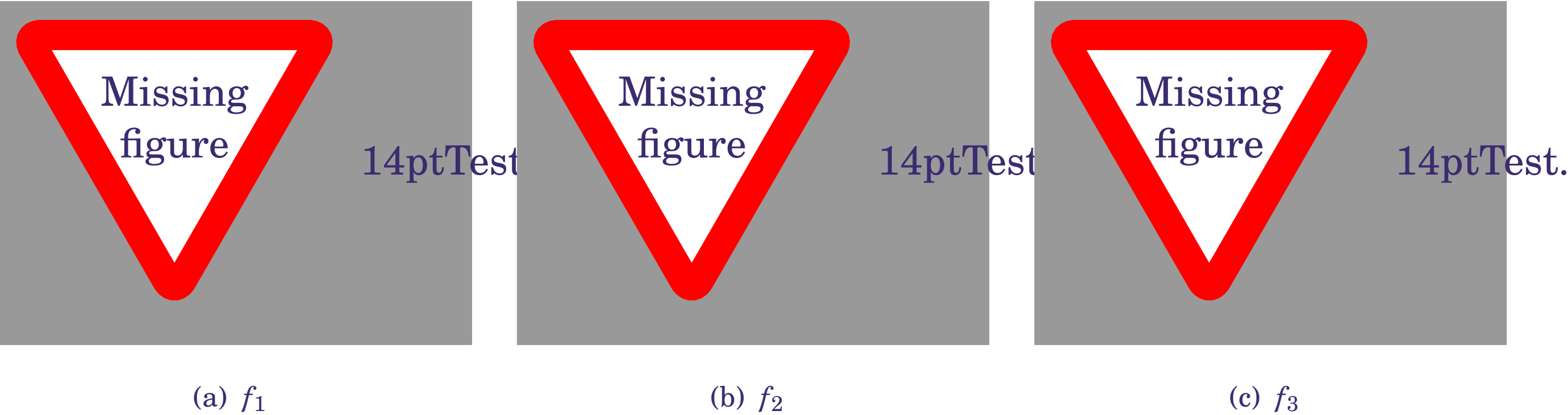


Figure 1: Histogram of G_q on three features



Step Two - Outlying Degree Scoring

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- Calculate Earth Mover Distance
 - ◆ Represent one feature among different groups
 - ◆ Purpose: calculate the minimum mean distance

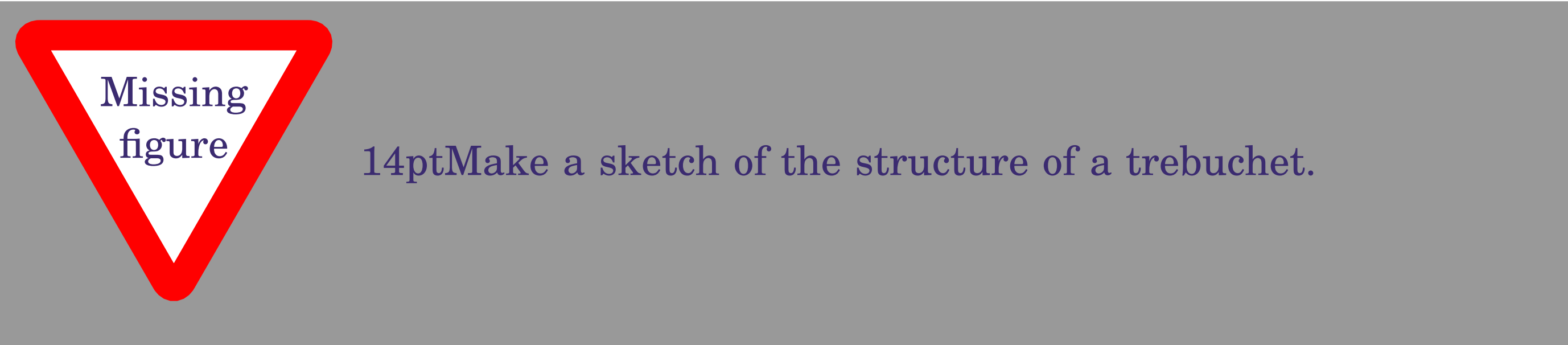


Figure 2: EMD of one feature



Step Two - Outlying Degree Scoring

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■ Calculate the outlying degree

$$OD(G_q) = \sum_1^n EDM(h_{q_s}, h_{k_s})$$

- ◆ $n \Leftrightarrow$ the number of contrast groups.
- ◆ $h_{k_s} \Leftrightarrow$ the histogram representation of G_k in the subspace s .





Step Three - Outlying Aspects Identification

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- Identify group outlying aspects mining based on the value of outlying degree.
- The greater the outlying degree is, the more likely it is group outlying aspect.



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Table 1: Original Dataset

G_1	F_1	F_2	F_3	F_4	G_2	F_1	F_2	F_3	F_4
	10	8	9	8		7	7	6	6
	9	9	7	9		8	9	9	8
	8	10	8	8		6	7	8	9
	8	8	6	7		7	7	7	8
	9	9	9	8		8	6	6	7
G_3	F_1	F_2	F_3	F_4	G_4	F_1	F_2	F_3	F_4
	8	10	8	8		9	8	8	8
	9	9	7	9		7	7	7	9
	10	9	10	7		8	6	6	8
	9	10	8	6		9	8	8	7
	9	9	7	9		8	7	9	8



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■ Synthetic Dataset and Ground Truth

Table 2: Synthetic Dataset and Ground Truth

Query group	$\mathbf{F_1}$	$\mathbf{F_2}$	F_3	$\mathbf{F_4}$	F_5	F_6	F_7	F_8
i_1	10	8	9	7	7	6	6	8
i_2	9	9	7	8	9	9	8	9
i_3	8	10	8	9	6	8	7	8
i_4	8	8	6	7	8	8	6	7
i_5	9	9	9	7	7	7	8	8
i_6	8	10	8	8	6	6	8	7
i_7	9	9	7	9	8	8	8	7
i_8	10	9	10	7	7	7	7	7
i_9	9	10	8	8	7	6	7	7
i_{10}	9	9	7	7	7	8	8	8



Synthetic Dataset Results

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Table 3: The experiment result on synthetic dataset

Method	Truth Outlying Aspects	Identified Aspects	Accuracy
GOAM	$\{F_1\}, \{F_2F_4\}$	$\{F_1\}, \{F_2F_4\}$	100%
Arithmetic Mean based OAM	$\{F_1\}, \{F_2F_4\}$	$\{F_4\}, \{F_2\}$	0%
Median based OAM	$\{F_1\}, \{F_2F_4\}$	$\{F_2\}, \{F_4\}$	0%



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Conclusion

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- Formalize the problem of *Group Outlying Aspects Mining* by extending outlying aspects mining;
- Propose a novel method **GOAM algorithm** to solve the *Group Outlying Aspects Mining* problem;
- Utilize the pruning strategies to reduce time complexity.



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