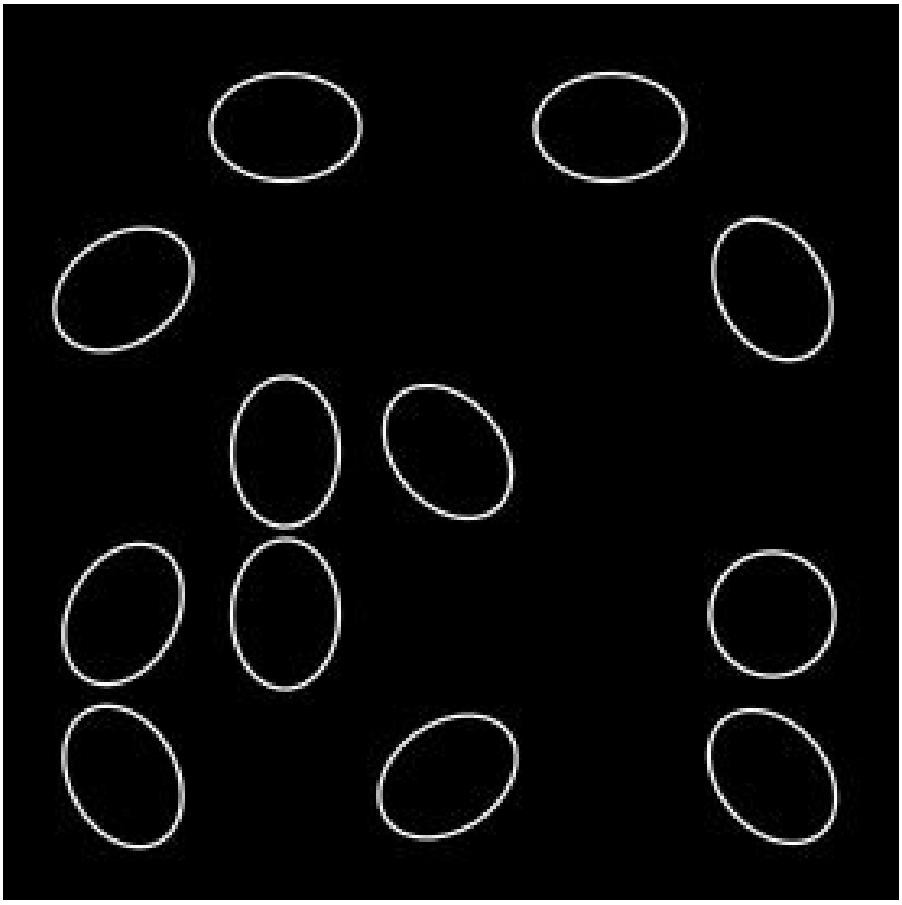
FEATURE ANALYSIS IN EARLY VISION

Experiment: Circles And Ellipses



Aditya Prakash

190065

adityaap@iitk.ac.in

Team 30

INTRODUCTION

This experiment is to test that search asymmetries can cause visual coding of some qualitative properties as deviation from a standard value. I used a prototypical shape (circle) with shapes that deviated from it (ellipse).

TARGET AND DISTRACTOR

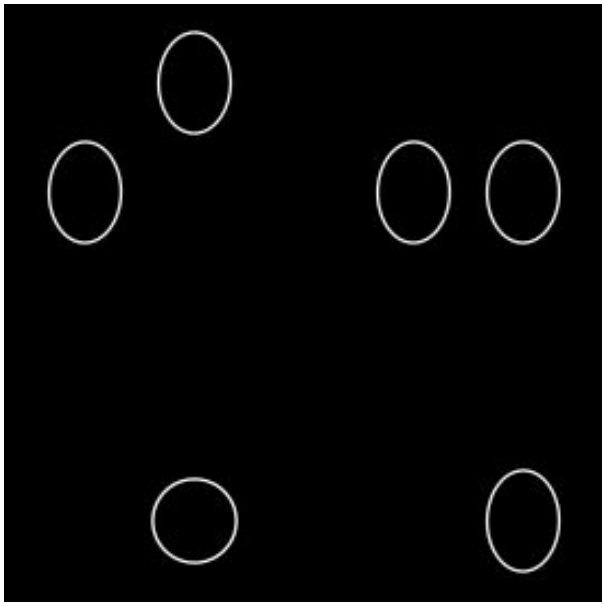
Circle of radius (3.5mm)

Ellipse of major axis (8.5mm) and minor axis (6mm) with varied orientation

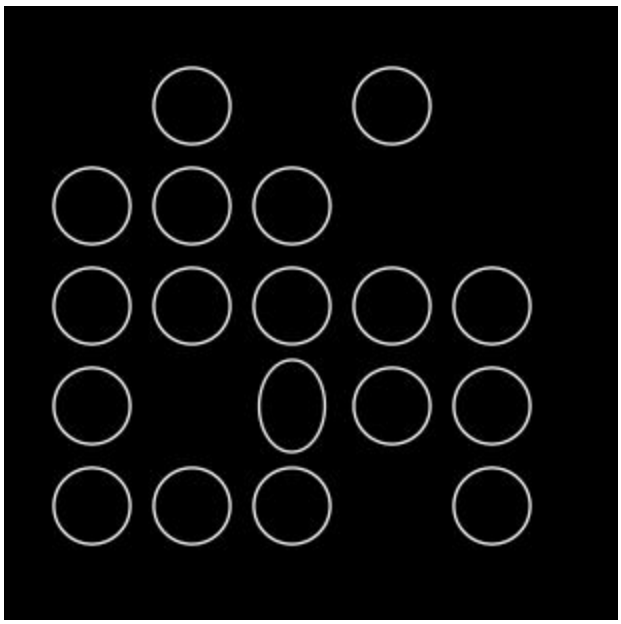
SAMPLE IMAGE FROM TRIALS

Fixed Orientation of Ellipses

Target Circle

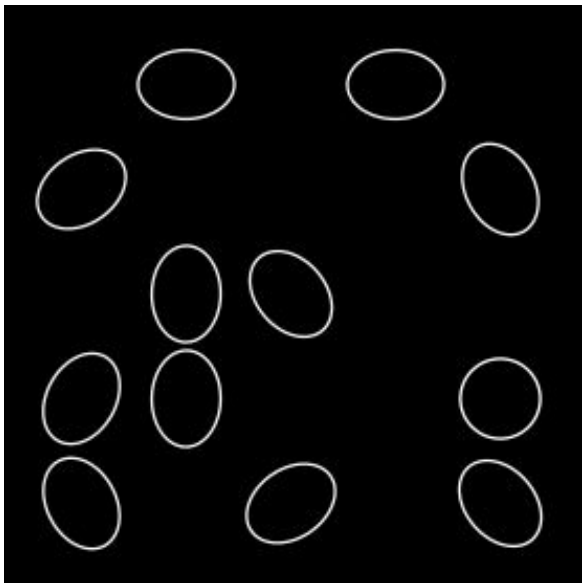


Target Ellipse

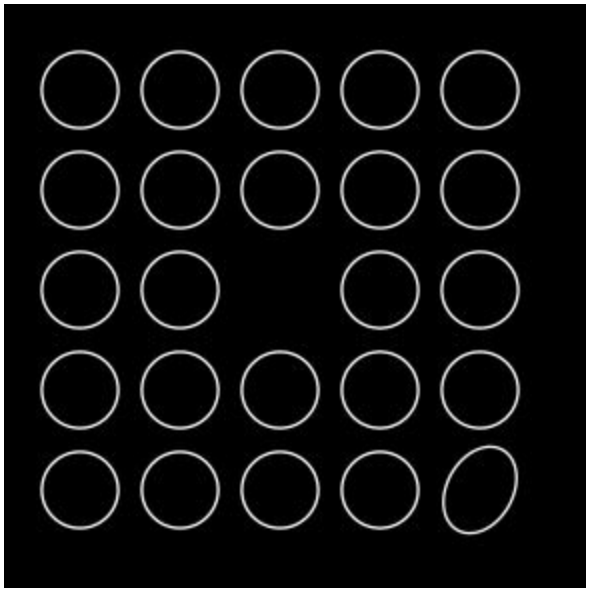


Varied Orientation of Ellipses

Target Circle



Target Ellipse



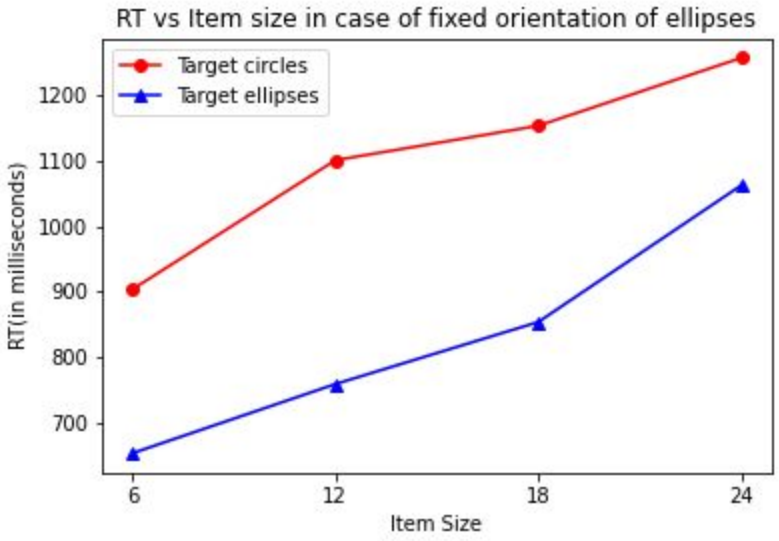
SUBJECT DETAILS

Total Number of Subjects: 9

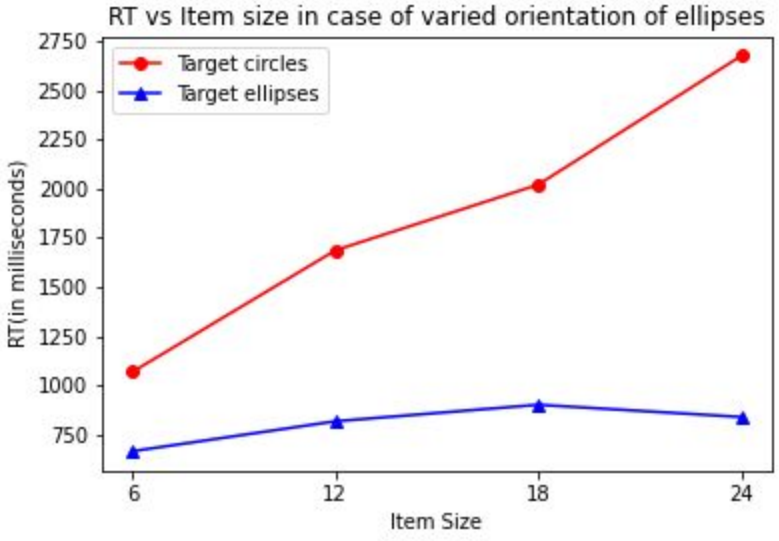
NAME	ROLL NUMBER	NUMBER OF RIGHT DECISIONS(OUT OF 240)
Ayush Jain	170194	225
Aditya Prakash	190065	237
Gagan Aryan	190327	234
Shivi	180730	231
Anmol Pabla	190154	233
Ashwin	180156	232
Harsh Muladhia	190357	223
Tushar Singla	190918	228
Harsh Kumar	190360	230

GRAPHS: AVERAGE RT vs SET SIZE

Fixed Orientation of Ellipses



Varied Orientation of Ellipses



MEAN, MEDIAN, MODE AND VARIANCE FOR EACH ITEM SIZE

Experiment 1: Fixed Orientation

Task 1: Target Circle

Item Size	Mean	Median	Mode	Variance
6	903.355556	747.5	530.0	198181.762469
12	1100.377778	1056.0	1246.0	169907.123951
18	1152.966667	1001.5	796.0	299002.632222
24	1256.600000	1075.5	883.0	518971.106667

Task 2: Target Ellipse

Item Size	Mean	Median	Mode	Variance
6	653.188889	595.0	483.0	56319.419877
12	758.711111	692.5	468.0	74340.960988
18	853.433333	742.0	570.0	151134.045556
24	1061.966667	898.5	4000.0	468869.676667

Experiment 2: Varied Orientation

Task 1: Target Circle

Item Size	Mean	Median	Mode	Variance
6	1067.088889	866.0	679.0	3.045532e+05
12	1686.911111	1430.0	1085.0	6.045078e+05
18	2021.944444	1628.5	4000.0	1.385340e+06
24	2678.288889	2660.5	4000.0	1.415688e+06

Task 2: Target Ellipse

Item Size	Mean	Median	Mode	Variance
6	662.811111	556.0	438.0	166596.842099
12	815.500000	656.0	513.0	265645.250000
18	899.700000	763.0	463.0	270906.032222
24	837.388889	724.0	450.0	201487.659877

CONCLUSION

As clear from the graph, the search for ellipses among circles is easier than searching circles among ellipses. The asymmetry is favouring search for the target ellipses. Fast search for the ellipse suggests that circles can be checked parallely for the presence of ellipses, but this is not the case when searching ellipses for the presence of a circle. Moreover, there is no impact of varying the orientation of ellipses on the search for ellipses. Whereas varied orientation slowed down the search for circles.