Playbrush Data Analysis

User and Group Data Analytics

This project analyzes offline brushing data of all participants in a toothbrushing study that are categorized into groups. The analysis provides data for each user and group. The input data are provided in the 1_raw_data.csv file and the user groups are provided in the 2_groups.csv file that are located in the input_data folder. Specifically, the following data are analyzed.

User Data:

1. How many times the user brushed in the morning, and in the evening for each day of the week. 0 for no brush, 1 for morning or evening brush, and 2 for morning and evening brush. Multiple brushes in the same morning should only be counted once.
2. How many days in the week a user brushed twice a day. Again, twice a day represents morning and evening, and not just multiple brushes.
3. The total number of valid morning and evening brush sessions in the week.
4. The average time spent brushing per valid session in the week.

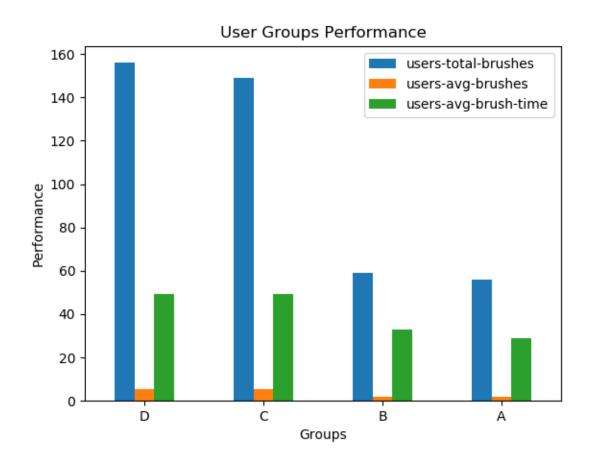**Group Data:**

1. How many valid brush sessions were observed in total?
2. What is the average number of brushing sessions per user in that group?
3. What is the average brushing duration per user in that group?
4. Which group performed the best? Rank the groups in terms of performance.

The results of the analysis for user data and group data are provided below.

Group Data Analytics Results

The following plot and table contains the results for group data analytics. The ranking of groups performance in descending order is D, C, B, A as shown in the plot.

	group	users-total-brushes	users-avg-brushes	users-avg-brush-time
3	D	156	5.2	49.46219
2	C	149	5.321429	49.3319
1	B	59	2.034483	32.88433
0	A	56	2	28.73911

User Data Analytics Results

The following table contains the results for user data analytics.

	group	PBID	mon	tue	wed	thu	fri	sat	sun	total-brushes	twice-brushes	avg-brush-time
0	D	PB2500036964	0	0	0	0	2	2	2	6	3	82.35833
1	D	PB2500036963	0	2	1	2	1	1	1	8	2	26.775
2	C	PB2500036880	0	0	0	0	0	0	0	0	0	0
3	A	PB2500036873	0	0	0	0	0	0	0	0	0	0
4	C	PB2500036788	2	2	2	2	2	1	2	13	6	79.20769
5	D	PB2500036764	0	0	0	0	1	0	0	1	0	37
6	C	PB2500036703	0	0	0	1	2	2	2	7	3	45.57857
7	B	PB2500036671	0	0	0	1	0	1	0	2	0	49.5
8	D	PB2500036660	0	0	2	2	2	2	2	10	5	81.84
9	C	PB2500036626	0	0	0	0	0	0	0	0	0	0
10	A	PB2500036593	0	0	0	0	0	0	1	1	0	30.05
11	B	PB2500036585	0	0	0	0	1	1	0	2	0	28.525
12	C	PB2500036366	0	0	0	0	0	0	1	1	0	89
13	D	PB2500035523	0	0	0	0	0	0	0	0	0	0
14	A	PB2500035486	0	0	0	0	0	0	0	0	0	0
15	D	PB2500035479	0	0	0	2	1	2	1	6	2	56.44167
16	B	PB2500035411	0	0	0	1	2	1	1	5	1	49.87
17	D	PB2500035373	1	2	2	2	2	2	2	13	6	43.43846
18	B	PB2500035330	0	0	0	0	0	1	0	1	0	20.95
19	D	PB2500035317	0	0	0	2	2	1	1	6	2	72.175
20	B	PB2500035308	0	0	0	1	1	0	0	2	0	34.025
21	B	PB2500035239	1	2	1	1	0	0	1	6	1	81.35
22	C	PB2500035170	0	1	2	2	1	1	2	9	3	74.22222
23	A	PB2500035145	0	1	1	0	1	1	2	6	1	75.69167
24	D	PB2500035119	0	0	1	1	1	0	2	5	1	51.46
25	C	PB2500034972	0	1	2	2	2	2	1	10	4	107.525
26	B	PB2500034959	0	0	0	0	0	0	0	0	0	0
27	C	PB2500034890	0	0	0	1	2	2	2	7	3	47.17143
28	A	PB2500034873	1	0	2	1	1	0	1	6	1	66.28333
29	D	PB2500034872	1	1	2	1	1	2	1	9	2	49.38333
30	A	PB2500034769	0	0	0	2	0	0	0	2	1	47.475
31	C	PB2500034762	0	0	0	0	0	2	2	4	2	64.525

32	D	PB2500034756	0	0	0	0	0	1	2	3	1	71.36667
33	B	PB2500034402	0	0	0	0	0	0	1	1	0	24
34	D	PB2500030280	0	1	2	0	2	2	1	8	3	46.86875
35	A	PB2500030275	0	0	0	0	0	0	1	1	0	24
36	A	PB2500029963	0	0	0	0	0	0	0	0	0	0
37	C	PB2500029848	0	0	0	0	1	2	2	5	2	77.15
38	B	PB2500029755	0	0	0	0	1	0	0	1	0	53
39	B	PB2500029572	0	0	0	0	1	0	1	2	0	30.525
40	A	PB2500029535	0	0	0	0	0	0	1	1	0	35
41	D	PB2500029526	0	0	0	0	1	2	1	4	1	72.525
42	D	PB2500029510	1	0	1	0	0	0	0	2	0	25
43	A	PB2500029467	0	0	0	0	1	2	0	3	1	29.71667
44	A	PB2500029403	1	0	0	0	0	0	0	1	0	24
45	C	PB2500029123	0	0	0	0	0	0	0	0	0	0
46	B	PB2500029118	0	1	2	2	2	2	2	11	5	72.72727
47	A	PB2500029113	0	2	1	0	0	0	0	3	1	25.71667
48	B	PB2500029003	0	0	0	1	0	0	0	1	0	45.05
49	D	PB2500029001	0	0	0	1	1	2	2	6	2	35.54167
50	B	PB2500028908	0	0	0	0	0	0	0	0	0	0
51	B	PB2500018485	0	0	0	0	0	0	0	0	0	0
52	B	PB2500018155	0	0	0	0	0	0	0	0	0	0
53	C	PB2500018046	0	0	0	0	0	0	0	0	0	0
54	D	PB2500017485	0	0	0	0	1	2	2	5	2	65.23
55	A	PB2500017260	1	1	0	0	0	0	0	2	0	51.6
56	B	PB2500017115	2	1	0	1	1	0	0	5	1	40.03
57	D	PB2500016490	0	2	0	1	1	1	1	6	1	45.66667
58	C	PB2500016479	0	0	0	0	1	0	1	2	0	41.05
59	A	PB2500016413	0	1	0	0	0	1	1	3	0	58.36667
60	A	PB2500016302	0	0	0	1	2	1	2	6	2	45.375
61	A	PB2500016085	0	0	0	0	1	0	0	1	0	28.7
62	C	PB2500016077	0	2	0	0	0	2	0	4	2	26.8
63	A	PB2500015176	0	0	0	0	0	1	0	1	0	22
64	A	PB2500015068	0	0	0	0	0	0	0	0	0	0
65	A	PB2500015032	0	1	1	0	0	0	0	2	0	33.05
66	B	PB2500014851	0	0	0	0	0	0	0	0	0	0
67	D	PB2500014820	0	0	0	0	0	0	0	0	0	0
68	D	PB2500014762	0	0	0	0	1	2	1	4	1	134.2875
69	C	PB2500014740	0	0	0	1	2	2	2	7	3	77.32857
70	D	PB2500014596	0	0	0	0	1	1	1	3	0	48.01667
71	A	PB2500014533	1	0	0	0	0	0	0	1	0	24.1
72	D	PB2500014494	0	2	2	2	2	1	2	11	5	62.65
73	A	PB2500014461	0	0	0	0	0	0	0	0	0	0
74	C	PB2500014442	0	0	0	2	1	1	2	6	2	63.69167

75	D	PB2500014435	0	1	1	0	0	2	2	6	2	29.50833
76	C	PB2500014415	0	0	0	1	1	1	0	3	0	46.01667
77	A	PB2500013900	1	0	0	0	0	0	0	1	0	24.05
78	A	PB2500010644	0	0	1	1	1	0	1	4	0	47.25
79	D	PB2500010636	0	0	0	1	0	0	0	1	0	24.05
80	C	PB2500010630	0	1	0	1	0	1	0	3	0	37.75
81	B	PB2500010629	0	0	0	0	2	1	2	5	2	59.61
82	B	PB2500010548	0	0	0	0	0	0	0	0	0	0
83	B	PB2500010542	0	0	0	0	1	1	1	3	0	61.03333
84	C	PB2500010328	0	0	2	2	1	1	1	7	2	40.75714
85	B	PB2500009814	1	0	0	0	0	0	0	1	0	22
86	D	PB2500009709	0	0	0	2	1	2	2	7	3	67.30714
87	B	PB2500009705	0	0	0	0	0	1	1	2	0	59.025
88	D	PB2500009583	0	0	0	0	0	0	0	0	0	0
89	A	PB2500009543	0	0	1	1	0	1	0	3	0	35
90	D	PB2500009446	0	0	0	0	1	2	2	5	2	54.43
91	C	PB2500009375	0	0	0	0	0	2	2	4	2	68.25
92	B	PB2500009374	0	0	1	0	1	1	0	3	0	33.7
93	B	PB2500009352	0	0	0	0	0	1	0	1	0	94.05
94	B	PB2500009228	0	0	0	2	0	0	0	2	1	32.6
95	D	PB2500009220	0	0	0	1	1	0	0	2	0	35.55
96	C	PB2500009210	0	0	0	0	0	0	0	0	0	0
97	C	PB2500009201	0	1	2	2	2	2	2	11	5	83.95455
98	D	PB2500009146	0	2	2	2	2	0	0	8	4	100.25
99	A	PB2500009132	0	0	0	0	0	0	0	0	0	0
100	A	PB2500009123	0	1	1	1	0	1	1	5	0	40.22
101	C	PB2500009101	0	2	2	2	1	1	1	9	3	42.99444
102	C	PB2500008956	0	0	0	1	2	1	2	6	2	62.875
103	C	PB2500008951	1	2	1	2	2	1	2	11	4	54.72727
104	B	PB2500008867	0	0	0	1	0	1	0	2	0	27.025
105	B	PB2500008854	0	0	0	0	0	0	0	0	0	0
106	A	PB2500008778	0	0	1	1	0	0	1	3	0	37.05
107	B	PB2500008735	0	0	0	0	1	0	0	1	0	35.05
108	D	PB2500008565	1	2	2	1	2	2	1	11	4	64.74545
109	C	PB2500008549	0	1	1	1	1	1	2	7	1	45.16429
110	A	PB2500008312	0	0	0	0	0	0	0	0	0	0
111	C	PB2500008248	0	0	0	2	2	2	2	8	4	55.14375
112	B	PB2500008209	0	0	0	0	0	0	0	0	0	0
113	C	PB2500008196	0	0	0	1	1	2	1	5	1	50.41
114	D	PB2500008183	0	0	0	0	0	0	0	0	0	0