# WEEKLY ACTIVE USER (WAU) DATA ANALYSIS

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OBJECTIVE:

- The dataset contains the Weekly Active User's Data for 56 weeks. The dataset contains contains all device IDs that were active in a particular week.
- Create a Weekly Growth Accounting chart based on the data, including quick ratio, new, resurrected and churned users.
- And based on that, share insights on what I think about user growth.

- **Weekly Active Users (WAU) Trend:**

Weekly Active Users
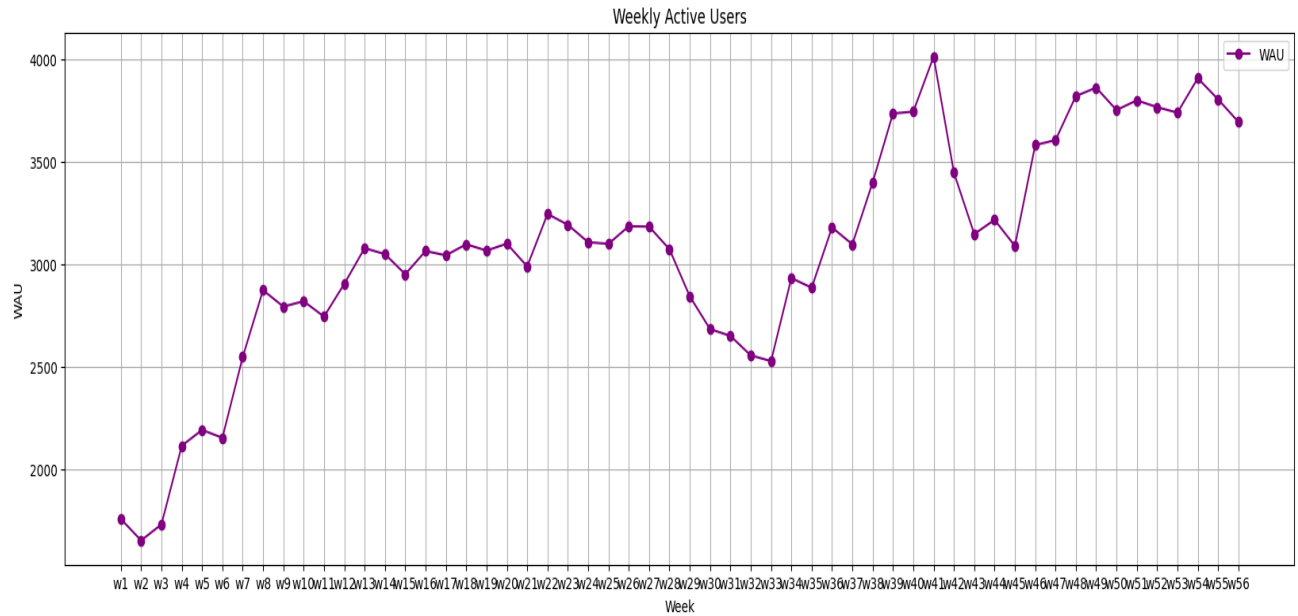
- The WAU shows an overall growing trend from week 1 (1,759 users) to week 56 (3,696 users).
- There's significant growth in the first half, with some fluctuations and a slight decline towards the end.
- Peak WAU was reached in week 41 with 4,014 users.

- **WAU Growth Accounting:**
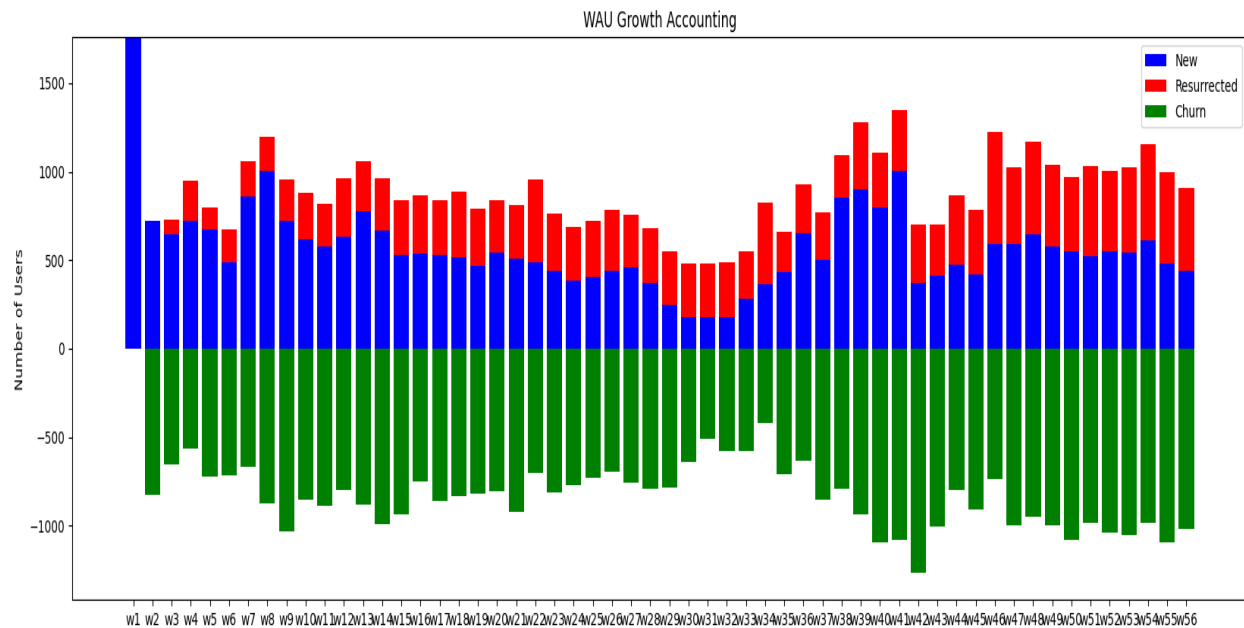
- Total new and resurrected users (42,222) **slightly outpace** total churn (40,285), explaining the overall growth
- However**, the margin is narrow**, indicating **challenges in rapid expansion**.
- As the user base grows, churn numbers generally increase, presenting a scaling challenge
- Weeks with high new user acquisition often see **higher churn** in subsequent weeks, indicating **difficulties in retaining new users.**
- In the latter weeks, the number of resurrected users is comparable to or even exceeds new users, highlighting the success of re-engagement strategies that were employed.

- **Retention Rate:**

Retention Rate Over Weeks
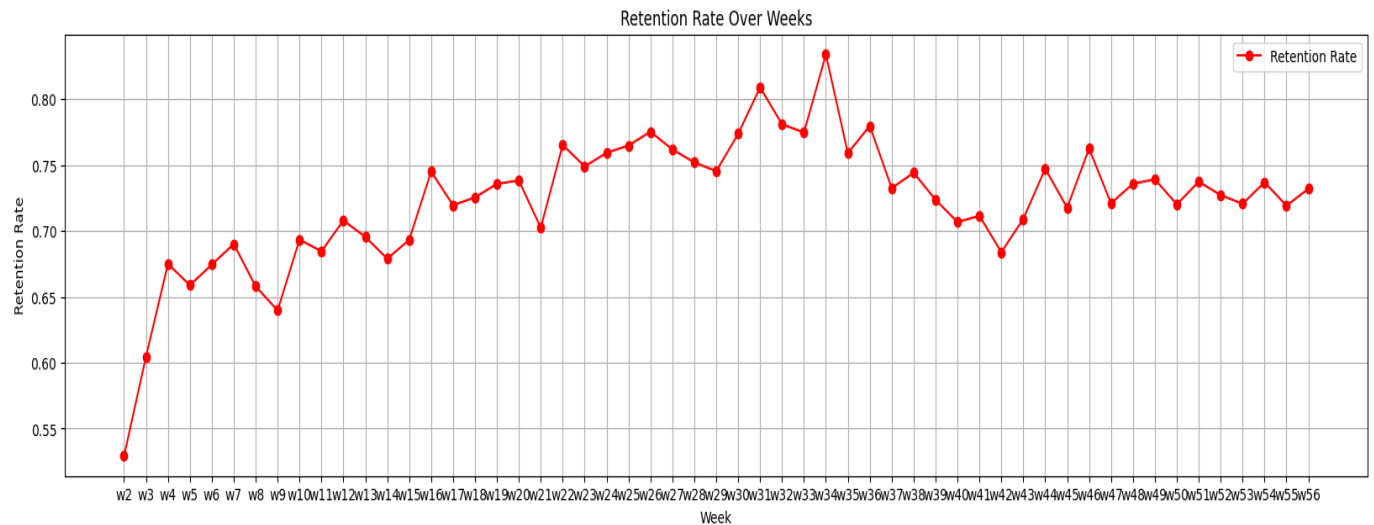
- The retention rate has generally improved over time.
- **Starting from 52.9% in week 2**, it quickly **rose to around 60-70%** in the following weeks.
- By the end of the period, the **retention rate consistently stays above 70%,** often reaching 75-78%.
- The highest retention rate was in week 34 at 83.39%.

- **Quick Ratio:**
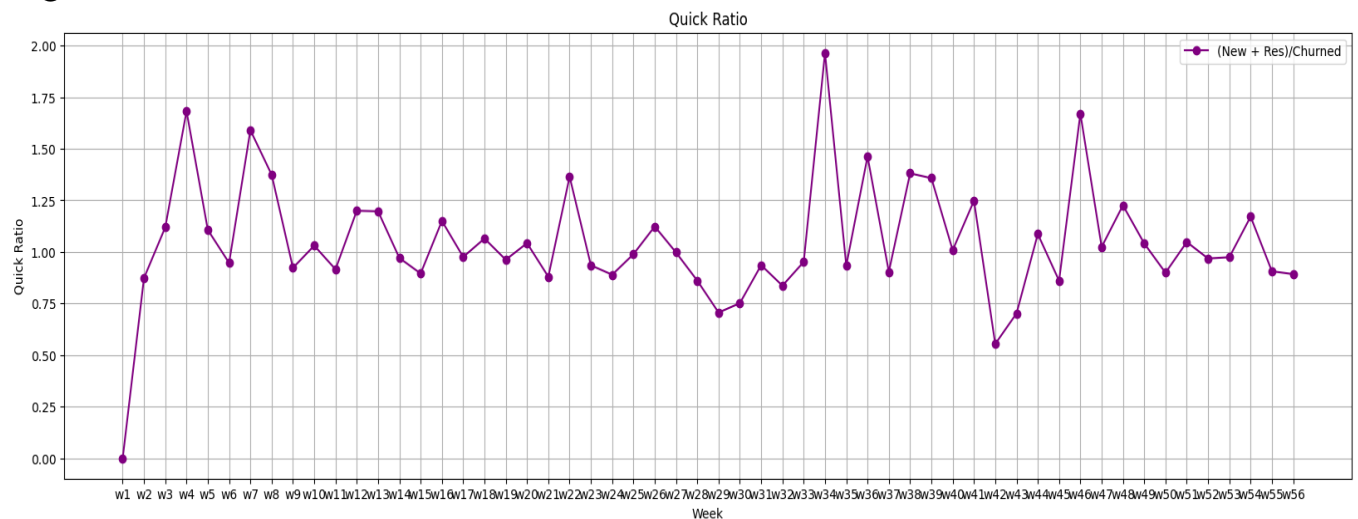
Quick Ratio

- The Quick Ratio fluctuates considerably throughout the period.
- A Quick Ratio above 1 indicates more users are being added (new + resurrected) than lost (churned), which is generally positive.
- The ratio often exceeds 1, suggesting overall growth, but there are periods where it dips below 1.

- **The highest Quick Ratio was in week 34 at 1.96, coinciding with the highest retention rate.**
- The lowest Quick Ratio was in week 42 at 0.55, indicating a significant drop in growth.
- Average Quick Ratio = 56.509 / 55 = 1.027
- So, the **average Quick Ratio over the time period is approximately 1.027.**
- This average being slightly above 1 indicates that, on average, **the product was acquiring and resurrecting more users than it was losing to churn each week. This suggests an overall trend of growth, albeit a modest one.**
- An average Quick Ratio of 1.027 implies that for every 100 users lost to churn, about 103 users were gained through new acquisitions and resurrections. **This represents a sustainable growth pattern, but there's certainly room for improvement to achieve more rapid expansion.**

- **New User Acquisition:**

New users Over Weeks
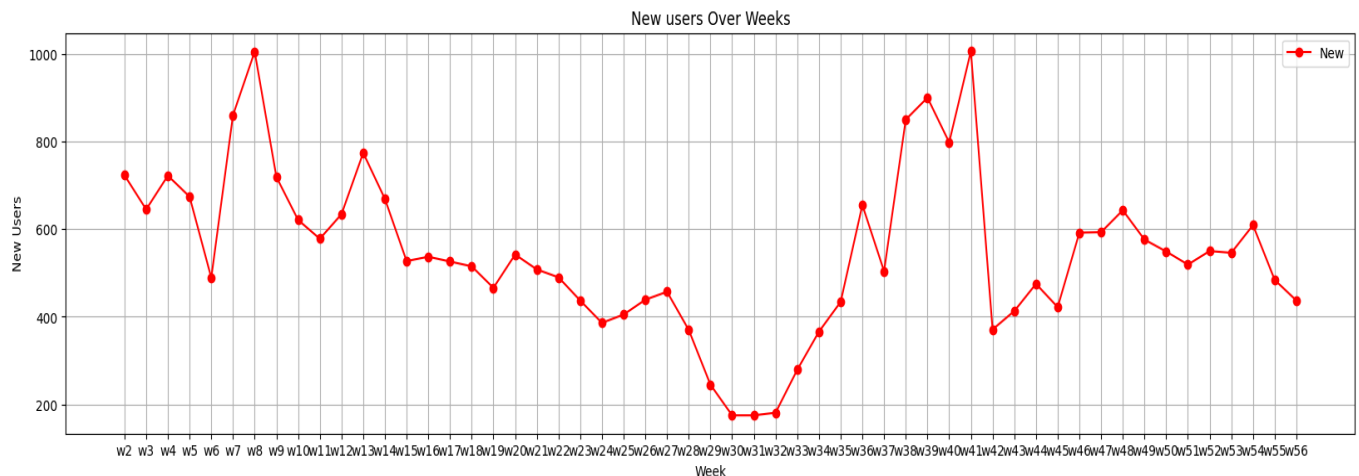
- New user numbers fluctuate but generally remain strong.
- The highest number of new users was in week 41 with 1,006 new users.
- There's a noticeable decrease in new user acquisition towards the end of the period.

- **Comparison of Retained users vs. (New + Resurrected users) as a % of WAU**

Comparison of Retained and New+Resurrected Users
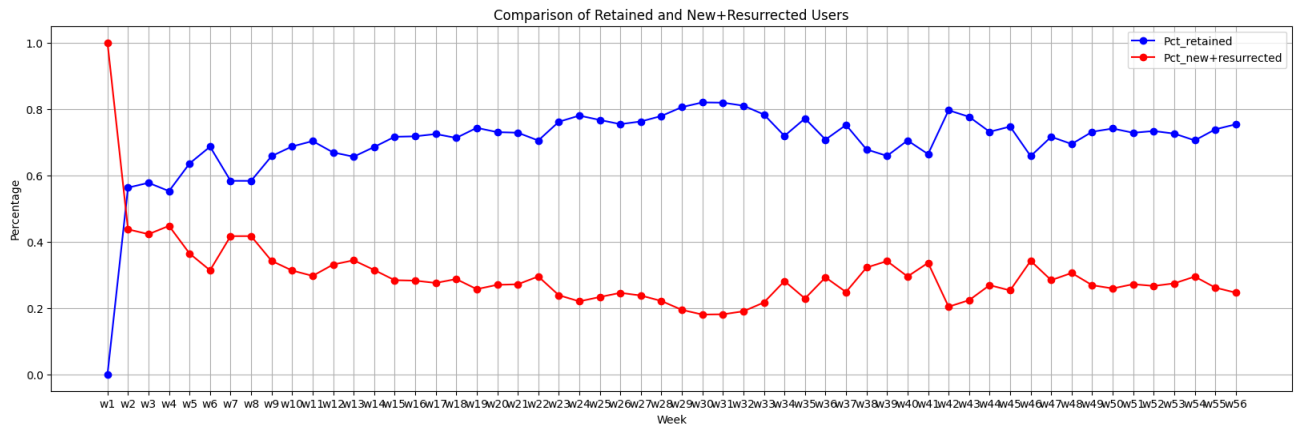
- For example, in Week 3, the number of WAU is 1732. Of that 57.7% of the users were retained from previous week, and 42.26% of the users were (New + Resurrected) users.
- On Average, 70.16% % of all the WAU of a particular week are retained users and 29.84% are (New + Acquired) users.
- This ratio has generally shifted towards more retained users over time, indicating improving retention.
- The high percentage of retained users is generally positive, indicating user satisfaction and product stickiness.
- However, the decreasing proportion of new users might limit overall growth potential.
- The decreasing percentage of new and resurrected users over time could indicate: a) A maturing product with a stable user base b) Potential challenges in attracting new users c) Reduced need for aggressive user acquisition due to strong retention.

ADDITIONAL QUESTIONS

- Can retained users be 0 in some week?
- Can churned users be 0 in some week?
- Can resurrected users be 0 in some week?

ANSWERS

- On Week 1, retained users will be 0, since that's the first week of the product (app/ website). All users will be new users.
- Similarly, on Week 1 churned users will be 0, since it's the first week and no users have left the app/ website yet.

- Resurrected users will be 0 for the first 2 weeks. Since, for a user to be considered a resurrected user, there must at least be a gap of one period where they haven't used the app/ website. So resurrected users can only be calculated from Week 3 onwards.

- APPENDIX
  - The following data was extracted from the initial dataset provided in the assignment.
  - All the calculations, graphs and subsequent analysis presented above were done using this data.

Week	WAU	Retained	Churn	Resurrected	New	Retention Rate	Quick Ratio
w1	1759	0	0	0	1759	0	0
w2	1654	931	828	0	723	0.529278	0.873188
w3	1732	1000	654	87	645	0.604595	1.119266
w4	2116	1169	563	225	722	0.674942	1.68206
w5	2193	1394	722	125	674	0.65879	1.106648
w6	2155	1479	714	187	489	0.674419	0.946779
w7	2549	1487	668	202	860	0.690023	1.58982
w8	2875	1677	872	193	1005	0.657905	1.373853
w9	2795	1839	1036	237	719	0.639652	0.92278
w10	2821	1938	857	262	621	0.693381	1.030338
w11	2746	1931	890	237	578	0.684509	0.91573
w12	2906	1944	802	328	634	0.707939	1.199501
w13	3080	2021	885	285	774	0.695458	1.19661
w14	3051	2091	989	291	669	0.678896	0.970677
w15	2953	2115	936	311	527	0.693215	0.895299
w16	3066	2200	753	329	537	0.745005	1.150066
w17	3045	2206	860	313	526	0.719504	0.975581
w18	3099	2209	836	375	515	0.725452	1.064593
w19	3068	2280	819	322	466	0.735721	0.962149
w20	3102	2265	803	295	542	0.738266	1.042341
w21	2991	2179	923	304	508	0.70245	0.87974
w22	3247	2289	702	468	490	0.765296	1.364672

w23	3194	2432	815	325	437	0.748999	0.934969
w24	3109	2425	769	298	386	0.759236	0.889467
w25	3101	2378	731	318	405	0.764876	0.989056
w26	3187	2404	697	344	439	0.775234	1.123386
w27	3185	2428	759	300	457	0.761845	0.997365
w28	3075	2395	790	310	370	0.751962	0.860759
w29	2845	2292	783	308	245	0.745366	0.706258
w30	2685	2201	644	309	175	0.773638	0.751553
w31	2652	2172	513	305	175	0.808939	0.935673
w32	2557	2071	581	305	181	0.78092	0.836489
w33	2529	1981	576	269	279	0.774736	0.951389
w34	2934	2109	420	459	366	0.833926	1.964286
w35	2887	2227	707	226	434	0.759032	0.933522
w36	3181	2251	636	275	655	0.779702	1.462264
w37	3099	2330	851	265	504	0.732474	0.903643
w38	3401	2306	793	245	850	0.744111	1.380832
w39	3737	2461	940	376	900	0.723611	1.357447
w40	3746	2641	1096	307	798	0.706717	1.008212
w41	4014	2665	1081	343	1006	0.711426	1.247919
w42	3448	2745	1269	332	371	0.683857	0.55398
w43	3149	2445	1003	291	413	0.709107	0.701894
w44	3218	2353	796	390	475	0.747221	1.086683
w45	3091	2309	909	360	422	0.717526	0.860286
w46	3583	2357	734	634	592	0.762536	1.6703
w47	3607	2583	1000	431	593	0.720904	1.024
w48	3822	2654	953	525	643	0.735792	1.225603
w49	3863	2825	997	462	576	0.739142	1.041123
w50	3754	2782	1081	423	549	0.720166	0.899167
w51	3801	2768	986	514	519	0.737347	1.047667
w52	3768	2764	1037	454	550	0.727177	0.968177
w53	3741	2715	1053	480	546	0.720541	0.974359
w54	3909	2757	984	543	609	0.736969	1.170732
w55	3806	2811	1098	511	484	0.71911	0.906193
w56	3696	2786	1020	473	437	0.732002	0.892157