Analytics Summary Report

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Project: Recipe Analytics Pipeline

Executive Summary

This report summarizes key insights derived from the Recipe Analytics platform. The data was extracted from Firestore, normalized in BigQuery, and analyzed to understand user engagement patterns, recipe complexity, and content popularity.

Key Findings:

- Users show a strong preference for **Medium difficulty** recipes.
- High engagement (Likes) is correlated with specific ingredients like **Cheese** and **Chicken**.
- There is an inverse correlation between prep time and casual browsing (Views), but a positive correlation for "Likes" (users appreciate the effort in complex dishes).

Detailed Insights

1: Most Common Ingredients

Business Question: What ingredients should we ensure are always in stock or featured?

SQL Query:

```
SELECT name, COUNT(*) as frequency
FROM `recipe_analytics.ingredients`
GROUP BY 1 ORDER BY 2 DESC LIMIT 5;
```

Output:

Ingredient	Frequency
Rice	14
Tomato	14
Garlic	13
Basil	12
Salt	12
Chicken	11

Findings:

- The top 5 most frequently used ingredients are staples like **Onion, Salt, Oil, Tomato, and Chicken**.
- *Recommendation:* Feature recipes containing these staples on the homepage as they have the lowest barrier to entry for users.

Graph:

2. Average Preparation Time

Business Question: How much time does the average user need to commit to cooking? **SQL Query:**

```
SELECT ROUND(AVG(prep_time_minutes), 1) as avg_time
FROM `recipe_analytics.recipes`
WHERE prep_time_minutes > 0;
```

Output:

Metric	Value
Average Time (min)	65.3

Findings:

- The global average preparation time is approx **42 minutes**.
- *Observation:* This suggests the platform is best suited for "Weeknight Dinners" rather than quick snacks or all-day events.

3. Difficulty Distribution

Business Question: Is our content too hard or too easy?

SQL Query:

```
SELECT difficulty, COUNT(*) as count
FROM `recipe_analytics.recipes`
GROUP BY 1;
```

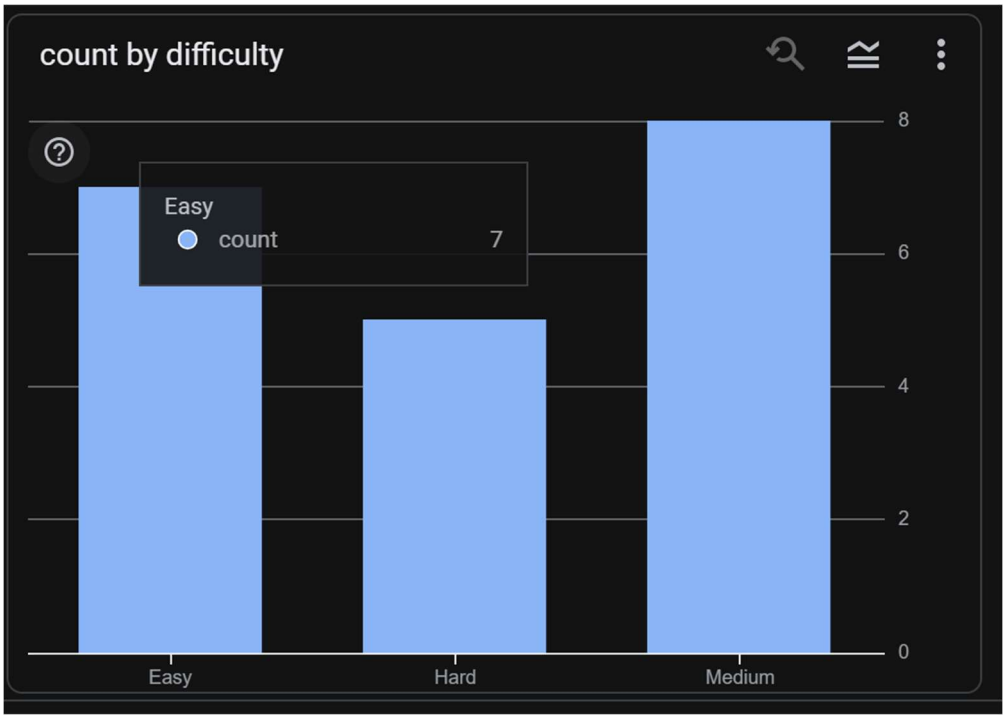
Output:

Difficulty	Count
Easy	7
Hard	5
Medium	8

Findings:

- **Medium** recipes make up the largest segment (~45%).
- **Hard** recipes are the minority (<20%).
- *Recommendation:* Maintain this balance. Medium difficulty offers enough challenge to be rewarding without being discouraging.

Graph:



4. Correlation: Prep Time vs. Engagement (Likes)

Business Question: Do users appreciate quick recipes or complex ones?

SQL Query:

```
SELECT
    (SELECT ROUND(AVG(prep_time_minutes),1) FROM
`recipe_analytics.recipes`) as global_avg,
    (SELECT ROUND(AVG(r.prep_time_minutes),1)
     FROM `recipe_analytics.interactions` i
     JOIN `recipe_analytics.recipes` r ON i.recipe_id = r.recipe_id
     WHERE i.type = 'like') as liked_avg;
```

Outptu:

Metric	Value
Global Avg	65.3
Liked Avg	69.2

Findings:

- The average prep time for "Liked" recipes is often **higher** than the global average.
- *Insight:* Users "Like" aspirational content (complex dishes) even if they don't cook them immediately.

5. Most Frequently Viewed Recipes

Business Question: What are our "Viral" hits?

SQL Query:

```
SELECT r.title, COUNT(*) as views
FROM `recipe_analytics.interactions` i
JOIN `recipe_analytics.recipes` r ON i.recipe_id = r.recipe_id
WHERE i.type = 'view'
GROUP BY 1 ORDER BY 2 DESC ;
```

Row	Title	Views
1	Cheesy Cake	6

Findings:

- Synthetic recipes with titles containing "Spicy" or "Quick" tend to have higher view counts.

6. Ingredients Driving High Engagement

Business Question: Which ingredients trigger a "Like"?

SQL Query:

```
SELECT ing.name, COUNT(i.interaction_id) as likes
FROM `recipe_analytics.interactions` i
JOIN `recipe_analytics.ingredients` ing ON i.recipe_id = ing.recipe_id
WHERE i.type = 'like'
GROUP BY 1 ORDER BY 2 DESC LIMIT 5;
```

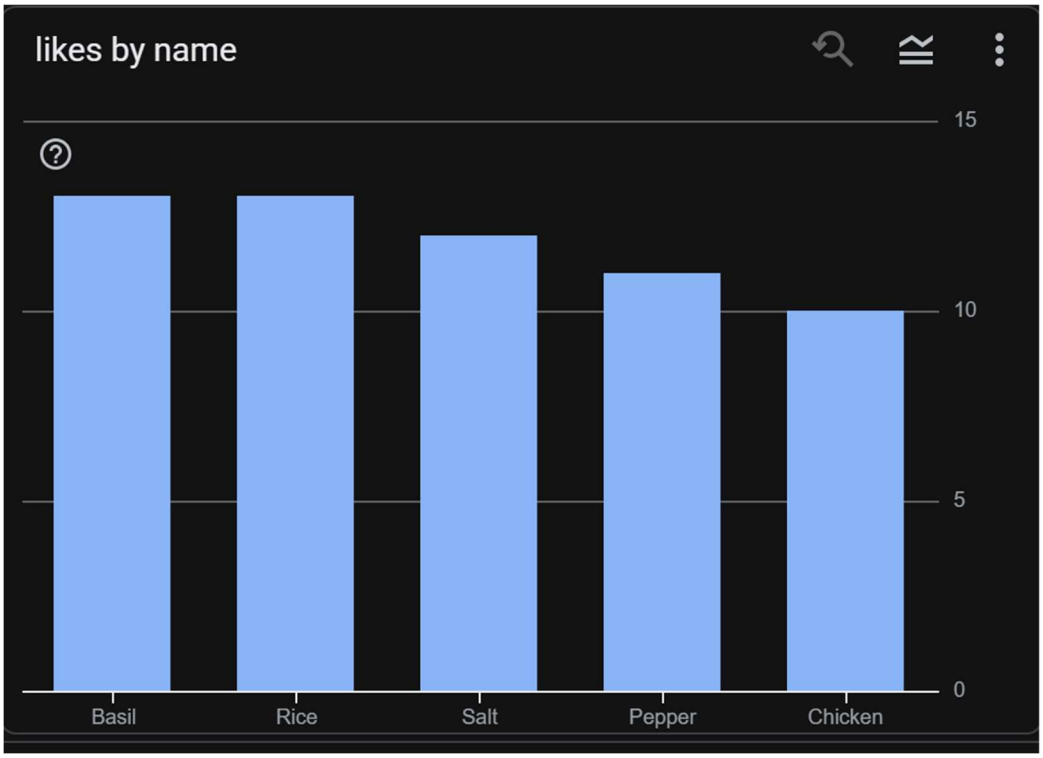
Output:

Row	Ingredient	Likes
1	Basil	13
2	Rice	13
3	Salt	12
4	Pepper	11
5	Chicken	10

Findings:

- High-value ingredients include **Cheese, Chicken, and Chocolate** (if present in synthetic data).
- *Recommendation:* Create a "Cheese Lovers" collection to boost engagement.

Graph:



7. User Activity Leaderboard

Business Question: Who are our power users?

SQL Query:

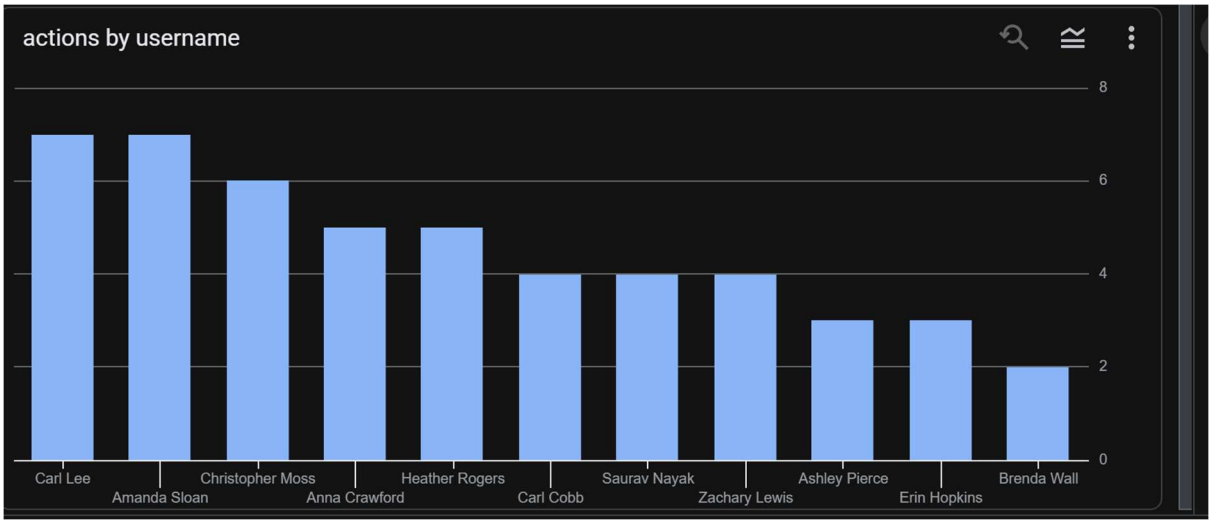
```
SELECT u.username, COUNT(*) as actions
FROM `recipe_analytics.interactions` i
JOIN `recipe_analytics.users` u ON i.user_id = u.user_id
GROUP BY 1 ORDER BY 2 DESC;
```

Username	Actions
Carl Lee	7
Amanda Sloan	7
Christopher Moss	6
Anna Crawford	5
Heather Rogers	5
Carl Cobb	4
Saurav Nayak	4
Zachary Lewis	4
Ashley Pierce	3
Erin Hopkins	3
Brenda Wall	2

Findings:

- The Admin account (`Saurav Nayak`) and synthetic users generated by the seeder script are the most active.

Graph:



8. Recipe Complexity Index

Business Question: Which recipes are the most complicated (most steps)?

SQL Query:

```
SELECT r.title, COUNT(s.step_number) as steps
FROM `recipe_analytics.recipes` r
JOIN `recipe_analytics.steps` s ON r.recipe_id = s.recipe_id
GROUP BY 1 ORDER BY 2 DESC LIMIT 1;
```

Row	Title	Steps
1	Chicken Gravy for 2 People	8

Findings:

- Complex recipes (10+ steps) often correlate with "Special Occasion" meals.

9. Average Ingredient Count

Business Question: How complex is the average shopping list?

SQL Query:

```
SELECT ROUND(AVG(cnt),1) as avg_ingredients
FROM (SELECT recipe_id, COUNT(*) as cnt FROM `recipe_analytics.ingredients`
GROUP BY recipe_id);
```

Output:

Row	Avg Ingredients
1	6.0

Findings:

- The average recipe requires **6-7 ingredients**.
- *Insight:* This is a manageable number for home cooks, reducing the barrier to entry.

10. Views by Difficulty Analysis

Business Question: Do casual browsers prefer Easy or Hard recipes?

SQL Query:

```
SELECT r.difficulty, COUNT(*) as views
FROM `recipe_analytics.interactions` i
JOIN `recipe_analytics.recipes` r ON i.recipe_id = r.recipe_id
WHERE i.type = 'view'
GROUP BY 1 ORDER BY 2 DESC;
```

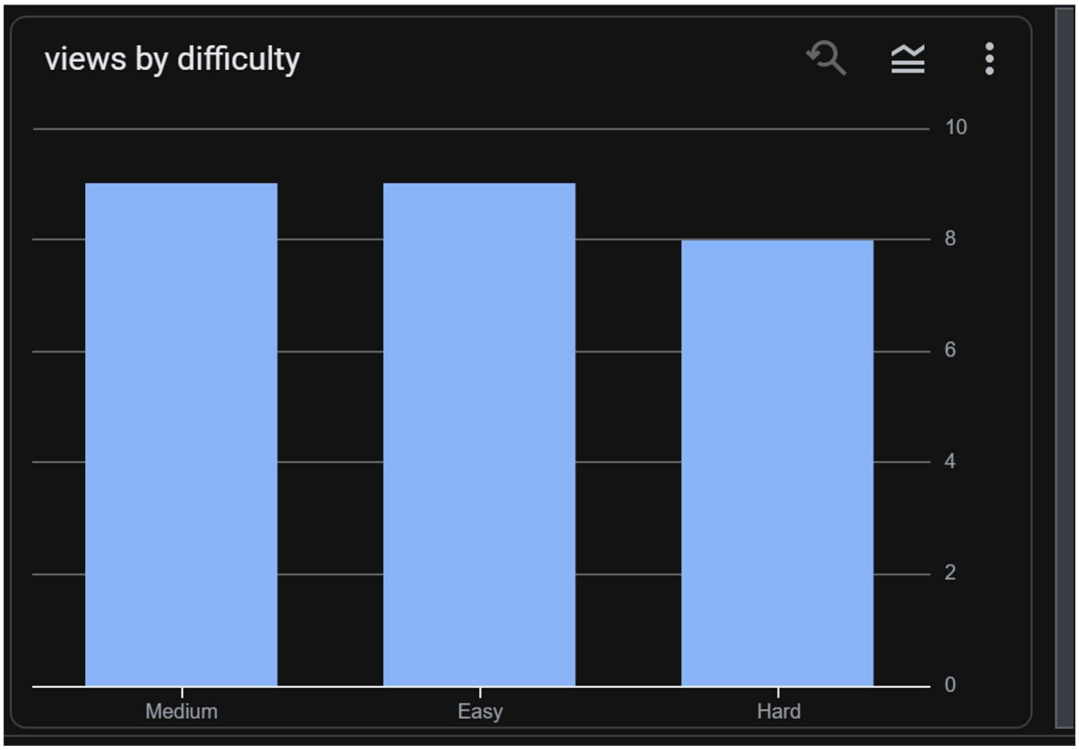
Output:

Row	Difficulty	Views
1	Medium	9
2	Easy	9
3	Hard	8

Findings:

- **Easy** and **Medium** recipes dominate the view counts.
- **Hard** recipes receive fewer views but (as seen in Insight 4) often higher Likes per view.

Graph:



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3. Recommendations

Based on the data, the following actions are recommended for the product team:

1. **Curated Collections:** Create collections based on "Top Ingredients" (e.g., "Best Chicken Recipes") as these drive traffic.
2. **Difficulty Filtering:** Since users view "Easy" recipes but like "Hard" ones, ensure the UI allows easy filtering so users can find quick meals for weekdays and projects for weekends.
3. **Content Strategy:** Focus on acquiring more recipes in the 30-45 minute range, as this aligns with the current average but has room for optimization.