

Mobile App for Indonesian Citizens

AI-Powered Sentiment Classification and Insight Analysis of Indonesian Government Mobile Apps Reviews for Public Service Improvement

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Dataset

Raw Dataset Link

https://play.google.com/store/apps/details?id=<package_name>

NOTE : Package Name is manually record from Google Play Store

1. SATUSEHAT - PeduliLindungi --> <https://play.google.com/store/apps/details?id=com.telkom.tracencare>
2. JAKI - Jakarta Kini --> <https://play.google.com/store/apps/details?id=id.go.jakarta.smartcity.jaki>
3. Identitas Kependudukan Digital --> https://play.google.com/store/apps/details?id=gov.dukcapil.mobile_id
4. M-Paspor --> https://play.google.com/store/apps/details?id=id.go.imigrasi.paspor_online
5. Jamsostek Mobile - BPJSTKU --> <https://play.google.com/store/apps/details?id=com.bpjstku>
6. MySAPK BKN --> <https://play.google.com/store/apps/details?id=com.nudi.bkn.sapk>
7. SiCantik Cloud --> <https://play.google.com/store/apps/details?id=id.go.perizinan.sicantikcloud>
8. Mobile JKN --> <https://play.google.com/store/apps/details?id=app.bpjs.mobile>
9. Cek Bansos --> <https://play.google.com/store/apps/details?id=id.go.kemensos.pelaporan>
10. PLN Mobile --> <https://play.google.com/store/apps/details?id=com.icon.pln123>
11. MyPertamina --> <https://play.google.com/store/apps/details?id=com.dafturn.mypertamina>
12. Pegadaian Digital --> <https://play.google.com/store/apps/details?id=com.pegadaidigital>
13. Digital Korlantas POLRI --> <https://play.google.com/store/apps/details?id=id.qoin.korlantas.user>
14. SIGNAL - Samsat Digital Nasional --> <https://play.google.com/store/apps/details?id=app.signal.id>
15. POLRI PRESISI --> <https://play.google.com/store/apps/details?id=superapps.polri.presisi.presisi>
16. Mobile JKN Faskes - BPJS Kesehatan --> <https://play.google.com/store/apps/details?id=app.bpjs.mobilefaskes>
17. OSS Indonesia --> <https://play.google.com/store/apps/details?id=id.go.oss>
18. Info BMKG --> https://play.google.com/store/apps/details?id=com.Info_BMKG
19. Sentuh Tanahku --> <https://play.google.com/store/apps/details?id=id.go.bpn.sentuh>
20. JDIH Kemensos --> https://play.google.com/store/apps/details?id=id.go.kemensos.jdih.jdih_kemensos_f
21. LMS Kemendes --> <https://play.google.com/store/apps/details?id=com.mid.lmskemendes>
22. Internal POLRI --> <https://play.google.com/store/apps/details?id=superapps.polri.internal.presisi>
23. Pemutakhiran PK - BKKBN --> <https://play.google.com/store/apps/details?id=com.yosicsa.pemutakhirankpk>
24. SIKS Mobile --> <https://play.google.com/store/apps/details?id=id.go.kemensos.sagismobile>
25. M-Pajak --> <https://play.google.com/store/apps/details?id=id.go.pajak.djp>
26. iPusnas --> <https://play.google.com/store/apps/details?id=mam.reader.ipusnas>
27. SIMPKB --> <https://play.google.com/store/apps/details?id=id.simpkb.app>
28. Jaga - KPK --> <https://play.google.com/store/apps/details?id=id.or.checkmy>
29. Satudikti - Kemdikbud --> <https://play.google.com/store/apps/details?id=id.satudikti.app>
30. IDENTIK PKH Kementan - Peruri --> <https://play.google.com/store/apps/details?id=com.solusibejo.hiternak>
31. BPKH Apps --> <https://play.google.com/store/apps/details?id=id.go.bpkh.nmva>
32. AK23 Online by Pusinafis POLRI --> <https://play.google.com/store/apps/details?id=com.ak23.online>
33. GTK Kemenag --> <https://play.google.com/store/apps/details?id=id.siap.ptk>

Project Overview

- **Global Digital Transformation**

Over the last two decades, digitalization has changed how people access information, interact, and use public services.

- **Indonesia Context**

The government adopts digital technologies to improve efficiency and transparency in public services.

- **Government Applications**

More than 27,000 government apps are managed by ministries, agencies, and local governments (KemenPAN-RB, 2023).

- **Government Applications**

Key Issues:

- Many apps are underutilized.
- Overlapping functions & poor UI/UX.
- Servers rarely accessed by the public.
- Risk of budget waste and misuse (mark-ups, fictitious projects, vendor collusion).

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Project Overview

- **Project Objective**

Enhance the quality of digital public services through AI-powered Sentiment Analysis & Insight Extraction using user reviews from Google Play Store.

- **Approach**

- Apply LLM IBM Granite for sentiment classification (Positive, Neutral, Negative, Mixed).
- Extract insights to detect recurring issues, complaints, and user suggestions.

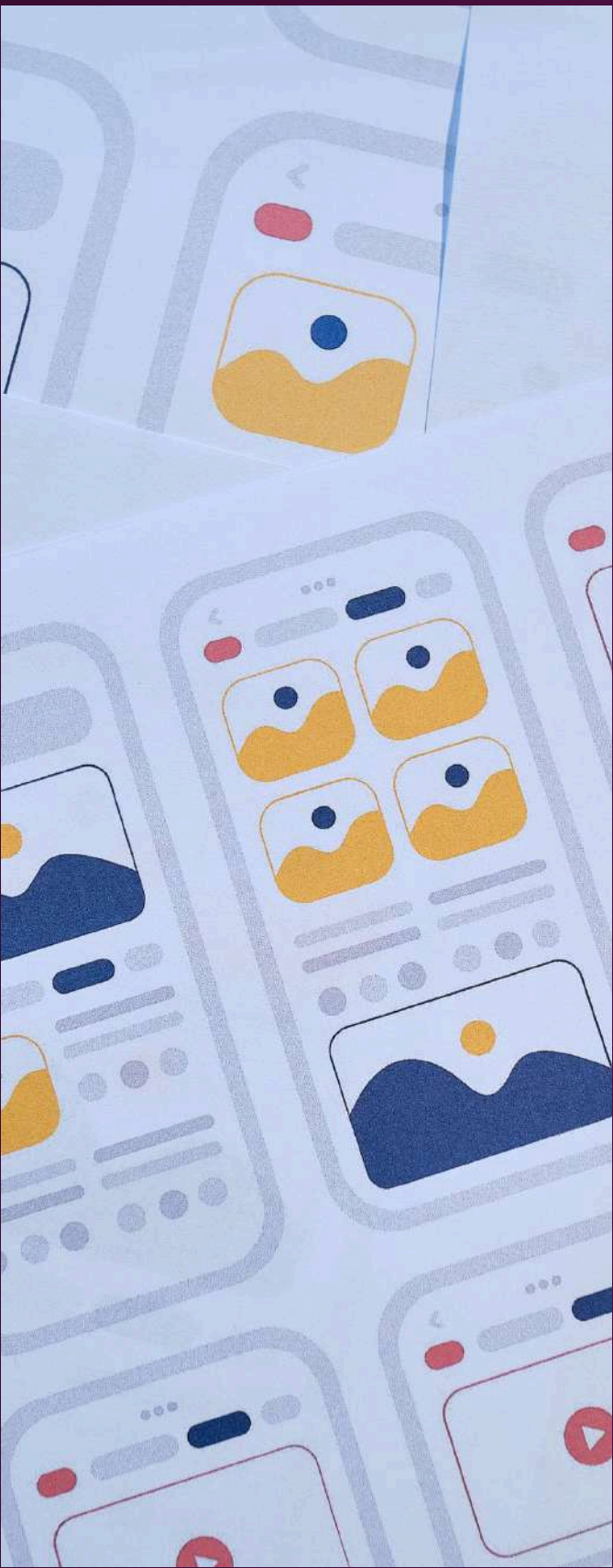
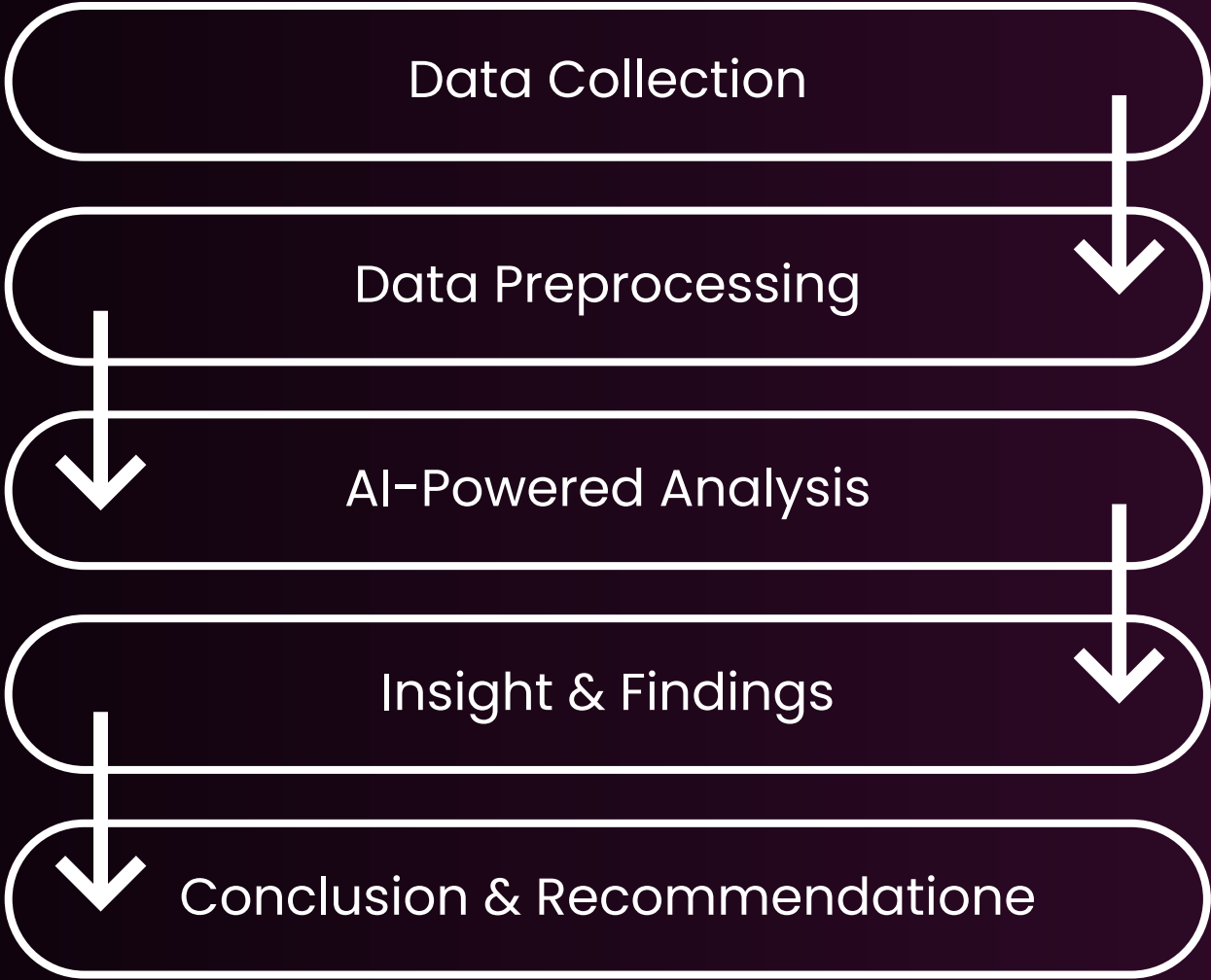
- **Expected Outcomes**

- Deliver data-driven insights for developers & policymakers.
- Support feature improvement prioritization and targeted service upgrades.
- Strengthen public trust, optimize technology budgets, and build an integrated government app ecosystem.



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Analysis Process Flowchart



● Analysis Process



1. Data Collection

- Identify government apps across ministries/sectors.
- Scrape reviews from Google Play Store (using google-play-scraper).
- Collect metadata: App name, Username, Rating, Review text, Date.

2. Data Preprocessing

- Remove duplicates → avoid bias.
- Clean invalid/special characters by Regex.
- Light cleanup → normalize spacing & punctuation.

● Analysis Process



3. AI-Powered Analysis

- Sentiment Classification → Positive, Neutral, Negative.
- Summarization → recurring issues, feature requests, positive highlights.
- Insight Extraction → keyword patterns (bugs, login, OTP, performance, security, etc.) + Visualization (bar/pie charts).

4. Insight & Findings

- Logical, unique, and data-driven analysis results.

5. Conclusion & Recommendation


- Provide actionable strategies for Government, Developers, and Stakeholders to improve digital public service quality.



Insight & Findings





Sentiment Classification per Review

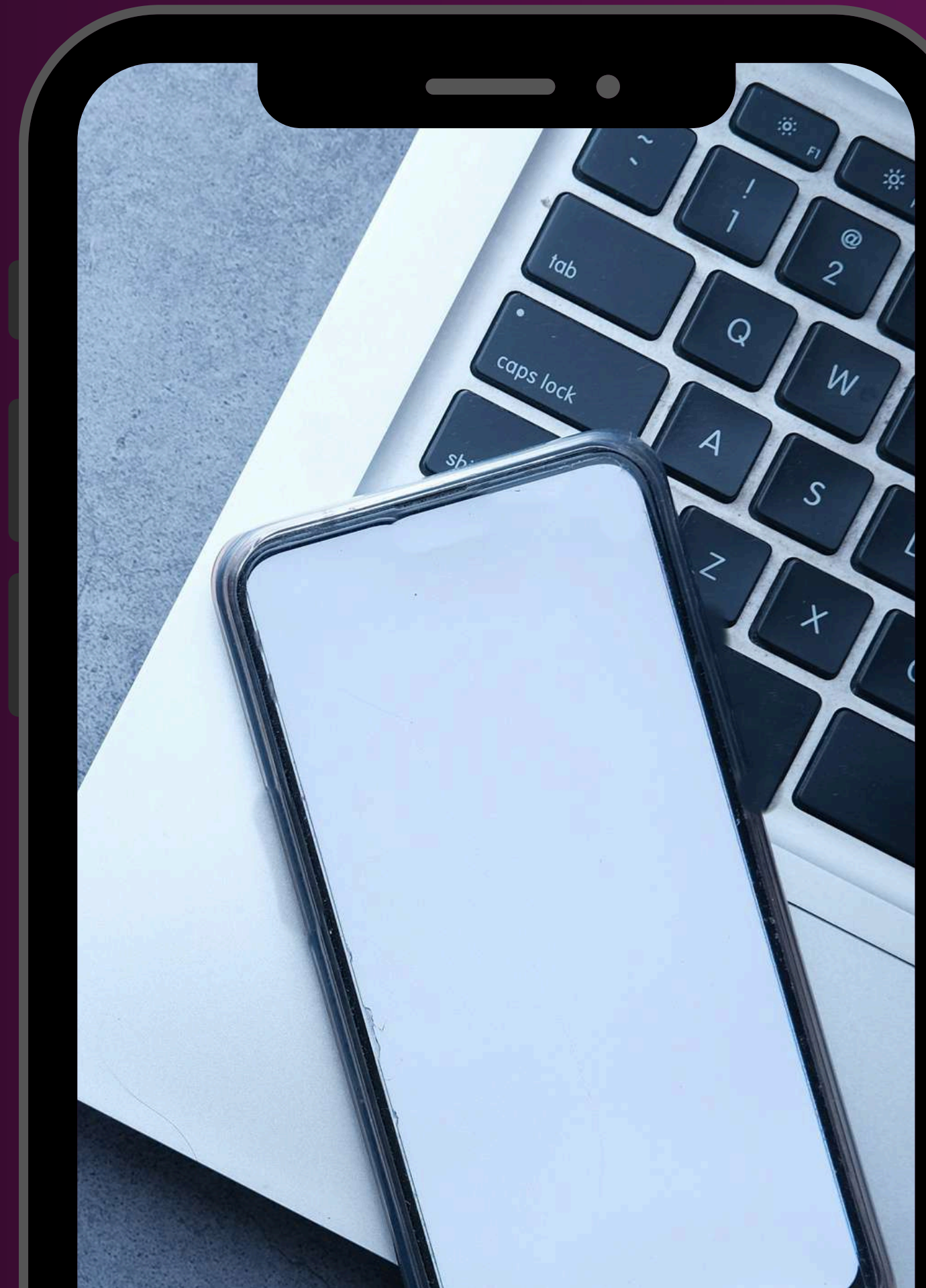
 Distribution: Negative 47% > Positive 37% > Neutral 16%

 Negative dominates: app crashes, login failure, slow performance.

 Positive: highlights usefulness & benefits.

 Neutral very few → reviews tend to be polarized (very satisfied or very dissatisfied).

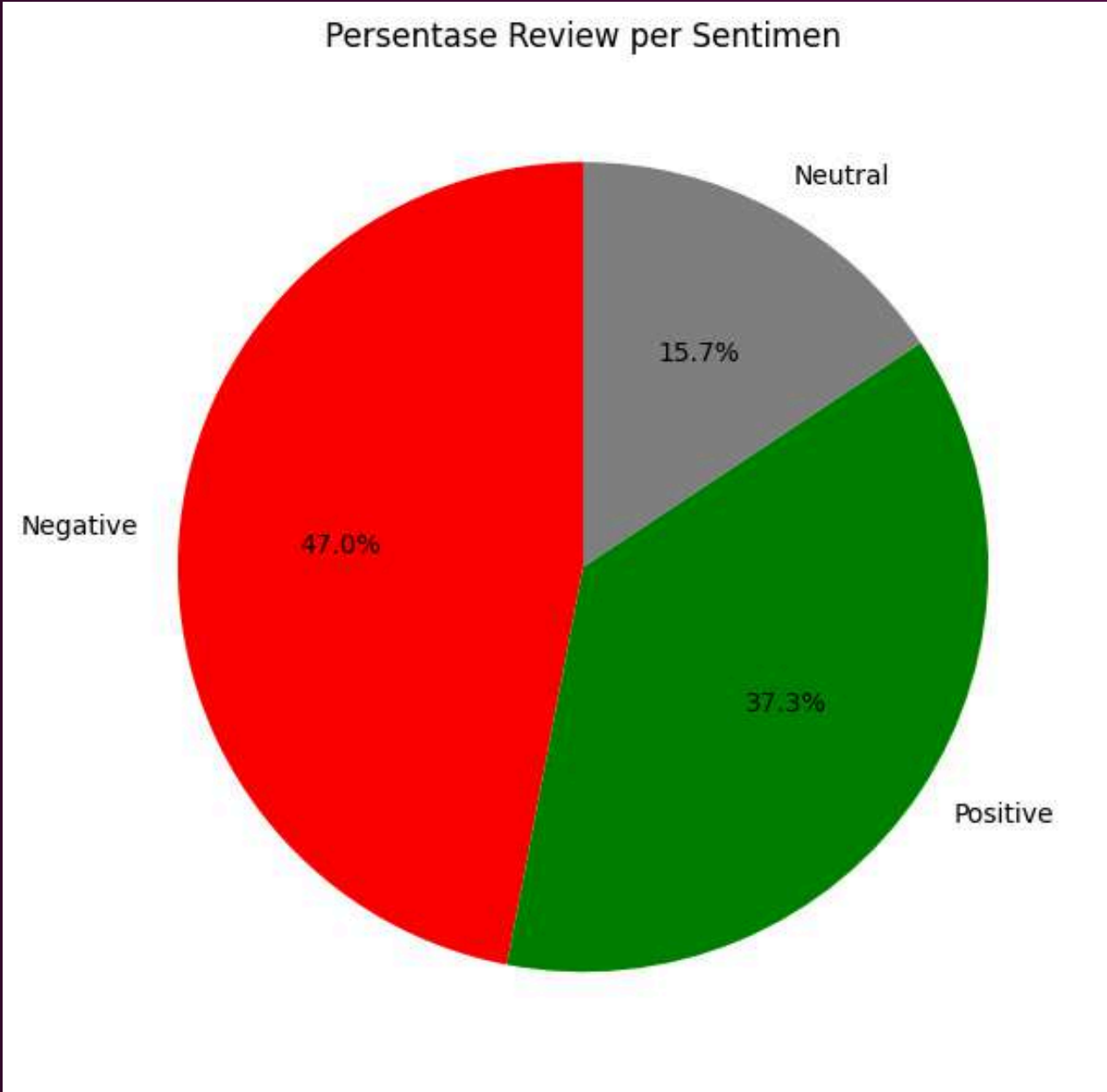
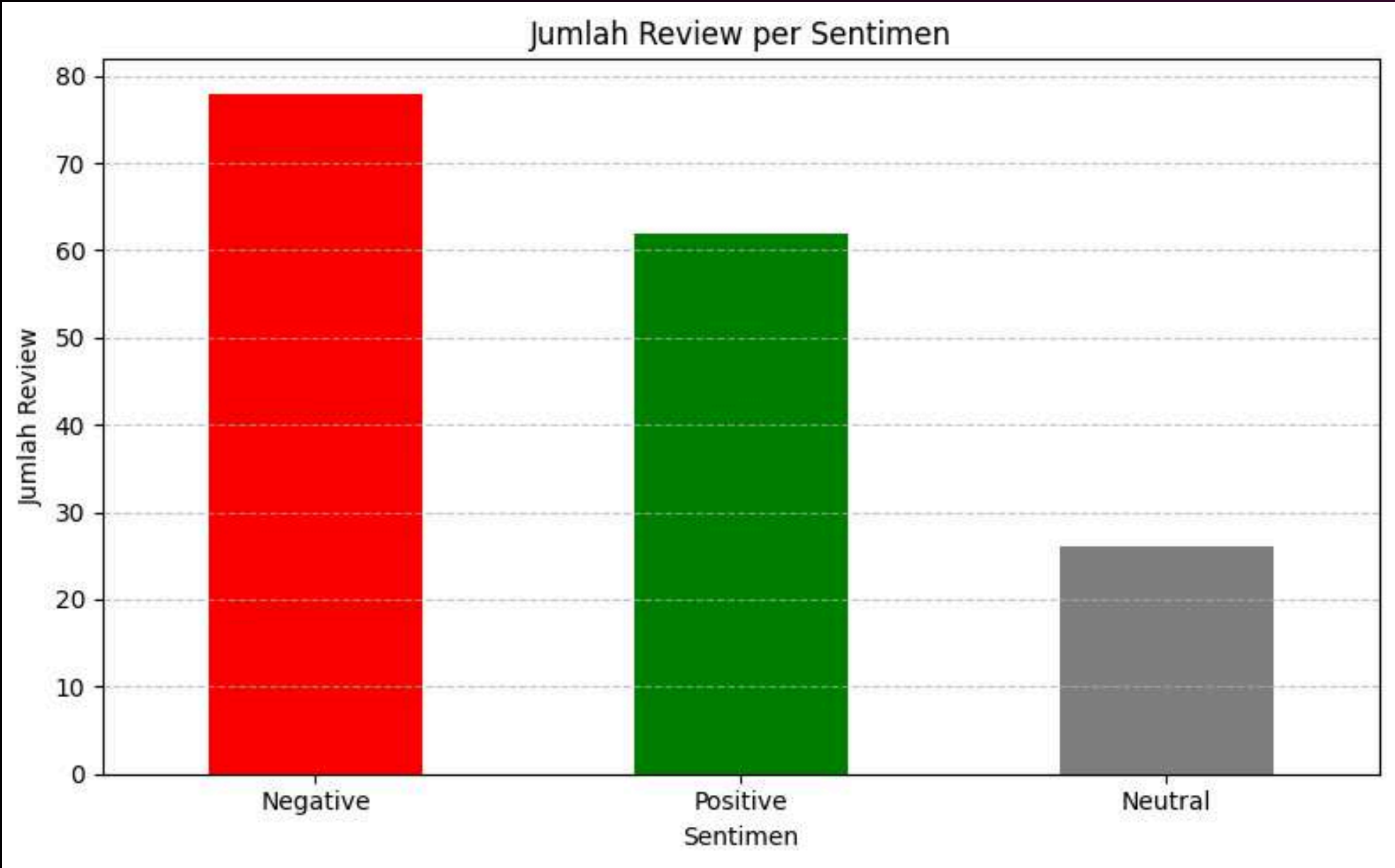
 Recommendation: prioritize bug fixing & stability improvements to shift public perception.





Data Visualization

Sentiment Classification per Review





Insight & Findings



Sentiment Classification per Application

📊 Similar distribution: Negative 48% > Positive 37% > Neutral 15%

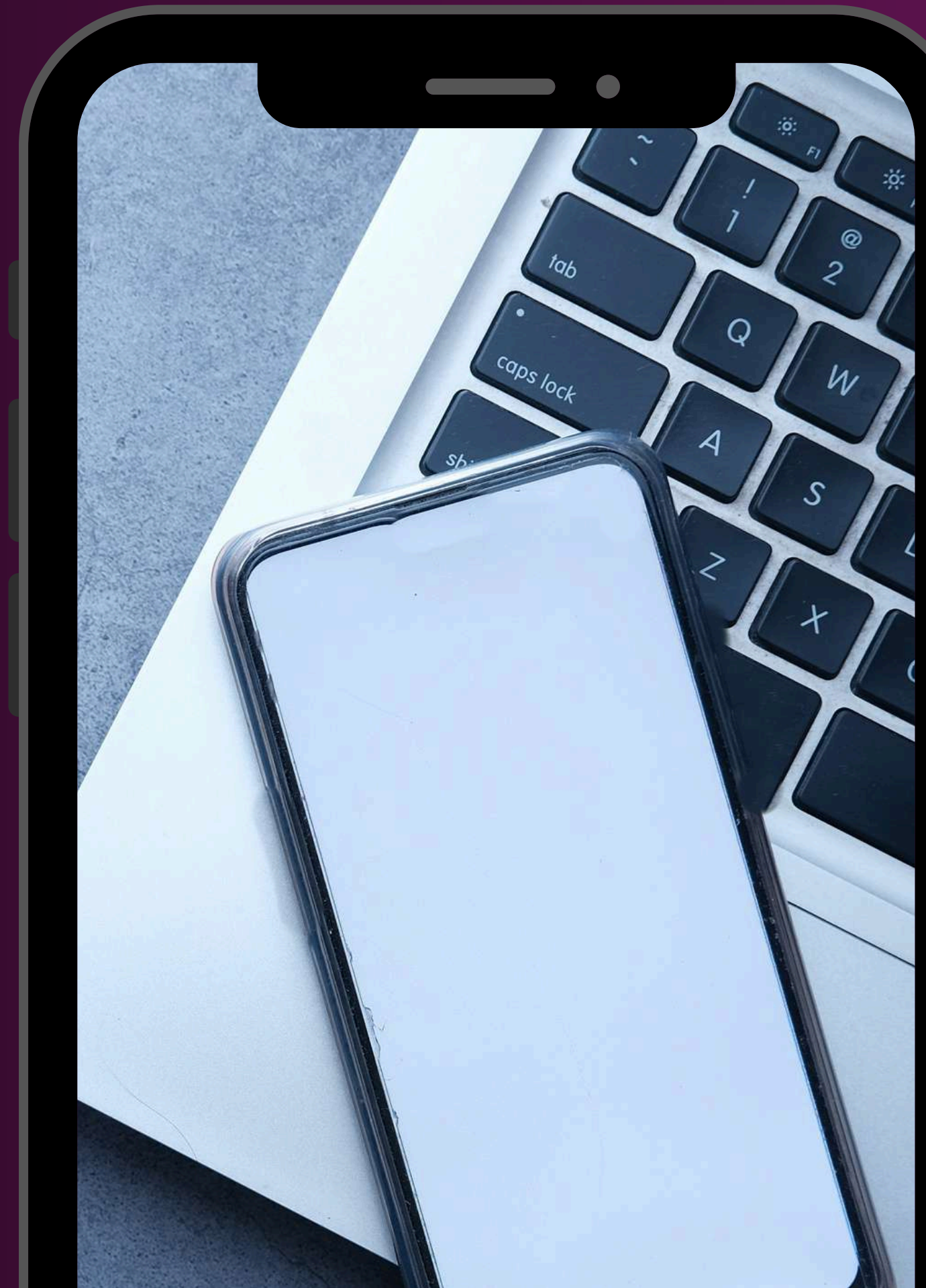
❌ Core service apps (Identity, Health, Education) face the most complaints.

✅ Balanced/positive apps include Pegadaian Digital, SIMPKB, JDIH Kemensos.

🚨 Apps with highest negative scores:

IKD Digital ID, PK Update BKKBN, Satudikti, SiCantik Cloud, Jamsostek Mobile.

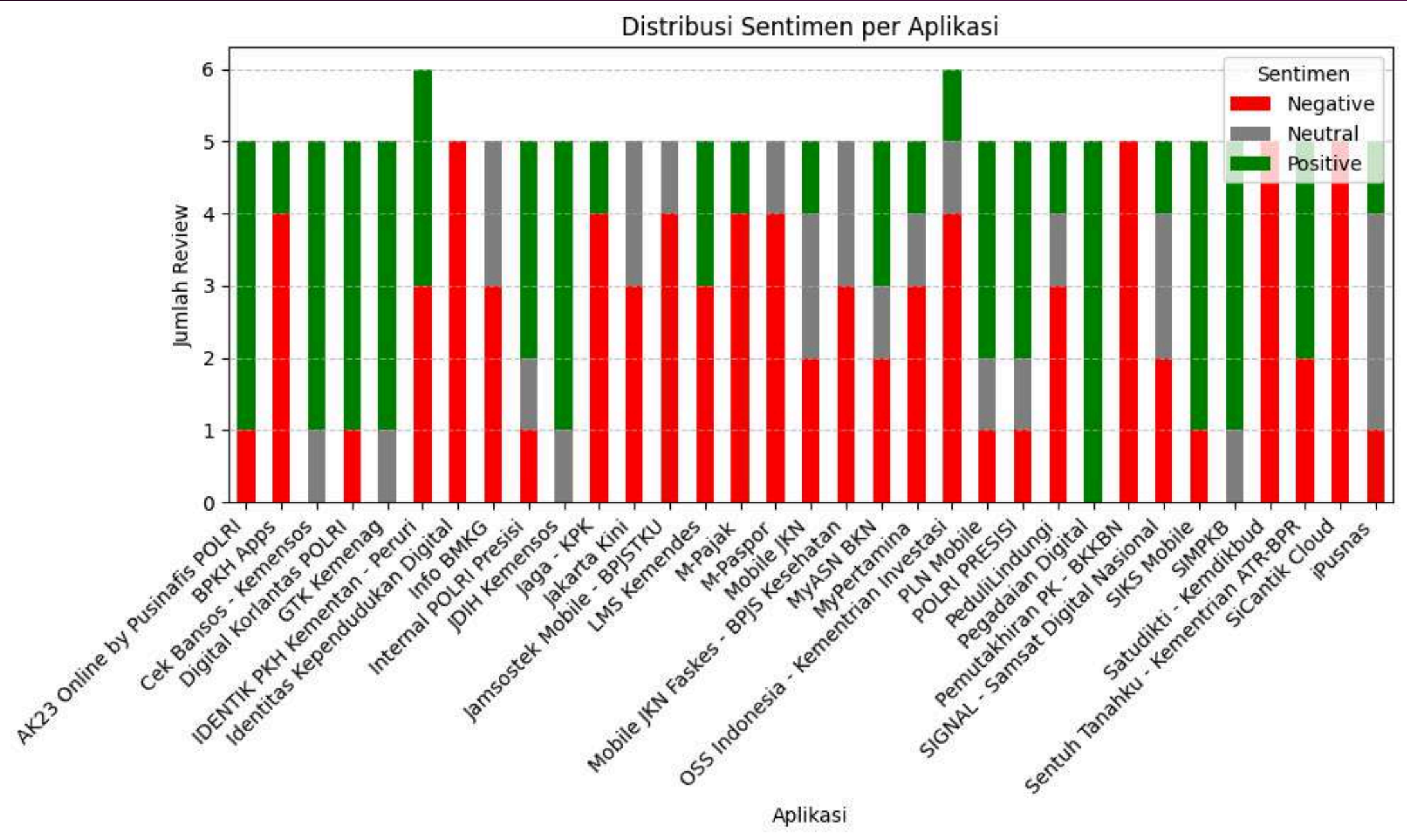
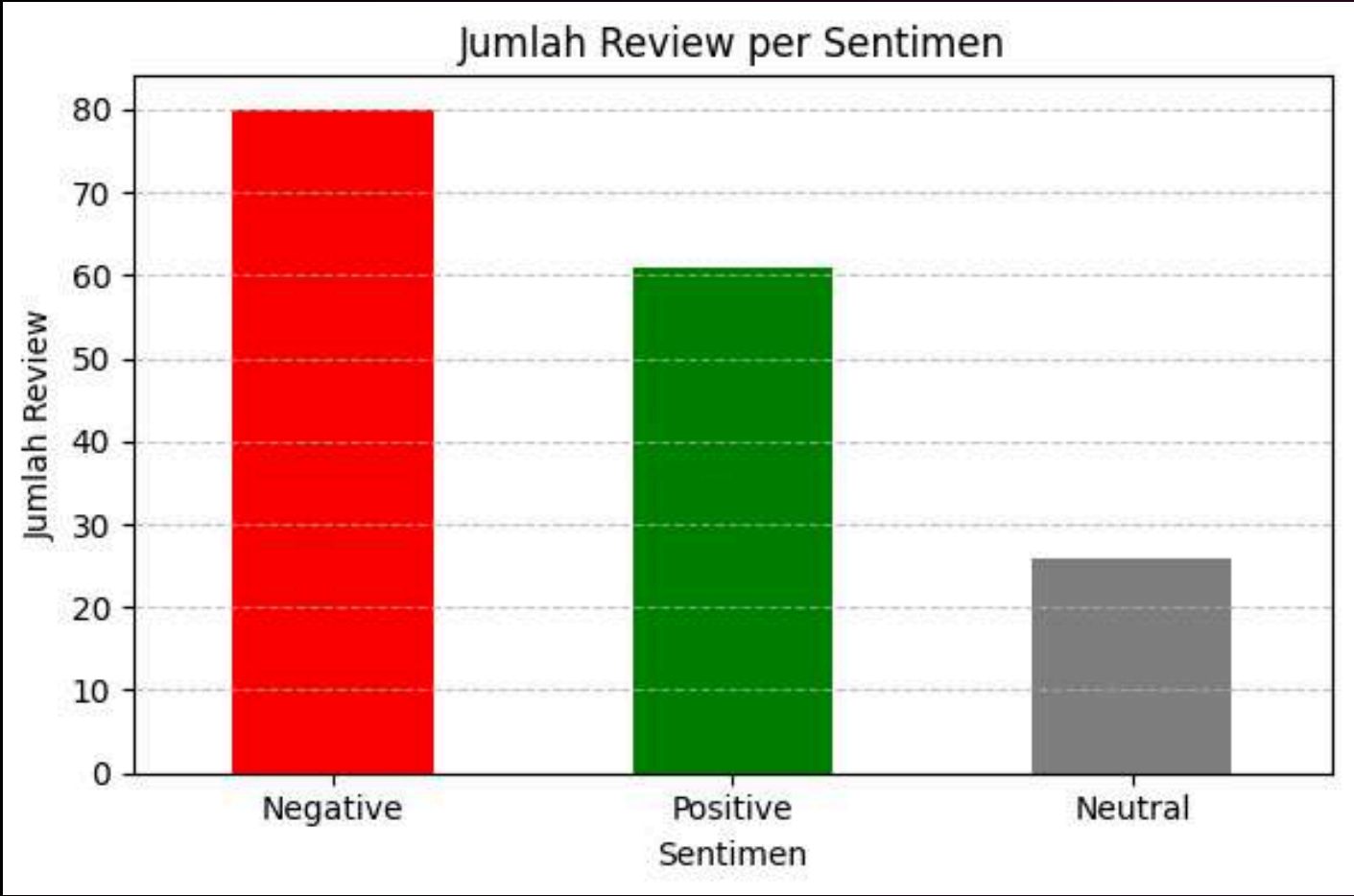
💡 Recommendation: prioritize audits & serious fixes on mission-critical apps (e.g., digital identity & licensing).





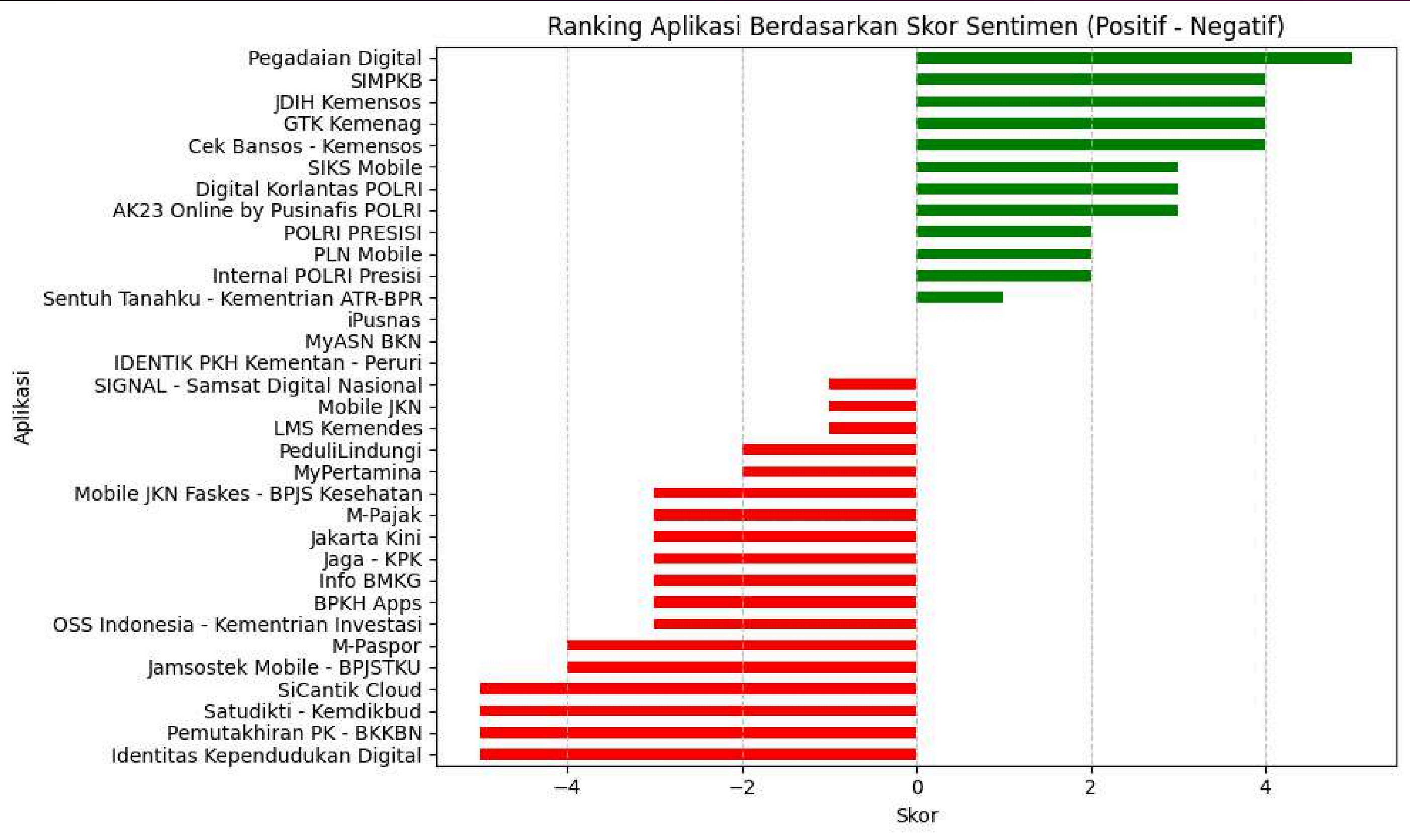
Data Visualization

Sentiment Classification per Application



Data Visualization

Sentiment Classification per Application





Insight & Findings



Sentiment Classification per Issue/Problem (APK Label)

Distribution: Negative 53% > Positive 43% > Neutral 4%

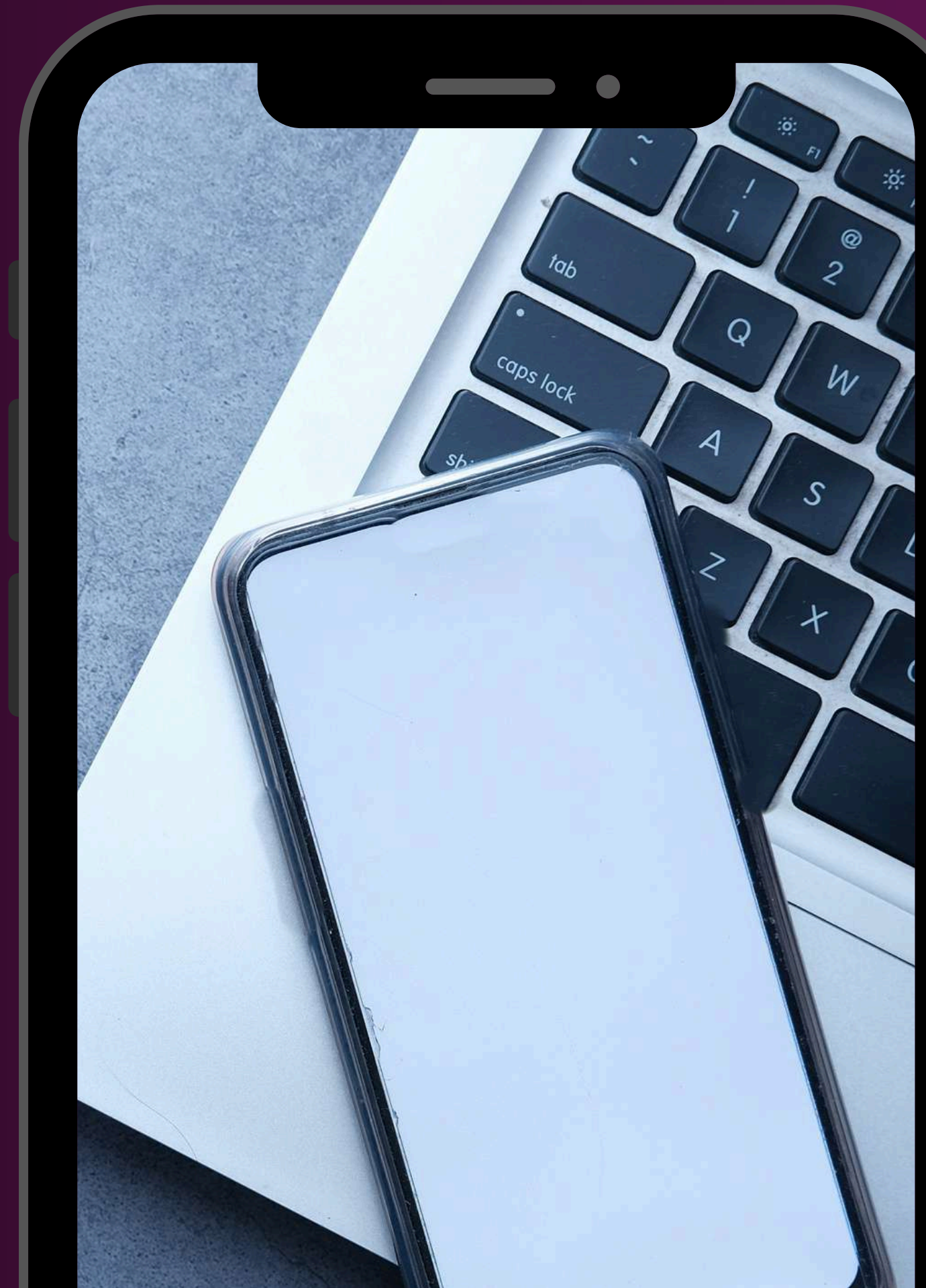
🔴 Most frequent issue: Login failure (10% of all reviews).

✗ Other recurring problems: password reset, server downtime, crashes, OTP delays.

✅ Despite issues, many still value the apps' core functions.

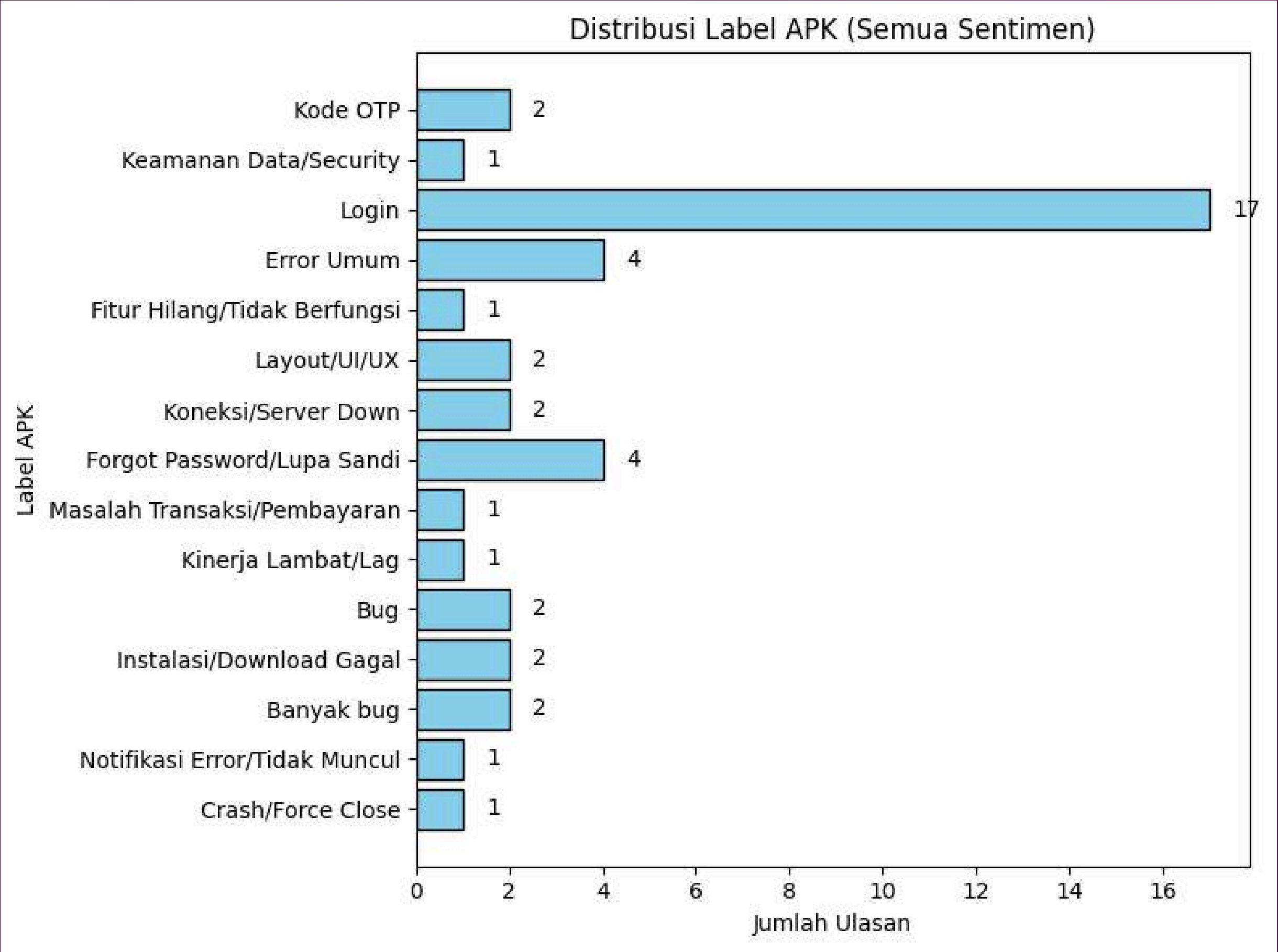
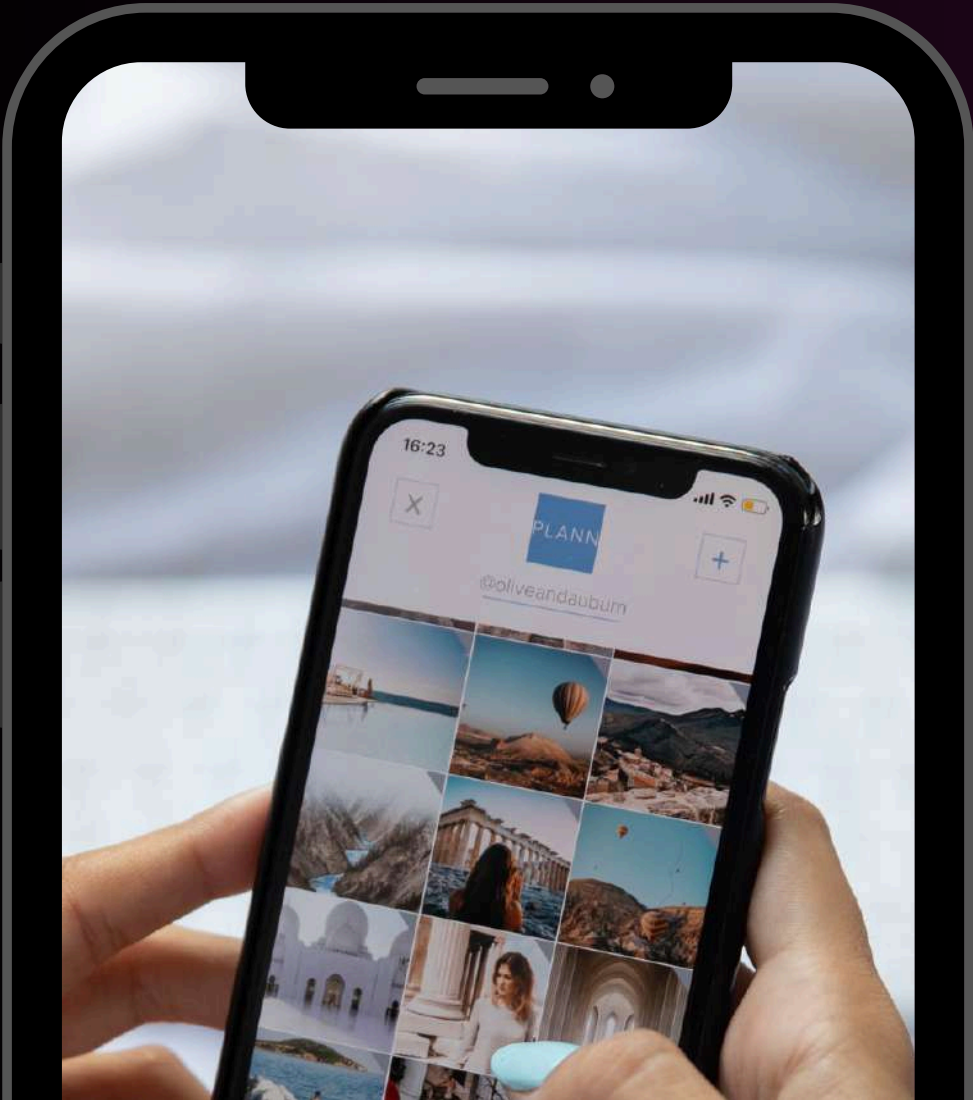
💡 Recommendation:

- Quick wins → fix login/authentication.
- Long-term → strengthen server capacity, error handling, user support (FAQ/chatbot).



Data Visualization

Sentiment Classification per Issue






Insight & Findings




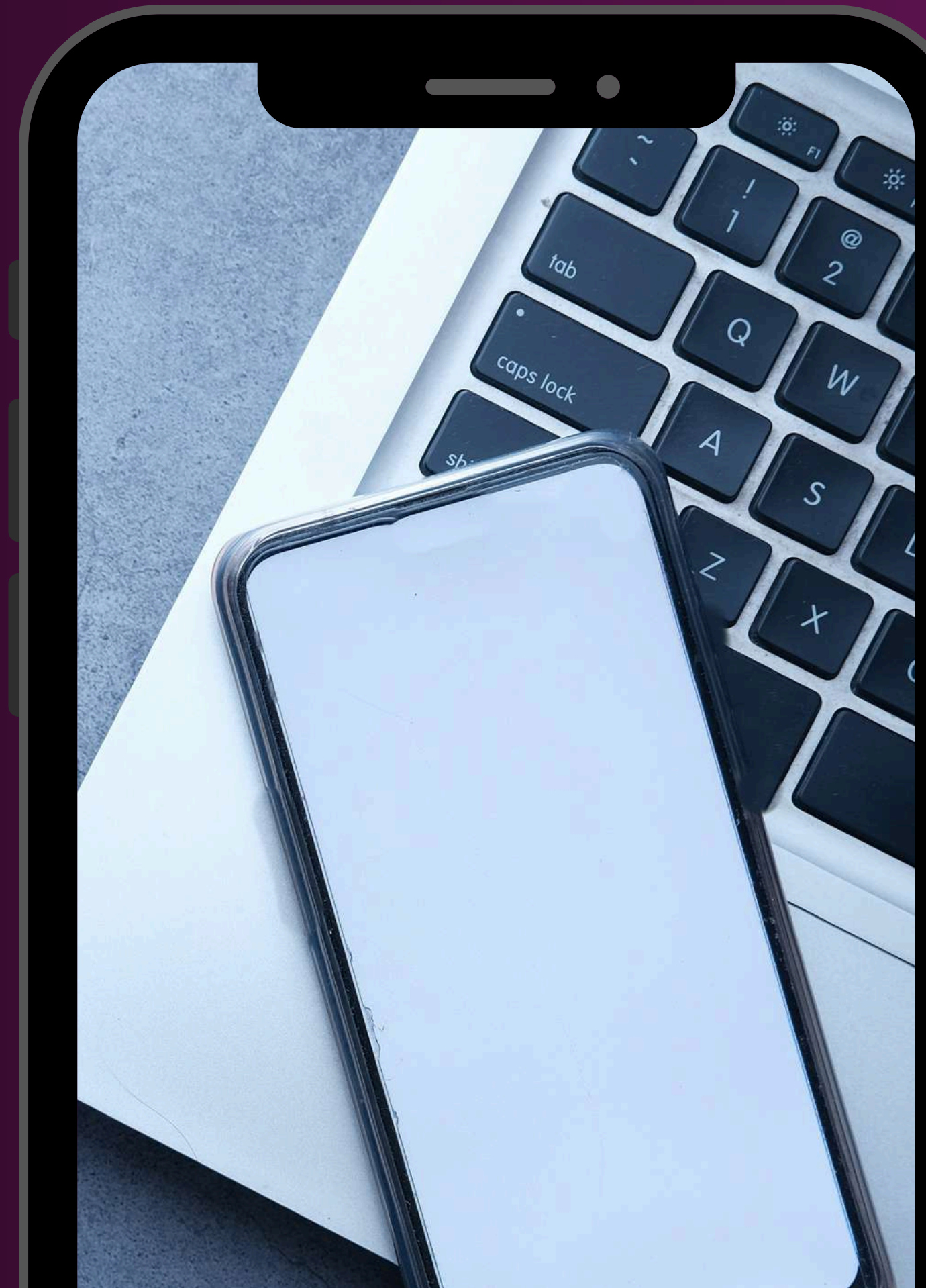
Multi-Label Sentiment per Application (App + Issue)

 Top 5 apps with the highest recurring issues:

- a. Mobile JKN (Login)
- b. MyPertamina (Bug)
- c. OSS Indonesia (Bug)
- d. JAKI (Login)
- e. LMS Kemendes (Login)

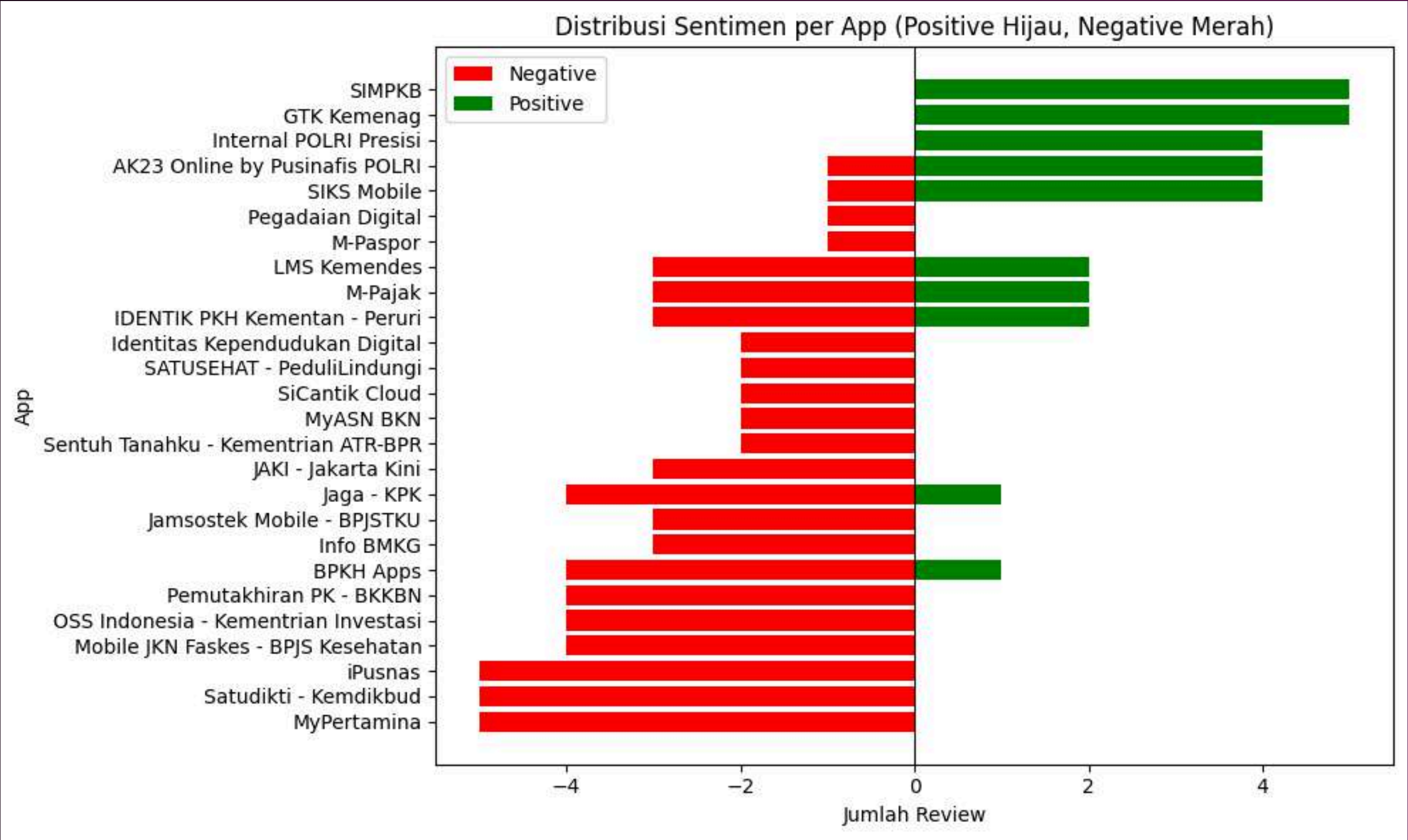
 Variability observed → influenced by review timing & volume.

 Recommendation: periodic monitoring + fast patch cycles for login/bug issues in high-traffic apps.



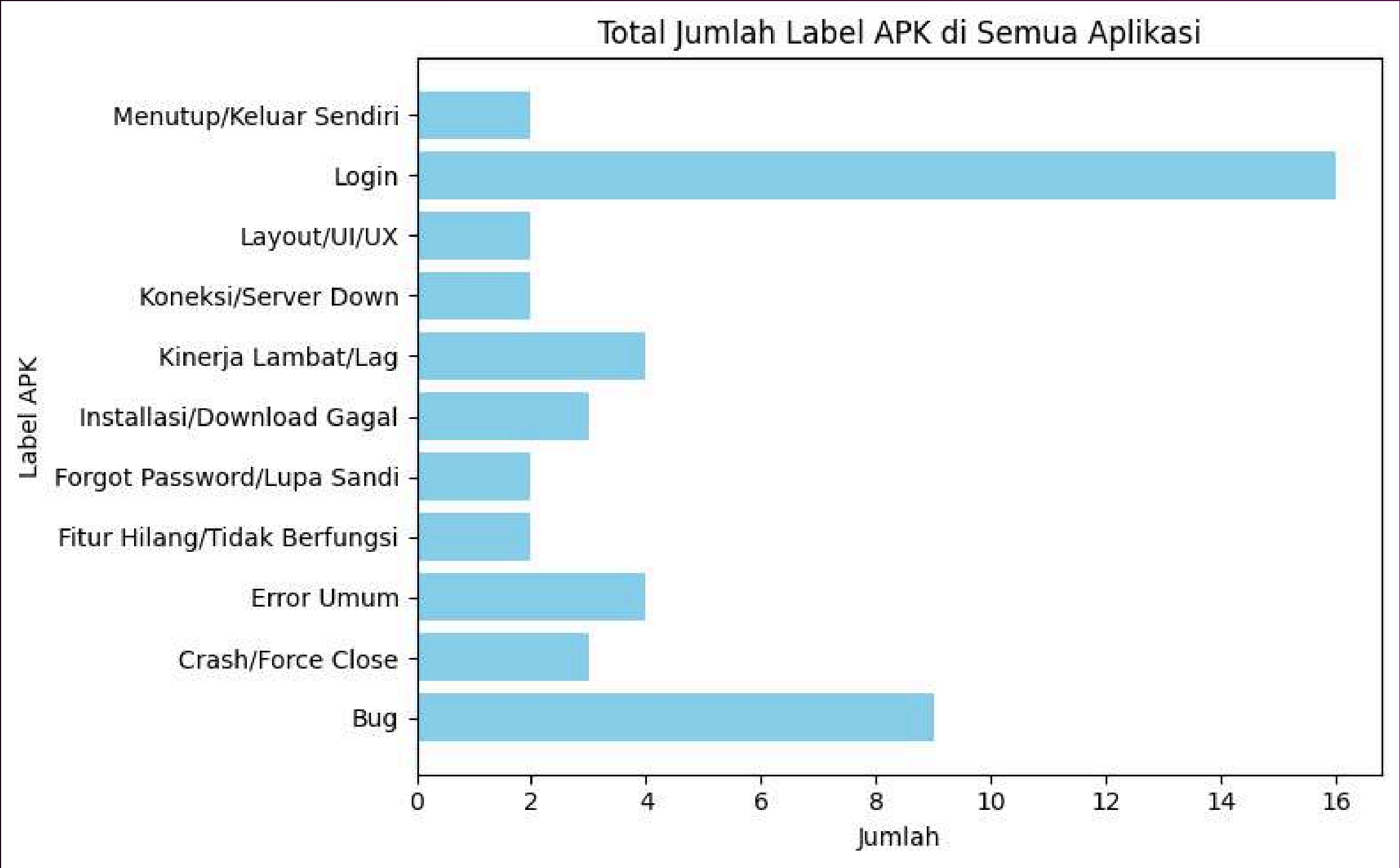
Data Visualization

Multi-Label Sentiment per
Application (App + Issue)



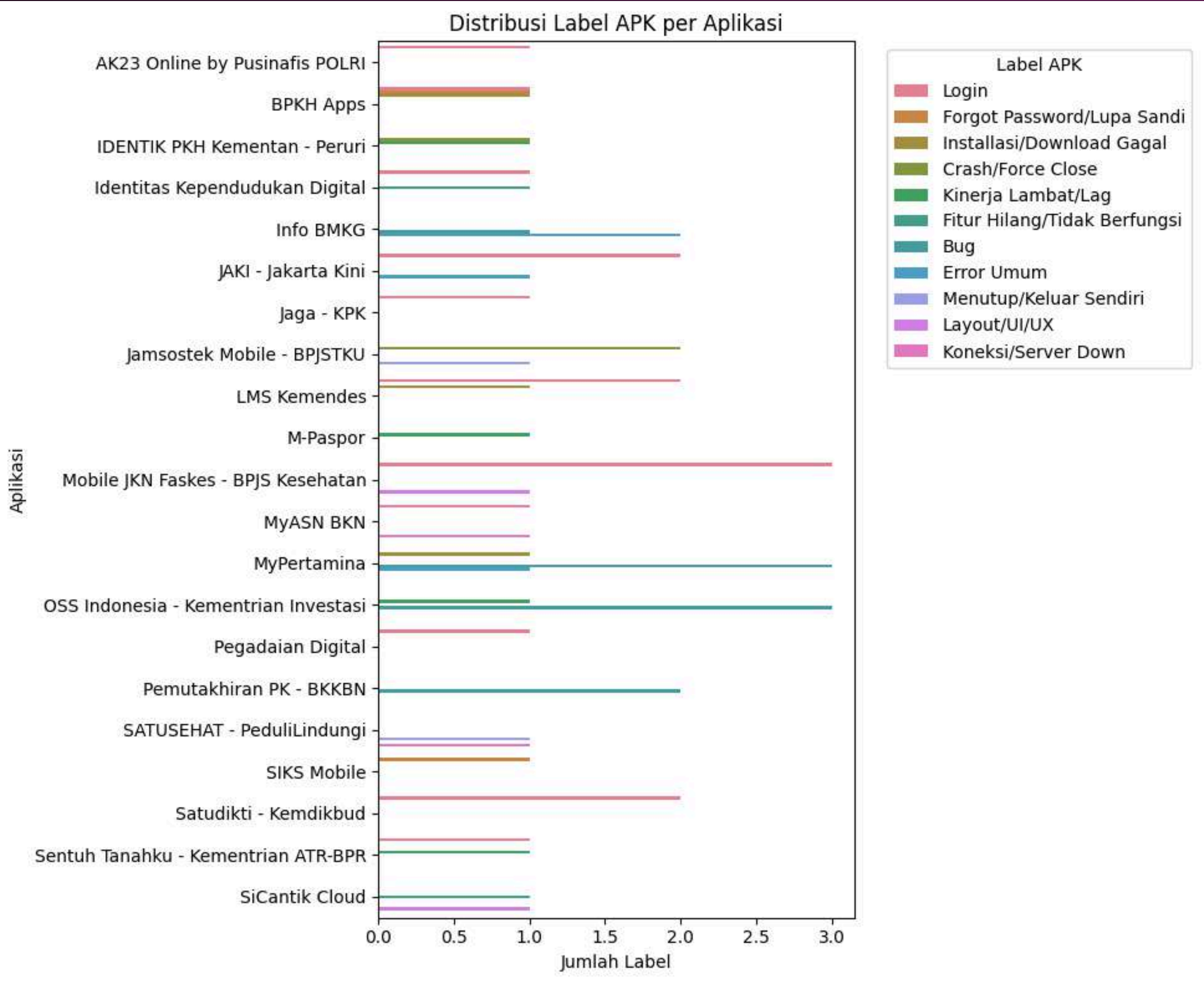
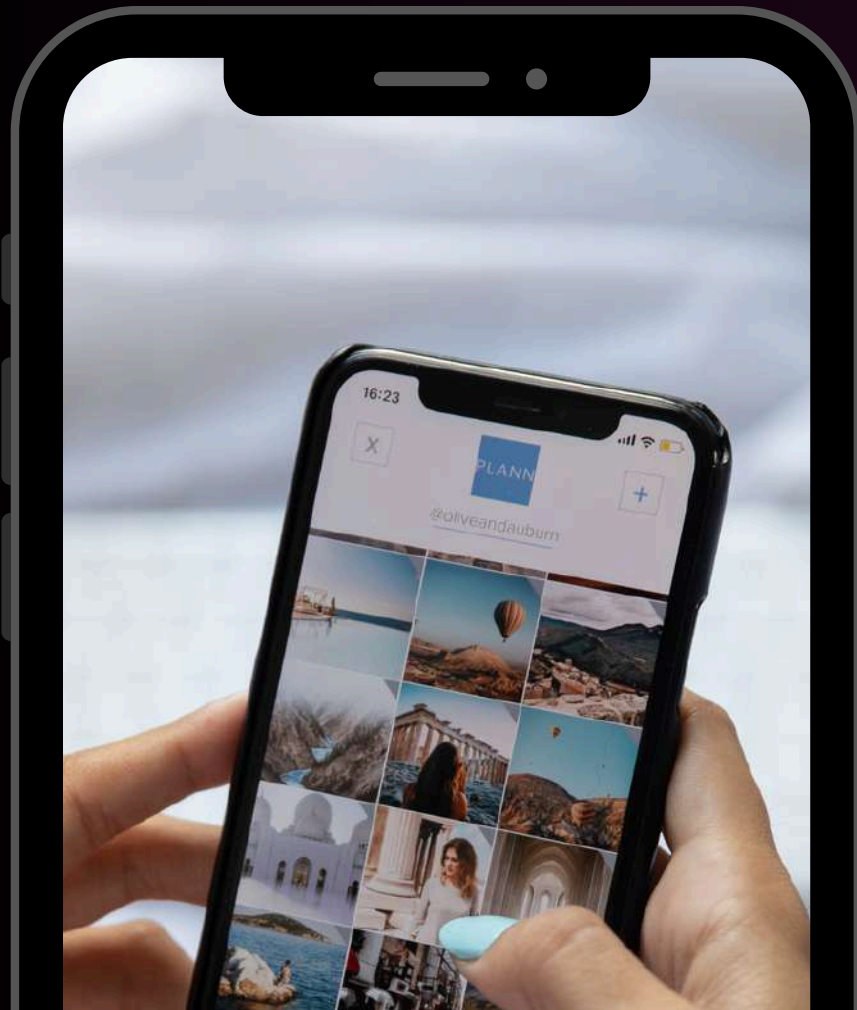
Data Visualization

Multi-Label Sentiment per
Application (App + Issue)



Data Visualization

Multi-Label Sentiment per
Application (App + Issue)



Conclusion

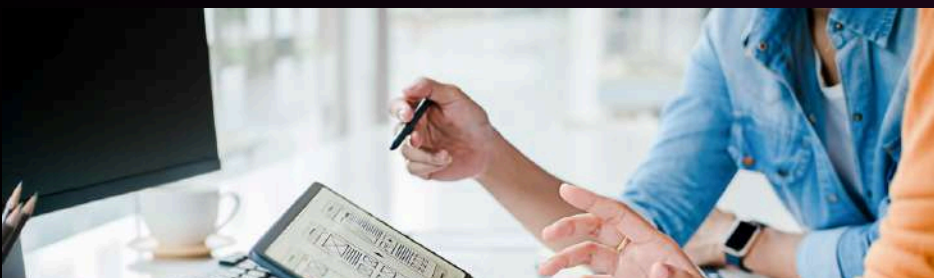
- ✗ Negative Sentiment Dominates → Login failures, crashes, poor UX.
- ✓ Positive Sentiment Exists → Apps seen as useful for public services.
- ⚠ Critical Weak Points → Authentication, stability, usability gaps.
- ↔ Polarization Across Apps → Some apps succeed, others heavily criticized.
- 🤝 Trust vs. Frustration → Citizens still rely on gov apps despite flaws.
- 📉 Public Service Gap → Lack of usability, integration, reliability.
- 🔒 Security Concerns → Data privacy & breach risks demand attention.



Recommendations for Government-Policymakers










- 🔧 Fix Core Issues → Prioritize login/authentication + stability.
- 📊 Continuous Monitoring → AI-powered review tracking.
- 💰 Optimize Budget → Consolidate redundant apps, avoid overlaps.
- 📌 Benchmark Best Apps → Adopt UI/UX standards from top performers.
- 📝 Citizen-Centered Development → Needs assessment before launch.
- 🔒 Cybersecurity Standards → Enforce strong data protection.
- ✅ Mandatory QA Testing → Functional + performance + security.
- 📱 One-for-All Mobile App → Centralized super-app to reduce fragmentation.



Recommendations for Developers & Vendors



-  Quick Wins → Fix login, crash handling, server reliability.
-  Rigorous QA & Testing → Pre/post update validation.
-  User-Centric Development → Integrate feedback into features.
-  Support Systems → Clear errors, FAQs, chatbots.
-  Security-by-Design → Encryption, secure auth, penetration testing.
-  Regular Updates → Based on evolving needs & user feedback.
-  Incident Response → Monitoring + fast recovery on failures.







Recommendations for Stakeholders (Public & Agencies)

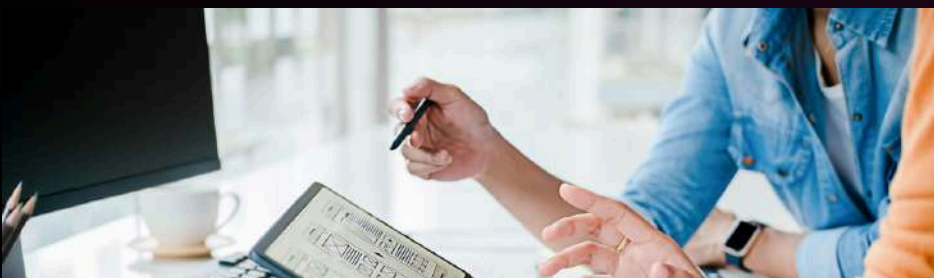


-  Transparency & Accountability → Share progress & fixes.
-  Data Privacy Awareness → Educate & empower users.
-  Cross-Agency Collaboration → Integrated, seamless services.



For Public (Citizens):

-  Active Participation → Keep giving feedback & criticism.
-  Build Digital Ecosystem → Support app adoption in daily life.
-  Openness to Technology → Embrace apps for easier access.
-  Responsible Usage → Practice digital literacy & protect privacy.



AI Support Explanation

Role of AI in the Project

- 🧠 AI as Analytical Engine → Processes & extracts insights from public reviews of government-owned apps.
- ⚙️ Powered by LLM (IBM Granite) → Multi-level analysis for sentiment, summarization, and insights.
- 🎯 Goal → Understand public perception & improve digital government services.

AI Support Explanation

Sentiment Classification

- ✓ Positive → Satisfaction, appreciation, support.
- ✗ Negative → Criticism, complaints, frustration.
- ⚖ Neutral → Informative or balanced feedback.
- ➡ Provides nuanced user perception beyond binary good/bad.

AI Support Explanation

Summarization

- 📝 LLM-Based Summarization → AI generates concise summaries of recurring issues & highlights.
- 👤 Manual Validation → Human-driven review for accuracy & context.
- ➡ Ensures reliability & alignment with real concerns.

AI Support Explanation

Text-Based Insight Extraction

- ⚡ Performance & Stability → Bugs, crashes, slow response.
- 🔑 Accessibility & Usability → Login failures, password reset, poor navigation.
- ☀️ Benefits & Positive Impact → Better access to public services.
- 🔒 Security & Public Trust → Concerns over privacy & data protection.

AI Support Explanation

Multi-Level Classification

- Per Review → Analyze each user feedback.
- Per App → Sentiment distribution by application.
- Per APK Label → Categories: login, error, bug, security.
- Cross-Classification → App + technical issue mapping (e.g., which apps face login failures most often).



Out of the Record Classification 100 Review per APP

Note

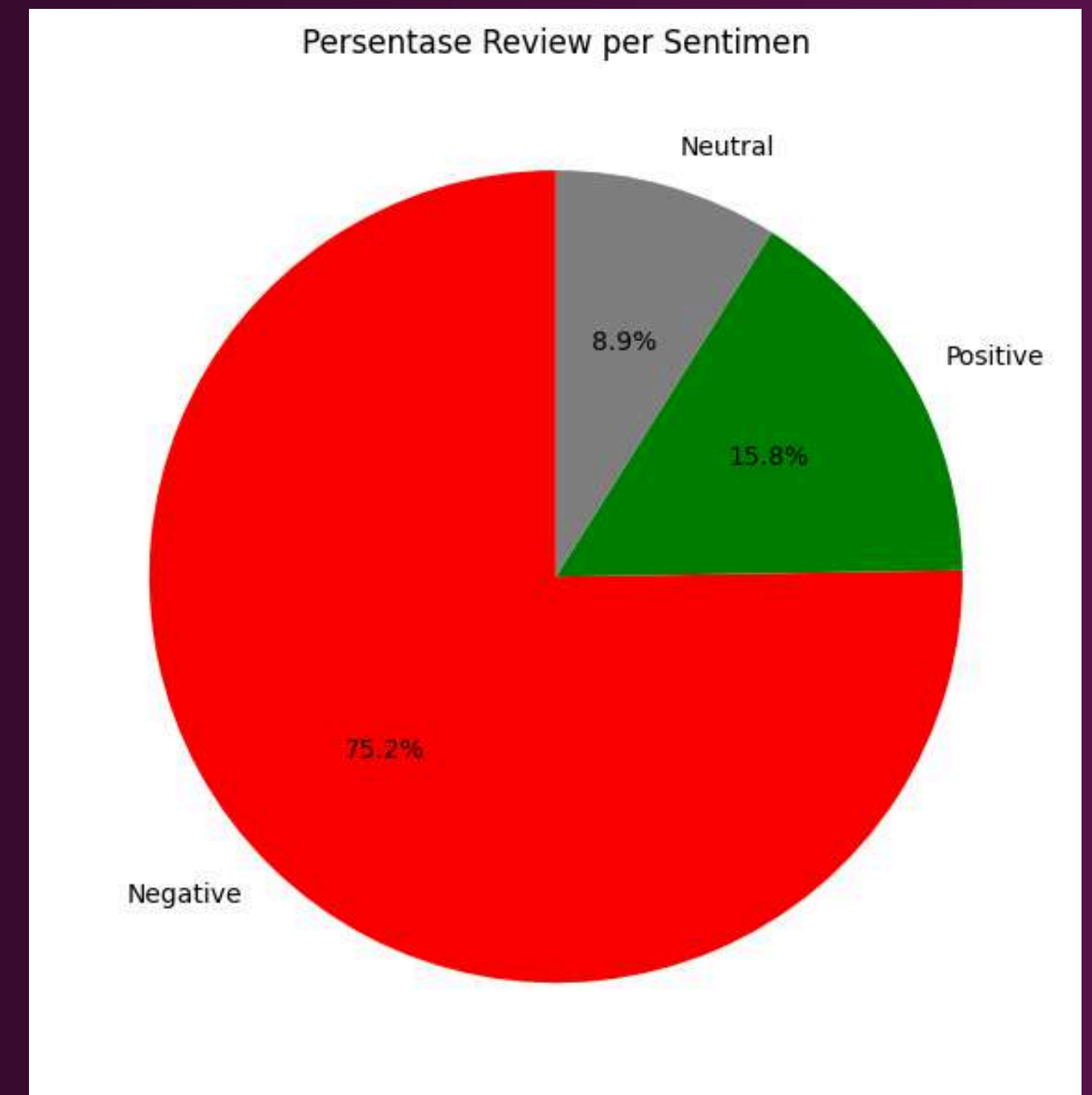
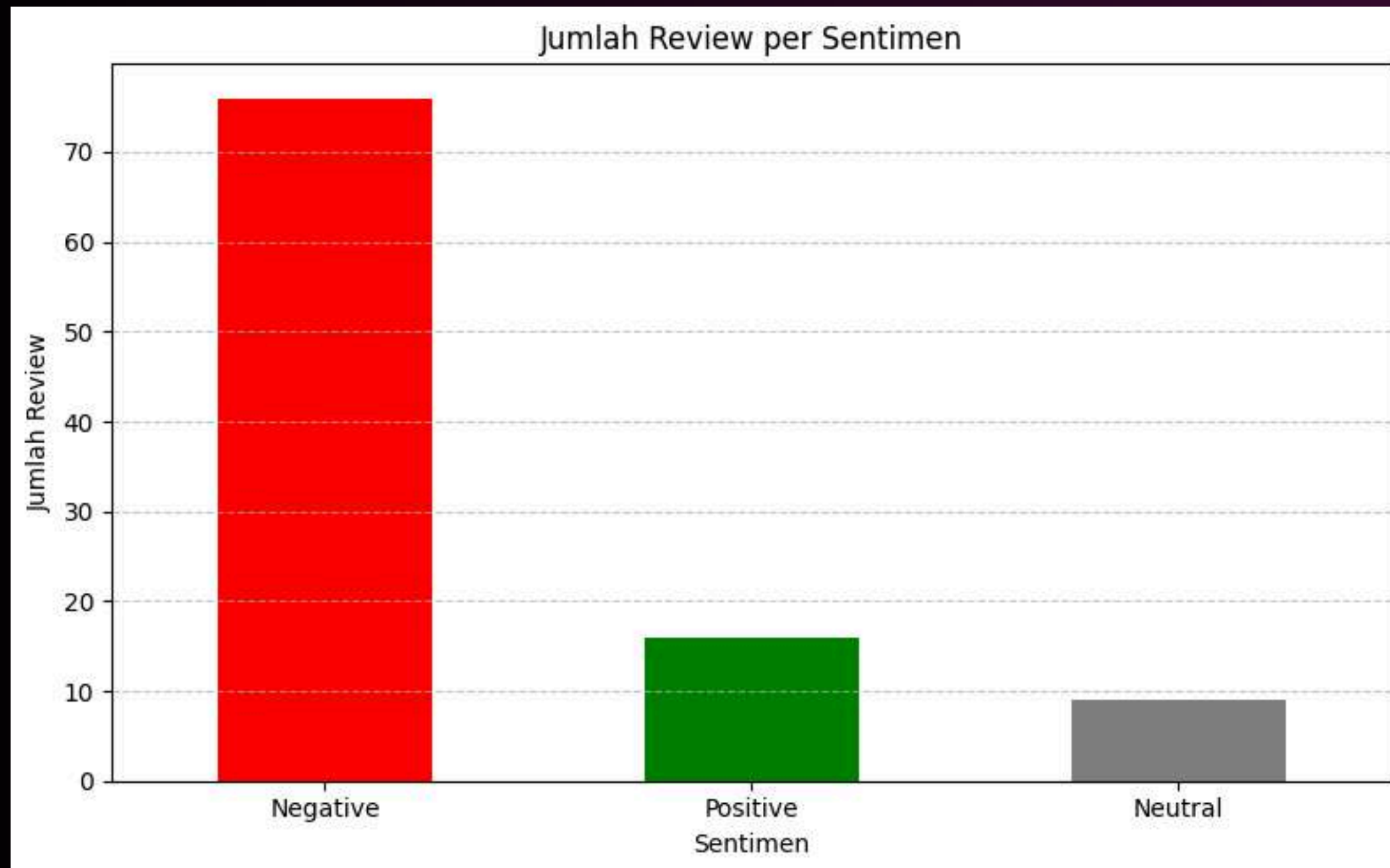
Attached in this presentation are the classification results of 100 reviews per application, focusing on several government-owned mobile apps that recorded the highest number of negative review sentiments. This provides a clear picture of the most critical pain points directly voiced by users.

Output Sentimen Review for APP Satu Dikti KEMDIKBUD

1. mohon di tingkatkan lagi lah untuk aplikasinya, kadang suka tidak bisa mencari data data mahasiswa ataupun dosen nama kampus pun juga tidak ada kalo di cari. karena ini aplikasi sangat penting untuk pendidikan. | Negative
2. susah login | Negative
3. kalo ga niat bikin aplikasi mending di tutup aja dah, server lemot banget kalah ama server gratisan. minimal anggaran yang sesuai kalau mau bikin aplikasi. | Negative
4. Aplikasi kalo dikelola pemerintah apa selalu gini? Data banyak yg gak ada. | Negative
5. gabisa loginnn | Negative
6. sudah sebulan nunggu tidak bisa login untuk mencari data mahasiswa tolong di bantu ini gimana caranya pakbu | Negative
7. aplikasi tolol 🖞🖞🖞🖞🖞 | Negative
8. dibenahi dong karena sudah dari tahun kemarin loading dan lelet banget. | Negative
9. apk najis | Negative
10. aplikasi nya sangat lemot tidak bisa mengecek data, TOLONG DI PERBAIKI KARNA INI SANGAT PENTING. | Negative
11. Tidak dapat menampilkan data mahasiswa | Negative
12. aplikasi asal jadi yang penting ada bahan laporan untuk spj. cari data di pddikti bisa pula tidak ditemukan. | Negative
13. gak bisa cek data mahasiswa | Negative
14. apk terampas, gabisa login2 padahal udah benar! !! ! gausah pakai aplikasi deh kalau ga dirawat aneh mending browser aja. APBN bukannya buat maintenance malah dipakai buat aneh aneh dikira ga penting apa ini aplikasi | Negative
15. kenapa tidak bisa login? kenapa riwayat studi tidak bisa diakses? | Negative
16. Aplikasi tidak bisa dibuka disengaja takut ketahuan. . Indon gitu | Negative
17. gk pernah update astaga. .. mau bikin generasi emas tapi malah bikin cemas ini, hadeuhh. .. | Neutral
18. gabisa login, percuma amet pake anggaran negara buat bikin aplikasi | Negative
19. Aplikasi tidak berfungsi tidak berguna sama sekali, tiap kali cek PDDikti dan cek Sivil tidak bisa. | Negative
20. Gabisa di cek apa". . padahal lagi butuh, di web nya gitu doang gak detail. . aplikasi nya malah begini juga. . gajelas bgt | Negative

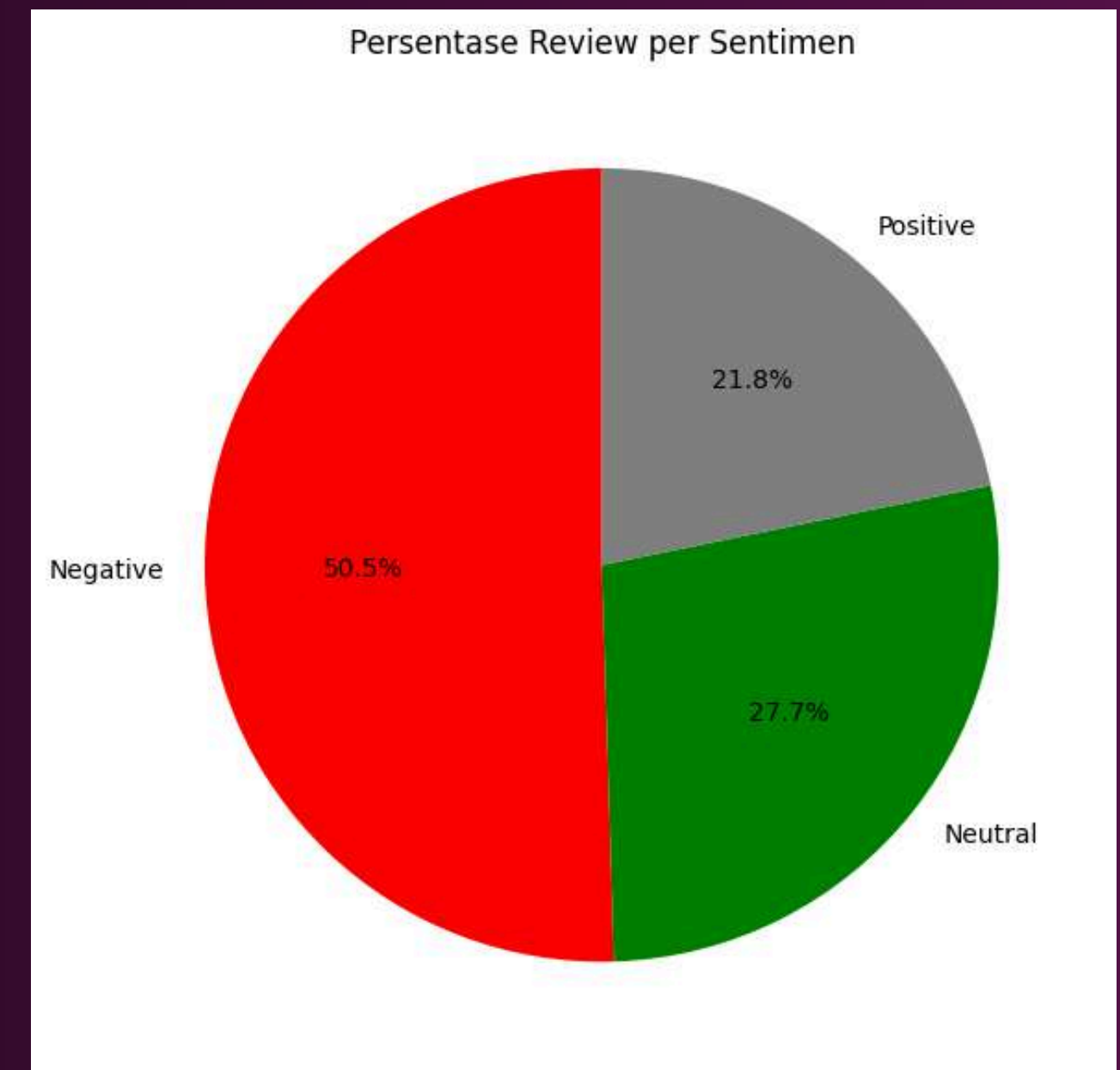
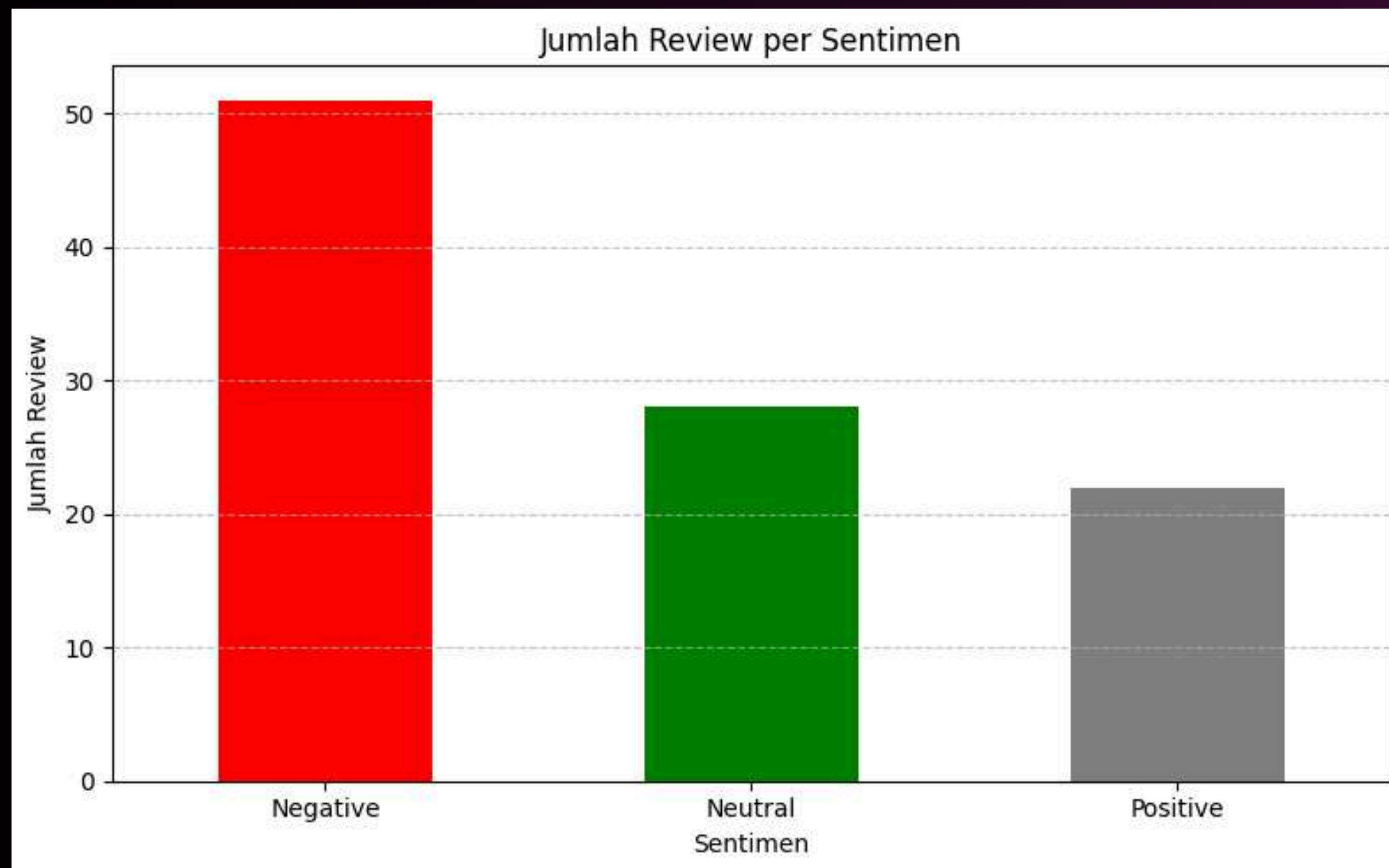
Classification 100 Review per APP

SATU DIKTI – KEMDIKBUD



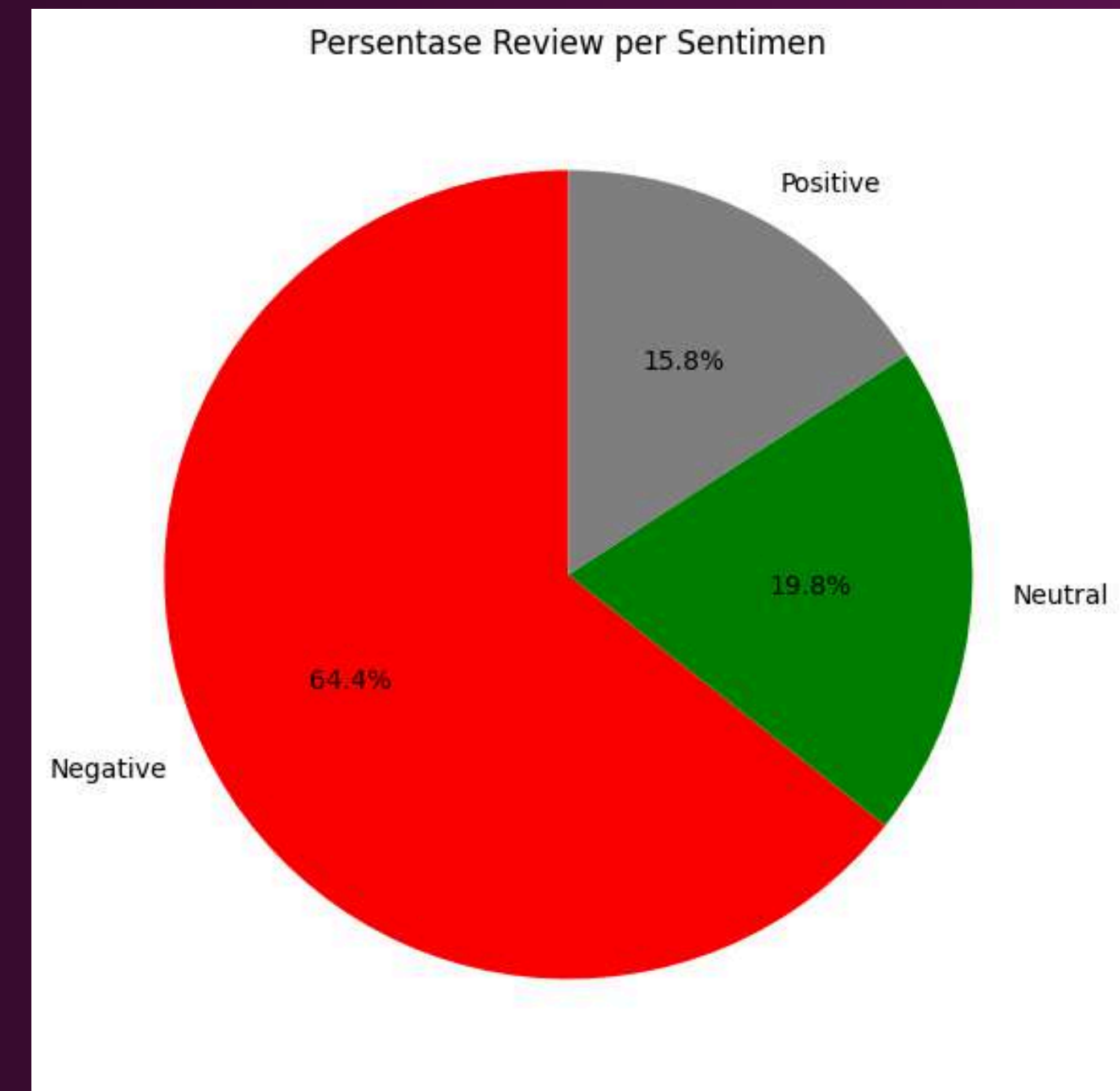
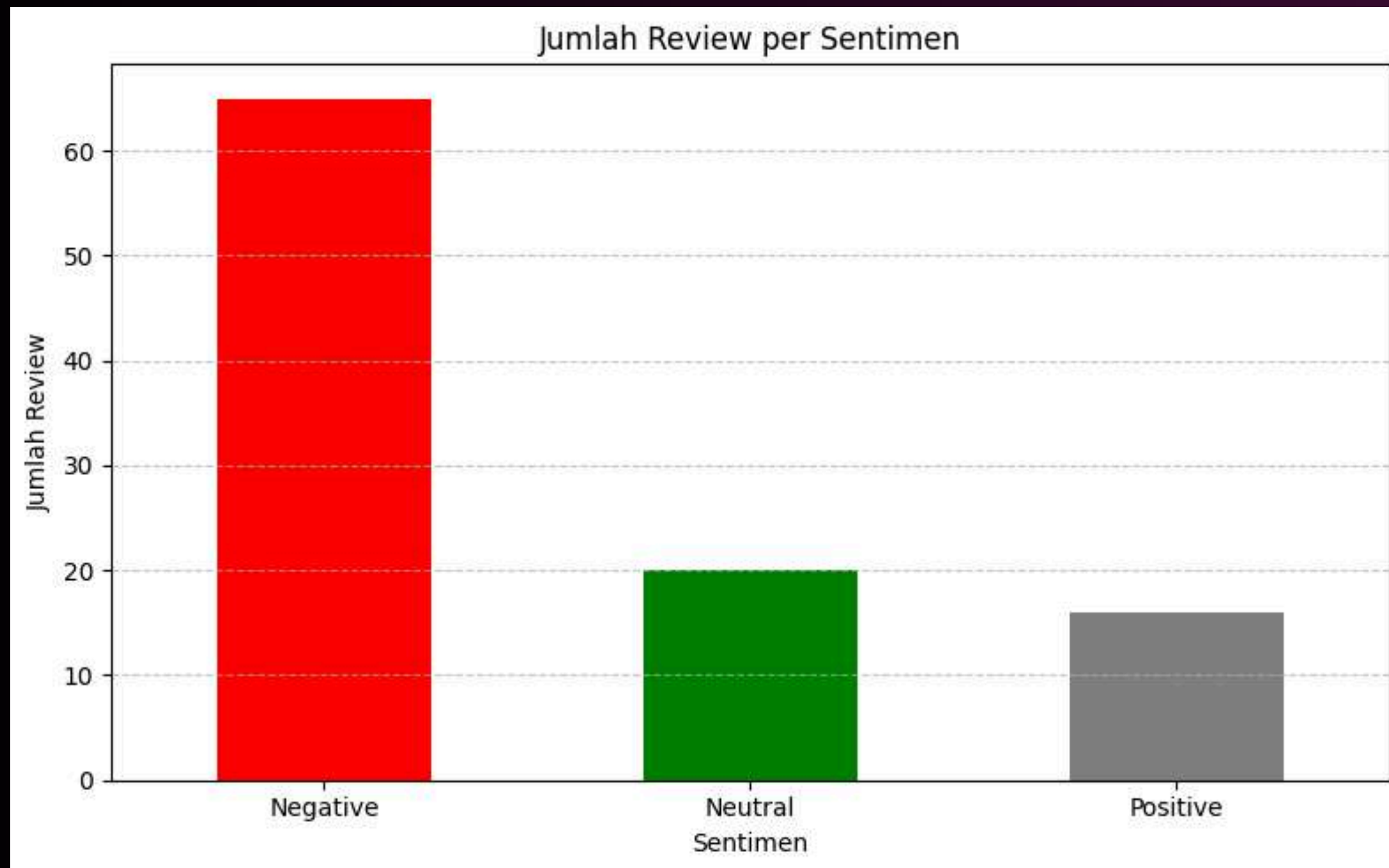
Classification 100 Review per APP

Identitas Kependudukan Digital (IDK)



Classification 100 Review per APP

Pemuktahiran PK – BKKBN

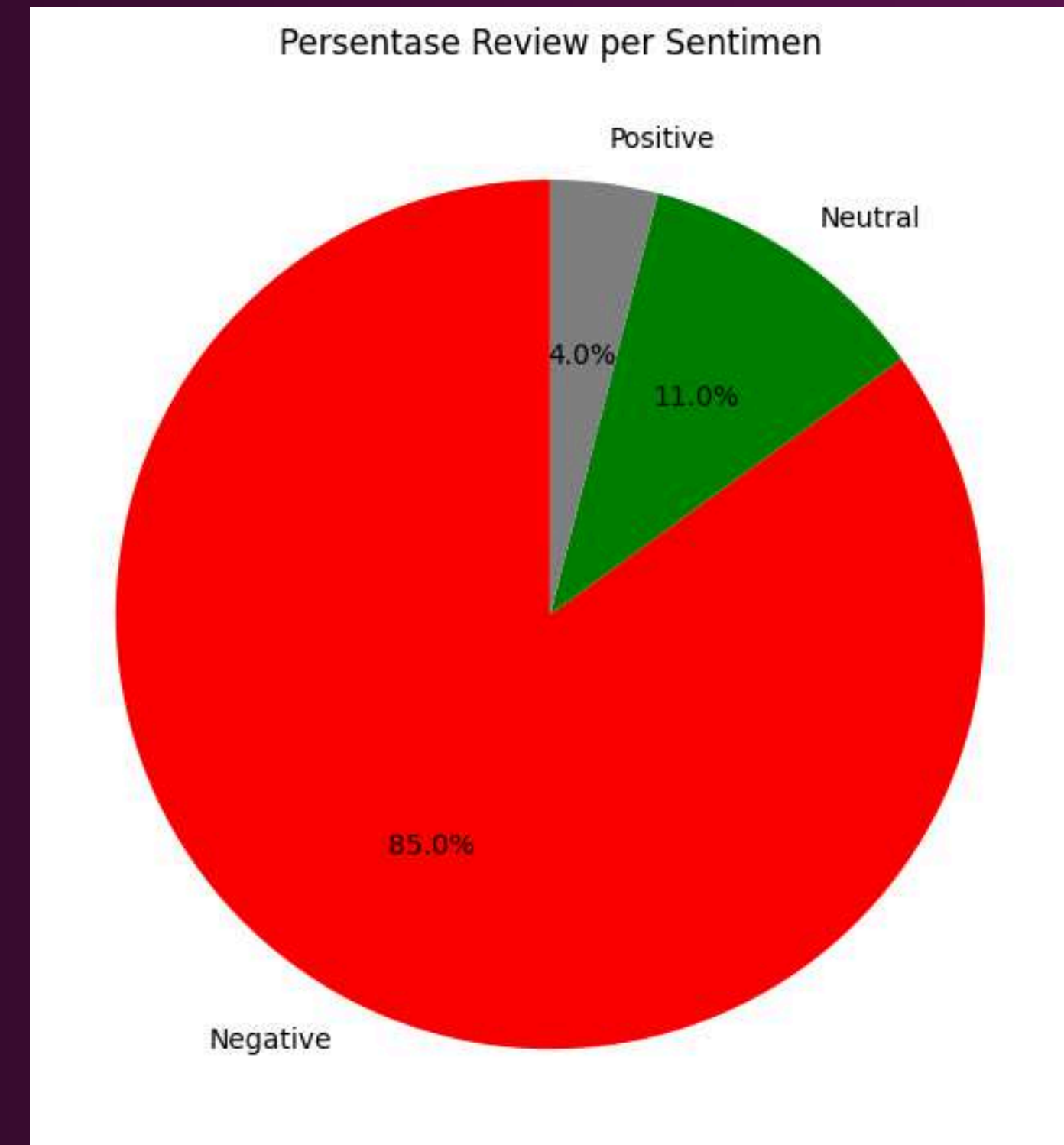
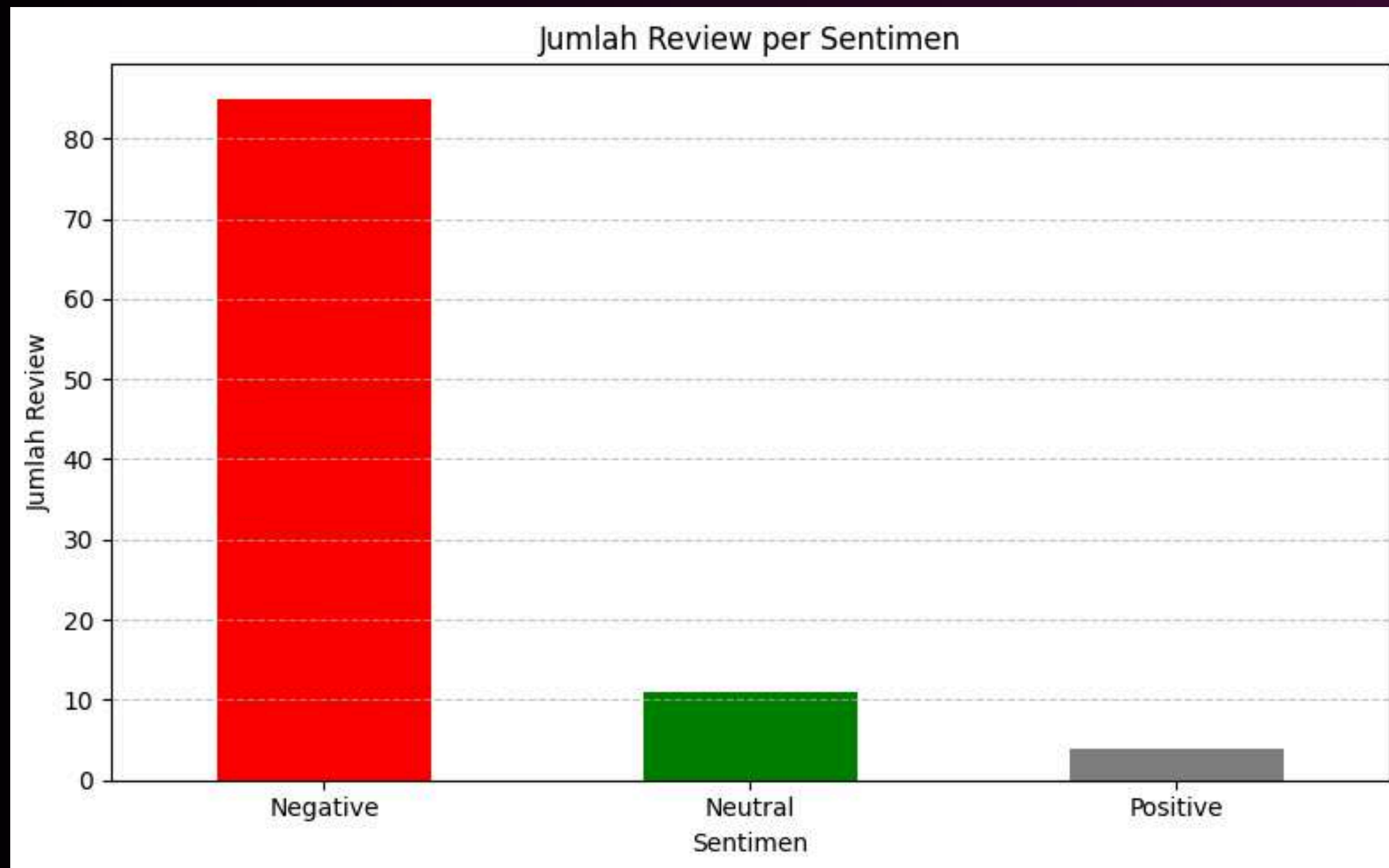


Output Sentimen Review for APP SiCANTIK Cloud

1. belum di verif² ni dah 1 bln | Negative
2. lama bgt proses pendftarannya | Negative
3. Tidak beroperasi dengan benar, lelet tidak ada yg di carikan, sangat buruk sekali 🖐🖐🖐🖐 | Negative
4. Setelah data diinput, lalu mau dlogin dengan reset sandi kalimat yang keluar no record. .. | Negative
5. sdh daftar tp tdk ad email masuk utk password | Neutral
6. aplikasinya sangat tidak berguna | Negative
7. ini aplikasi apa sih, mempersulit banget, tujuannya apa juga bikin aplikasi bobrok gini, mau masuk ke akun saja susah | Negative
8. Maaantaap | Positive
9. Mengganggu | Neutral
10. Try begining | Neutral
11. nanta | Neutral
12. Parah app nya lemot web lemot | Negative
13. Enak seperti dulu langsung ke dinkes gak nyampe 1 minggu jadi Ini berminggu minggu masih verifikasi terus Gak serius ini | Negative
14. Mohon dbantu keluhan saya tidak bisa buka akun padahal perdana ini mau gunakan akun ini, .Tapi setelah sudah mengisi data untuk mendaftar akun ternyata ad bacaan no identitas sebelumnya sudah digunakan. .. gimana ya kira2 ini? 🙏 | Negative
15. Aplikasi buruk sekali, kata sandi nya gak di tanya waktu mendaftar, mau loging jadi susah mohon bantuannya | Negative
16. Sangat Membatu kmi seneng aplkasi nl | Negative
17. Aplikasi hanya loading terus tidak bisa digunakan. | Negative
18. Loding lama, wlwpun ada kuota banyak tetep aplikasi muter" doank | Negative
19. Sulit d akses d hp | Negative
20. Trimakasih | Neutral

Classification 100 Review per APP

SiCANTIK Cloud – KOMDIGI



Output Sentimen Review for APP Jamsostek BPJS TKU

1. ok | Positive

2. ok | Positive

3. kok tiba tiba pas baru di update jmo nya ke versi baru, malah pas saya mau masuk ke aplikasi jmo saya kok malah membal
nolak GK bisa masuk ke aplikasi jmo saya. mohon bantuannya. ... !! | Negative

4. mantap apk nya mudah simpel dan praktis | Positive

5. setelah pembuaruan terakhir ko hilang ga bisa dibuka terus dah dihapus trus install lagi juga ga bisa dibuka gimana ni suhu |
Negative

6. payah gak bisa di buka aplikasinya | Negative

7. Aplikasinya tidak bisa dibuka keluar2 terus tolong diperbaiki | Negative

8. abis di update malah ngga bisa di buka sama sekali 😞 | Negative

9. setelah diperbaharui malah ga bisa dibuka trus install lagi juga ga bisa dibuka | Negative

10. kok aplikasinya gabisa dibuka lgi eror kah? | Negative

11. Kenapa JMO gak bisa di buka, mati hidup mati hidup, padahal jaringan bagus, suda di restar, suda di hapus ceche malah gak
kebuka aplikasinya. . | Negative

12. kenapa setelah diupgrade jadi ga bisa dibuka sama sekalian banyak keluhan yang sama | Negative

13. baik | Positive

14. Sangat membntu | Positive

15. jmp sangat bermanfaat | Positive

16. Habis update aplikasi tidak bisa di buka, ada apa dengan aplikasi ini? | Negative

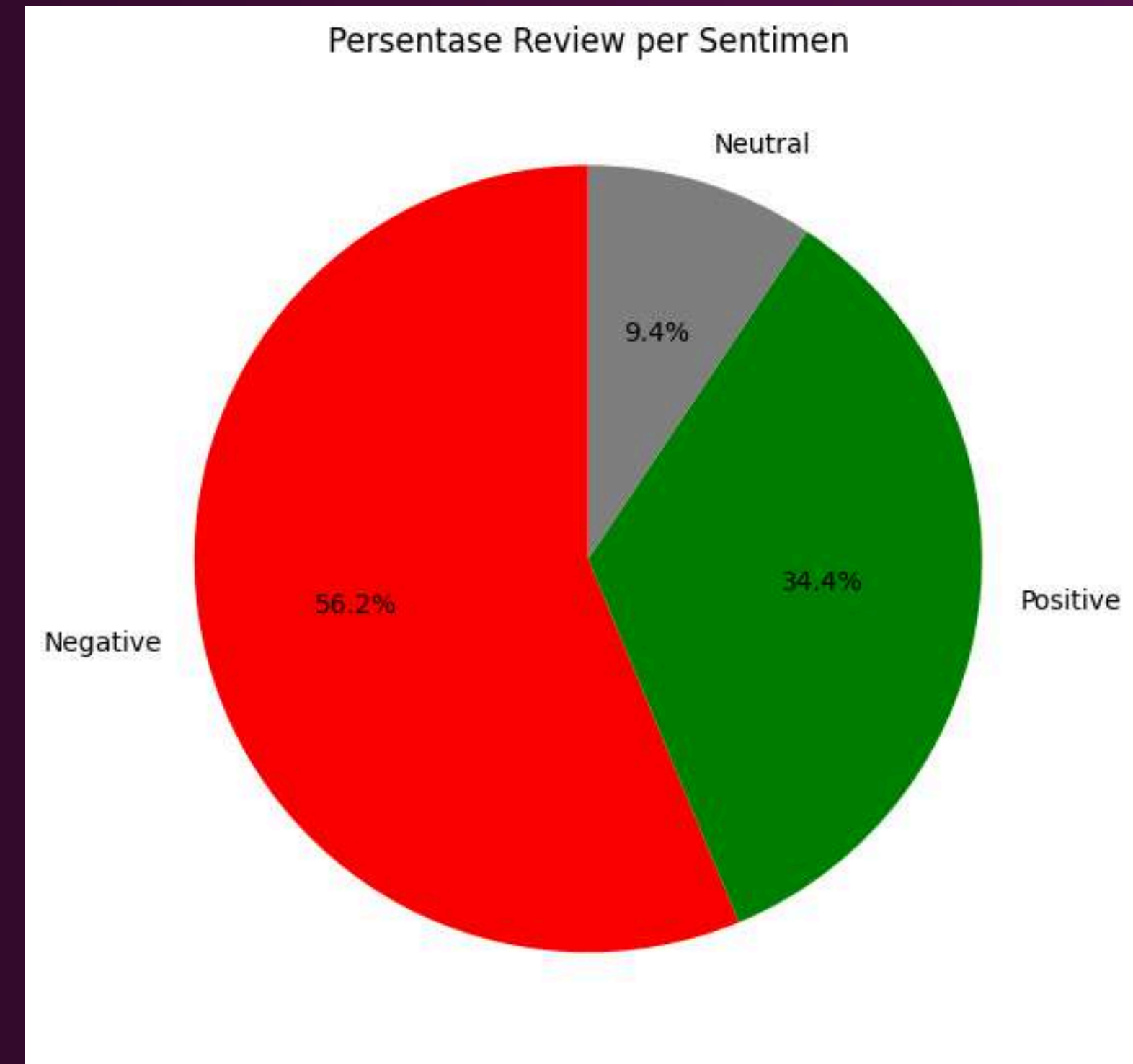
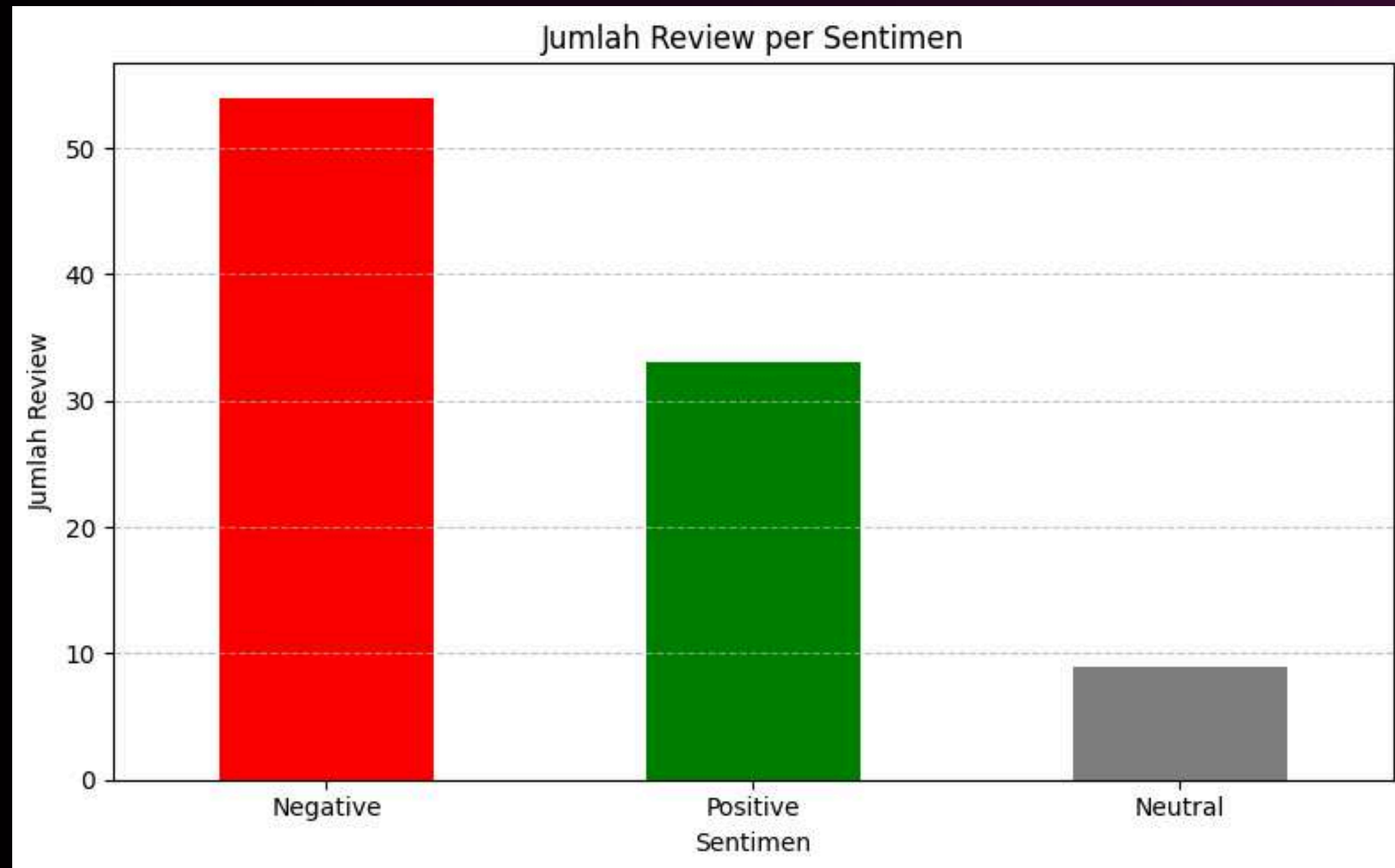
17. baik | Positive 18. sangat bermanfaat | Positive

19. sekarang jd gak bisa di buka lagi. padahal juga sdh install ulang | Negative

20. di suruh update aplikasi ini selesai instal malah tk bisa di buka | Negative

Classification 100 Review per APP

Jamsostek BPJS TKU – KEMENSOS



Thank You *Indonesia*

On Indonesia's 80th Independence Day, we celebrate innovation and digitalization that empower the people. As our gift, I present insights to strengthen public services, data security, and a more inclusive digital ecosystem. Happy 80th Independence Day, towards true digital freedom for all.

Dirgahayu RI ke-80

```
Example of
e::ToString< >,
e::ToString< String* >,
e::ToString< IFormatProvider* >, and
e::ToString< String*, IFormatProvider* >
see the following output when run in the I
le number is formatted with various combin
s and IFormatProvider.

tProvider is not used; the default culture
format string: 11876.54
format string: 11,876.54000
format string: 1.187654E+004
format string: 1.18765E+004

tureInfo object for Inl-NLl is used for the
format string: 11876.54
format string: 11,876.54000
format string: 1.187654E+004

mberFormatInfo object with digit group size =
separator = ' ' is used for the IFormatProvi
format string: 1 18 76 54
format string: 1.187654E+004
ss any key to continue . . . -
```