

ANALYZE APPROPRIATE

A black rectangular box containing the text 'ANALYZE APPROPRIATE' in a green, monospace-style font. The letter 'A' is replaced by a green icon of a smartphone with a checkmark on its screen.

ANALYZE APPROPRIATE

Usable Security and Privacy (CS60081)
Course Project

Measuring and Comparing the appropriateness of data collection purposes in Mobile

Apps created by Indian and US Developers

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Why Analyze Appropriate?

- Mobile Apps gather personal information
- Ensuring responsible and ethical data collection is crucial
- Potential threats like tracking users without consent or selling data to advertisers
- For better transparency

Why India and US?

- US has encouraged security standards like NIST and PCI DSS
- India, with no mandatory standards, has issued guidelines like CERT-In's "Guidelines on Mobile App Security." As a result, US security policies are generally more stringent than India's.

Research Questions

- Identify the most common data collection purposes of mobile apps created by Indian and US developers?
- Compare the stated data collection purposes of Indian and US mobile app developers?
- Assess the perceptions of Indian and US mobile app users regarding the appropriateness of different data collection purposes.
- Evaluate the compliance of Indian and US mobile app regulations with the user data being collected?
- Identify the factors that influence the appropriateness of data collection purposes in mobile apps .

Common Data Collection Purposes and Implications

- Advertising and Marketing
- App Functionality and Personalization
- Analytics and Performance Monitoring
- Security and Fraud

User Data Collection Laws and Policies (India)

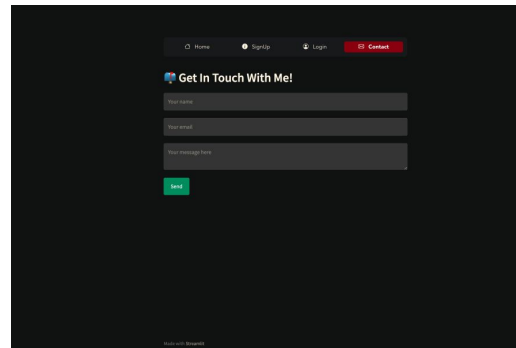
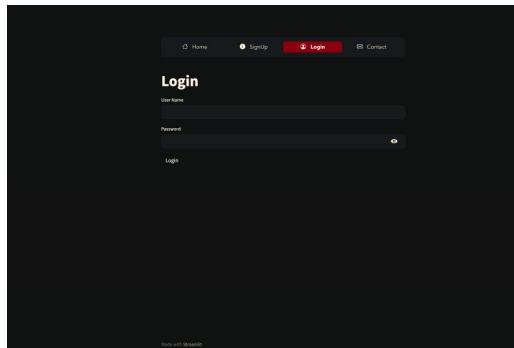
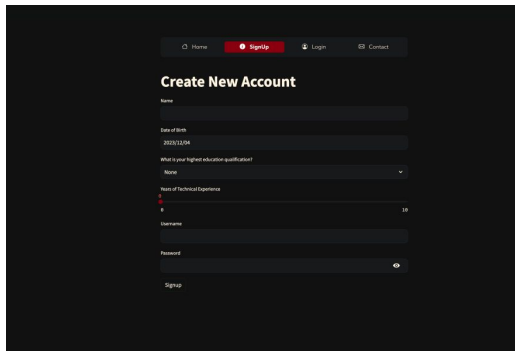
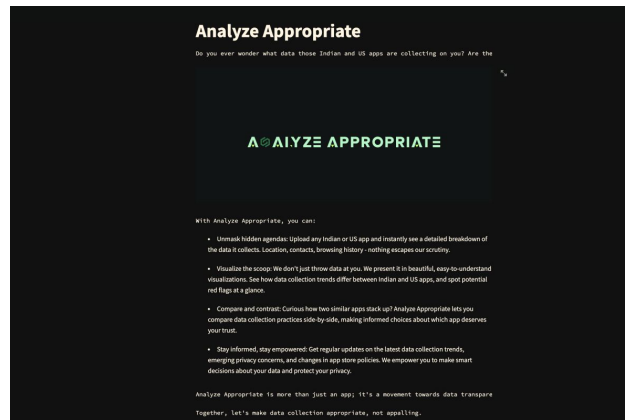
- Information Technology Act, 2000 (IT Act)
- Personal Data Protection Bill, 2023 (PDP Bill)
- Sector-Specific Regulations
- App Store Guidelines

User Data Collection Laws and Policies (US)

- Federal Trade Commission (FTC)
- Children's Online Privacy Protection Act (COPPA)
- Health Insurance Portability and Accountability Act (HIPAA)
- Gramm-Leach-Bliley Act (GLBA)
- Sector-Specific Regulations

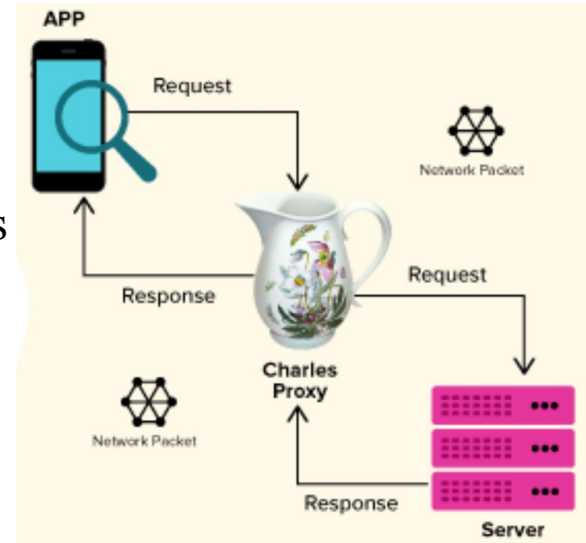
SYSTEM DESIGN

- Home Page
- Sign Up
- Login
- Contact Page



Data Collection Methodology

1. App Selection
2. Genymotion Emulation
3. Charles Proxy Traffic Capture
4. SSL Decryption with Custom CA Certificates
5. Data Analysis



Creation of Data Matrix

- The responses from the survey mainly include two broad categories- one (Yes/No) for Data Regulation Compliance and Second is Perception/Opinions of the User Regarding Data Collection Purposes
- We form a matrix for each application which includes these categorical data encoded in suitable range(+ve answers are given higher magnitude).
- These matrices are then compared according to region/country and within their category.

- (1) Frobenius norm: Square each element, sum them all, and then take the square root. This provides an overall measure of the "magnitude" of the matrix.
- (2) Spectral norm: Calculate the largest singular value of the matrix. This captures the maximum "stretch" or "spread" of the data.
- (3) Nuclear norm: Sum the singular values of the matrix. This represents the total variance captured by all the elements.

Survey

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Menu

Login

User Name

h

Password

••••••••

☒ Login

Deploy

Analyze Appropriate

Login Section

Logged In as h

Complainece Opinion - India

Do you feel there is unauthorised access?

☒ Yes ☐ No

Do you feel that applications follow user location data related guidelines?

☒ Yes ☐ No

Do you think that your sensitive data is being accessed?)(Call Logs, Financial Data and Files)

☒ Yes ☐ No

Do you feel safe while providing your mobile wallet data etc.?

☒ Yes ☐ No

Complainece Opinion - US

Are there fair App Permissions?

☒ Yes ☐ No

Are ther adequate Security Measures

☒ Yes ☐ No

Is User Authorization seeked for Data Usage/Sharing?

☒ Yes ☐ No

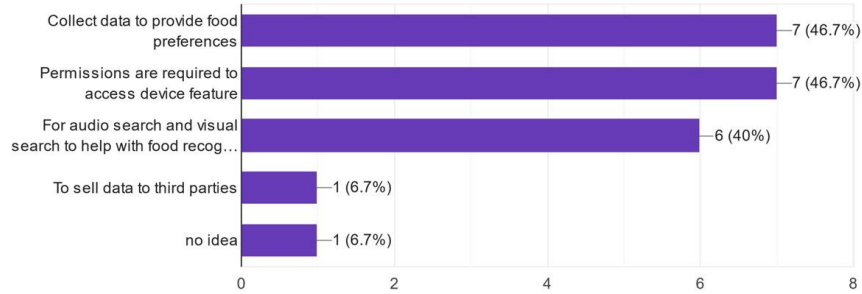
Do you feel safe for your biometrics?

☒ Yes ☐ No

Survey

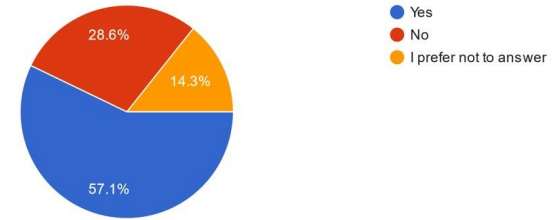
What do you know think is the purpose of microphone and camera access asked by Zomato?

15 responses



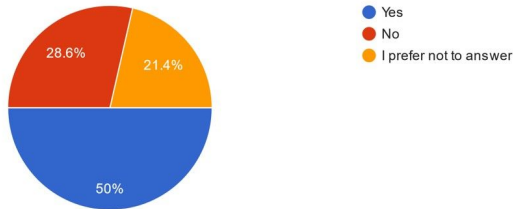
Does the Domino's app provide users with information about how to report privacy concerns or complaints?

14 responses



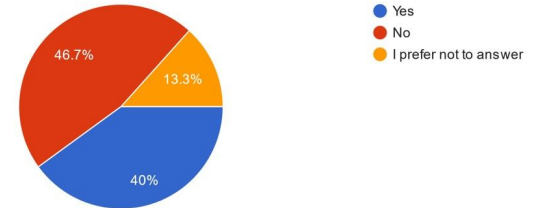
Does the Domino's app provide information about its data retention policies and how long it stores user data?

14 responses



Does the app provide information about its data retention policies and how long it stores user data?

15 responses



Results

Frobenius Norm: 16.3707055437449 (Zomato)

Frobenius Norm: 22.891046284519195 (Dominos)

Frobenius Norm: 27.422618401604176 (Ludo King)

Frobenius Norm: 31.496031496047245 (Roblox)

S Norm: 13.089379760131177

S Norm: 19.14464035869748

S Norm: 22.688341189536036

S Norm: 25.8252129698371

Nuclear Norm: 39.898180763514475

Nuclear Norm: 57.4236666666643854

Nuclear Norm: 72.02653670719904

Nuclear Norm: 85.51797298196647

Thank You