

Supplementary material: The results of initial statistical analysis of the entire dataset.

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Abstract

1 The results of initial statistical analysis of the entire dataset

Table 1: Basic statistical analysis of the entire dataset

Dataset variable name	count	mean	std	min	max	GPSC Variable Representation
ACCESS_ ALL_ DOWNLOADS	4464	0.000896	0.029924	0	1	X_0
ACCESS_ CACHE_ FILESYSTEM	4464	0.000896	0.029924	0	1	X_1
ACCESS_ CHECKIN_ PROPERTIES	4464	0.004928	0.070037	0	1	X_2
ACCESS_ COARSE_ LOCATION	4464	0.083333	0.276416	0	1	X_3
ACCESS_ COARSE_ UPDATES	4464	0.006944	0.083053	0	1	X_4
ACCESS_ FINE_ LO- CATION	4464	0.087814	0.283055	0	1	X_5
ACCESS_ LOCATION_ EXTRA_ COM- MANDS	4464	0.022849	0.14944	0	1	X_6
ACCESS_ MOCK_ LO- CATION	4464	0.023746	0.152272	0	1	X_7
ACCESS_ MTK_ MMHW	4464	0.000224	0.014967	0	1	X_8
ACCESS_ NET- WORK_ STATE	4464	0.596326	0.490689	0	1	X_9
ACCESS_ PROVIDER	4464	0	0	0	0	X_{10}

ACCESS_ SERVICE	4464	0	0	0	0	X_{11}
ACCESS_ SHARED_ DATA	4464	0	0	0	0	X_{12}
ACCESS_ SUPERUSER	4464	0.001792	0.0423	0	1	X_{13}
ACCESS_ SURFACE_ FLINGER	4464	0.004928	0.070037	0	1	X_{14}
ACCESS_ WIFI_ STATE	4464	0.328853	0.469849	0	1	X_{15}
activityCalled	4464	0	0	0	0	X_{16}
ACTIVITY_ RECOGNITION	4464	0	0	0	0	X_{17}
ACCOUNT_ MANAGER	4464	0.005824	0.076104	0	1	X_{18}
ADD_ VOICE-MAIL	4464	0.020833	0.142842	0	1	X_{19}
ANT	4464	0	0	0	0	X_{20}
ANT_ ADMIN	4464	0	0	0	0	X_{21}
AUTHENTICATE_ ACCOUNTS	4464	0.034946	0.183664	0	1	X_{22}
AUTORUN_ MANAGER_ LICENSE_ MANAGER	4464	0	0	0	0	X_{23}
AUTORUN_ MANAGER_ LICENSE_ SERVICE(.autorun)	4464	0	0	0	0	X_{24}
BATTERY_ STATS	4464	0.078853	0.269539	0	1	X_{25}
BILLING	4464	0.000448	0.021164	0	1	X_{26}
BIND_ ACCESSIBILITY_ SERVICE	4464	0.006944	0.083053	0	1	X_{27}
BIND_ APP-WIDGET	4464	0.005824	0.076104	0	1	X_{28}
BIND_ CARRIER_ MESSAGING_ SERVICE	4464	0.004928	0.070037	0	1	X_{29}
BIND_ DEVICE_ ADMIN	4464	0.026882	0.161756	0	1	X_{30}
BIND_ DREAM_ SERVICE	4464	0.004928	0.070037	0	1	X_{31}
BIND_ GET_ INSTALL_ REFERRER_ SERVICE	4464	0	0	0	0	X_{32}

BIND_ INPUT_ METHOD	4464	0.004928	0.070037	0	1	X_{33}
BIND_ NFC_ SERVICE	4464	0.004928	0.070037	0	1	X_{34}
BIND_ OTIFI- CATION_ LISTENER_ SERVICE	4464	0.005376	0.073134	0	1	X_{35}
BIND_ PRINT_ SERVICE	4464	0.004928	0.070037	0	1	X_{36}
BIND_ RE- MOTEVIEWS	4464	0.004928	0.070037	0	1	X_{37}
BIND_ TEXT_ SERVICE	4464	0.004928	0.070037	0	1	X_{38}
BIND_ TV_ IN- PUT	4464	0.004928	0.070037	0	1	X_{39}
BIND_ VOICE_ INTERACTION	4464	0.004928	0.070037	0	1	X_{40}
BIND_ VPN_ SERVICE	4464	0.004928	0.070037	0	1	X_{41}
BIND_ WALL- PAPER	4464	0.004928	0.070037	0	1	X_{42}
BLUETOOTH	4464	0.045027	0.207386	0	1	X_{43}
BLUETOOTH_ ADMIN	4464	0.039875	0.195686	0	1	X_{44}
BLUETOOTH_ PRIVILEGED	4464	0.004928	0.070037	0	1	X_{45}
BODY_ SEN- SORS	4464	0.006272	0.078959	0	1	X_{46}
BRICK	4464	0.005824	0.076104	0	1	X_{47}
BROADCAST_ PACKAGE_ REMOVED	4464	0.004928	0.070037	0	1	X_{48}
BROADCAST_ SMS	4464	0.004928	0.070037	0	1	X_{49}
BROADCAST_ STICKY	4464	0.028226	0.165636	0	1	X_{50}
BROADCAST_ WAP_ PUSH	4464	0.004928	0.070037	0	1	X_{51}
C2D_ MES- SAGE	4464	0.000224	0.014967	0	1	X_{52}
CALL_ PHONE	4464	0.056004	0.229954	0	1	X_{53}
CALL_ PRIVI- LEGED	4464	0.005376	0.073134	0	1	X_{54}
CAMERA	4464	0.226478	0.418599	0	1	X_{55}
CAPTURE_ AUDIO_ OUT- PUT	4464	0.004928	0.070037	0	1	X_{56}
CAPTURE_ SECURE_ VIDEO_ OUT- PUT	4464	0.004928	0.070037	0	1	X_{57}

CAPTURE_ VIDEO_ OUT- PUT	4464	0.004928	0.070037	0	1	X_{58}
CHANGE_ COMPONENT_ ENABLED_ STATE	4464	0.005824	0.076104	0	1	X_{59}
CHANGE_ CONFIGURA- TION	4464	0.023297	0.150864	0	1	X_{60}
CHANGE_ DIS- PLAY_ MODE	4464	0	0	0	0	X_{61}
CHANGE_ NETWORK_ STATE	4464	0.055332	0.228652	0	1	X_{62}
CHANGE_ WIFI_ MULTI- CAST_ STATE	4464	0.026434	0.160439	0	1	X_{63}
CHANGE_ WIFI_ STATE	4464	0.275762	0.446947	0	1	X_{64}
CHECK_ LI- CENSE	4464	0	0	0	0	X_{65}
CLEAR_ APP_ CACHE	4464	0.025314	0.157094	0	1	X_{66}
CLEAR_ APP_ USER_ DATA	4464	0.006944	0.083053	0	1	X_{67}
CONTROL_ LOCATION_ UPDATES	4464	0.004928	0.070037	0	1	X_{68}
DATABASE_ INTERFACE_ SERVICE	4464	0	0	0	0	X_{69}
DELETE_ CACHE_ FILES	4464	0.005152	0.071603	0	1	X_{70}
DELETE_ PACKAGES	4464	0.007168	0.084372	0	1	X_{71}
DEVICE_ POWER	4464	0.005824	0.076104	0	1	X_{72}
DIAGNOSTIC	4464	0.005152	0.071603	0	1	X_{73}
DISABLE_ KEYGUARD	4464	0.280018	0.449058	0	1	X_{74}
DOWNLOAD_ SERVICE	4464	0	0	0	0	X_{75}
DOWNLOAD_ WITHOUT_ NOTIFICATION	4464	0.004928	0.070037	0	1	X_{76}
DUMP	4464	0.005376	0.073134	0	1	X_{77}
EXPAND_ STA- TUS_ BAR	4464	0.025762	0.158441	0	1	X_{78}
EXTENSION_ PERMISSION	4464	0	0	0	0	X_{79}

FACTORY_ TEST	4464	0.005152	0.071603	0	1	X_{80}
FLASHLIGHT	4464	0.03181	0.175514	0	1	X_{81}
FORCE_ BACK	4464	0.004928	0.070037	0	1	X_{82}
FULLSCREEN.FULL	4464	0	0	0	0	X_{83}
GET_ AC- COUNTS	4464	0.150762	0.357856	0	1	X_{84}
GET_ PACK- AGE_ SIZE	4464	0.02845	0.166273	0	1	X_{85}
GET_ TASKS	4464	0.641353	0.479657	0	1	X_{86}
GET_ TOP_ ACTIVITY_ INFO	4464	0.004928	0.070037	0	1	X_{87}
GLOBAL_ SEARCH	4464	0.004928	0.070037	0	1	X_{88}
GOOGLE_ AUTH	4464	0	0	0	0	X_{89}
GOOGLE_ PHOTOS	4464	0	0	0	0	X_{90}
HARDWARE_ TEST	4464	0.005824	0.076104	0	1	X_{91}
INJECT_ EVENTS	4464	0.004928	0.070037	0	1	X_{92}
INSTALL_ LOCATION_ PROVIDER	4464	0.005376	0.073134	0	1	X_{93}
INSTALL_ PACKAGES	4464	0.00672	0.081711	0	1	X_{94}
INSTALL_ SHORTCUT	4464	0.004928	0.070037	0	1	X_{95}
INTERACT_ ACROSS_ USERS	4464	0.000224	0.014967	0	1	X_{96}
INTERNAL_ SYSTEM_ WIN- DOW	4464	0.004928	0.070037	0	1	X_{97}
INTERNET	4464	0.733647	0.442101	0	1	X_{98}
JPUSH_ MES- SAGE	4464	0	0	0	0	X_{99}
KILL_ BACK- GROUND_ PROCESSES	4464	0.504256	0.500038	0	1	X_{100}
LOCATION_ HARDWARE	4464	0.004928	0.070037	0	1	X_{101}
MANAGE_ AC- COUNTS	4464	0.03293	0.178474	0	1	X_{102}
MANAGE_ APP_ TOKENS	4464	0.004928	0.070037	0	1	X_{103}
MANAGE_ DOCUMENTS	4464	0.004928	0.070037	0	1	X_{104}
MAPS_ RE- CEIVE	4464	0	0	0	0	X_{105}

MASTER_ CLEAR	4464	0.006496	0.080347	0	1	X_{106}
MEDIA_ BUT- TON	4464	0.000224	0.014967	0	1	X_{107}
MEDIA_ CON- TENT_ CON- TROL	4464	0.0056	0.074634	0	1	X_{108}
MESSAGE	4464	0	0	0	0	X_{109}
MODIFY_ AUDIO_ SET- TINGS	4464	0.046371	0.210311	0	1	X_{110}
MODIFY_ PHONE_ STATE	4464	0.011201	0.105251	0	1	X_{111}
MOUNT_ FOR- MAT_ FILESYS- TEMS	4464	0.021953	0.146548	0	1	X_{112}
MOUNT_ UNMOUNT_ FILESYSTEMS	4464	0.02957	0.169416	0	1	X_{113}
NFC	4464	0.027554	0.163709	0	1	X_{114}
PERSISTENT_ ACTIVITY	4464	0.022401	0.148002	0	1	X_{115}
PERMISSION	4464	0	0	0	0	X_{116}
PERMISSION_ RUN_ TASKS	4464	0	0	0	0	X_{117}
PLUGIN	4464	0	0	0	0	X_{118}
PROCESS_ OUTGOING_ CALLS	4464	0.029346	0.168793	0	1	X_{119}
READ	4464	0	0	0	0	X_{120}
READ_ AT- TACHMENT	4464	0	0	0	0	X_{121}
READ_ AVEST- TINGS	4464	0	0	0	0	X_{122}
READ_ CALEN- DAR	4464	0.027106	0.16241	0	1	X_{123}
READ_ CALL_ LOG	4464	0.02733	0.163061	0	1	X_{124}
READ_ CON- TACTS	4464	0.151658	0.358729	0	1	X_{125}
READ_ CONTENT_ PROVIDER	4464	0	0	0	0	X_{126}
READ_ DATA	4464	0	0	0	0	X_{127}
READ_ DATABASES	4464	0	0	0	0	X_{128}
READ_ EX- TERNAL_ STORAGE	4464	0.275762	0.446947	0	1	X_{129}

READ_ FRAME_ BUFFER	4464	0.004928	0.070037	0	1	X_{130}
READ_ GMAIL	4464	0	0	0	0	X_{131}
READ_ GSER- VICES	4464	0	0	0	0	X_{132}
READ_ HIS- TORY_ BOOK- MARKS	4464	0.004928	0.070037	0	1	X_{133}
READ_ IN- PUT_ STATE	4464	0.004928	0.070037	0	1	X_{134}
READ_ LOGS	4464	0.012321	0.110325	0	1	X_{135}
READ_ MES- SAGES	4464	0	0	0	0	X_{136}
READ_ OWNER_ DATA	4464	0.003584	0.059768	0	1	X_{137}
READ_ PHONE_ STATE	4464	0.535394	0.498802	0	1	X_{138}
READ_ PRO- FILE	4464	0.03293	0.178474	0	1	X_{139}
READ_ SET- TINGS	4464	0.000896	0.029924	0	1	X_{140}
READ_ SMS	4464	0.092742	0.290103	0	1	X_{141}
READ_ SO- CIAL_ STREAM	4464	0.022177	0.147277	0	1	X_{142}
READ_ SYNC_ SETTINGS	4464	0.032034	0.17611	0	1	X_{143}
READ_ SYNC_ STATS	4464	0.023297	0.150864	0	1	X_{144}
READ_ USER_ DICTIONARY	4464	0.023746	0.152272	0	1	X_{145}
READ_ VOICE- MAIL	4464	0.004928	0.070037	0	1	X_{146}
REBOOT	4464	0.005824	0.076104	0	1	X_{147}
RECEIVE	4464	0	0	0	0	X_{148}
RECEIVE_ BOOT_ COM- PLETED	4464	0.843638	0.363239	0	1	X_{149}
RECEIVE_ MMS	4464	0.021953	0.146548	0	1	X_{150}
RECEIVE_ SIGNED_ DATA_ RE- SULT	4464	0	0	0	0	X_{151}
RECEIVE_ SMS	4464	0.15457	0.361535	0	1	X_{152}
RECEIVE_ USER_ PRESENT	4464	0.00112	0.033452	0	1	X_{153}
RECEIVE_ WAP_ PUSH	4464	0.021505	0.145078	0	1	X_{154}

RECORD_ AUDIO	4464	0.041219	0.198818	0	1	X_{155}
REORDER_ TASKS	4464	0.024194	0.153667	0	1	X_{156}
RESPOND	4464	0	0	0	0	X_{157}
RESTART_ PACKAGES	4464	0.035618	0.185357	0	1	X_{158}
REQUEST	4464	0	0	0	0	X_{159}
SDCARD_ WRITE	4464	0.000224	0.014967	0	1	X_{160}
SEND	4464	0	0	0	0	X_{161}
SEND_ RE- SPOND_ VIA_ MESSAGE	4464	0.004928	0.070037	0	1	X_{162}
SEND_ SMS	4464	0.137097	0.343988	0	1	X_{163}
SET_ AC- TIVITY_ WATCHER	4464	0.005376	0.073134	0	1	X_{164}
SET_ ALARM	4464	0.005152	0.071603	0	1	X_{165}
SET_ AL- WAYS_ FINISH	4464	0.005152	0.071603	0	1	X_{166}
SET_ ANIMA- TION_ SCALE	4464	0.0056	0.074634	0	1	X_{167}
SET_ DEBUG_ APP	4464	0.004928	0.070037	0	1	X_{168}
SET_ ORIEN- TATION	4464	0.005376	0.073134	0	1	X_{169}
SET_ POINTER_ SPEED	4464	0.004928	0.070037	0	1	X_{170}
SET_ PRE- FERRED_ APPLICATIONS	4464	0.005152	0.071603	0	1	X_{171}
SET_ PRO- CESS_ LIMIT	4464	0.004928	0.070037	0	1	X_{172}
SET_ TIME	4464	0.004928	0.070037	0	1	X_{173}
SET_ TIME_ ZONE	4464	0.022177	0.147277	0	1	X_{174}
SET_ WALLPA- PER	4464	0.027554	0.163709	0	1	X_{175}
SET_ WALLPA- PER_ HINTS	4464	0.024642	0.155048	0	1	X_{176}
SIGNAL_ PER- SISTENT_ PROCESSES	4464	0.004928	0.070037	0	1	X_{177}
STATUS_ BAR	4464	0.005824	0.076104	0	1	X_{178}
STORAGE	4464	0.000224	0.014967	0	1	X_{179}
SUBSCRIBED_ FEEDS_ READ	4464	0.022401	0.148002	0	1	X_{180}
SUBSCRIBED_ FEEDS_ WRITE	4464	0.022401	0.148002	0	1	X_{181}

SYSTEM_ ALERT_ WIN- DOW	4464	0.398746	0.489695	0	1	X_{182}
TRANSMIT_ IR	4464	0.006272	0.078959	0	1	X_{183}
UNINSTALL_ SHORTCUT	4464	0.004928	0.070037	0	1	X_{184}
UPDATE_ DE- VICE_ STATS	4464	0.004928	0.070037	0	1	X_{185}
USES_ POL- ICY_ FORCE_ LOCK	4464	0.000896	0.029924	0	1	X_{186}
USE_ CREDEN- TIALS	4464	0.036962	0.188691	0	1	X_{187}
USE_ FINGER- PRINT	4464	0.008513	0.09188	0	1	X_{188}
USE_ SIP	4464	0.022177	0.147277	0	1	X_{189}
VIBRATE	4464	0.200269	0.400246	0	1	X_{190}
WAKE_ LOCK	4464	0.885529	0.318419	0	1	X_{191}
WRITE	4464	0	0	0	0	X_{192}
WRITE_ APN_ SETTINGS	4464	0.006496	0.080347	0	1	X_{193}
WRITE_ AVSETTING	4464	0	0	0	0	X_{194}
WRITE_ CAL- ENDAR	4464	0.026434	0.160439	0	1	X_{195}
WRITE_ CALL_ LOG	4464	0.023073	0.150154	0	1	X_{196}
WRITE_ CON- TACTS	4464	0.038082	0.191417	0	1	X_{197}
WRITE_ DATA	4464	0	0	0	0	X_{198}
WRITE_ DATABASES	4464	0	0	0	0	X_{199}
WRITE_ EX- TERNAL_ STORAGE	4464	0.441308	0.496599	0	1	X_{200}
WRITE_ GSER- VICES	4464	0.004928	0.070037	0	1	X_{201}
WRITE_ HIS- TORY_ BOOK- MARKS	4464	0.004928	0.070037	0	1	X_{202}
WRITE_ IN- TERNAL_ STORAGE	4464	0.002464	0.049585	0	1	X_{203}
WRITE_ ME- DIA_ STOR- AGE	4464	0.00224	0.047282	0	1	X_{204}
WRITE_ OWNER_ DATA	4464	0.00224	0.047282	0	1	X_{205}
WRITE_ PRO- FILE	4464	0.023297	0.150864	0	1	X_{206}

WRITE_ SE- CURE_ SET- TINGS	4464	0.007616	0.086949	0	1	X_{207}
WRITE_ SET- TINGS	4464	0.141353	0.348424	0	1	X_{208}
WRITE_ SMS	4464	0.027106	0.16241	0	1	X_{209}
WRITE_ SO- CIAL_ STREAM	4464	0.022177	0.147277	0	1	X_{210}
WRITE_ SET- SYNC_ SET- TINGS	4464	0.032258	0.176704	0	1	X_{211}
WRITE_ DIC- USER_ TIONARY	4464	0.023073	0.150154	0	1	X_{212}
WRITE_ VOICEMAIL	4464	0.004928	0.070037	0	1	X_{213}
Ljava / lang / re- flect / Method;- >invoke	4464	0.550179	0.497531	0	1	X_{214}
Ljavax / crypto / Cipher;->doFinal	4464	0.516577	0.499781	0	1	X_{215}
Ljava / lang / Runtime;->exec	4464	0.341398	0.474232	0	1	X_{216}
Ljava / lang / System;->load	4464	0.112903	0.31651	0	1	X_{217}
Ldalvik / system / DexClassLoader;- >loadClass	4464	0.058692	0.235073	0	1	X_{218}
Ljava / lang / System;- >loadLibrary	4464	0.104615	0.306091	0	1	X_{219}
Ljava / net / URL;- >openConnection	4464	0.179659	0.383947	0	1	X_{220}
Landroid / hard- ware / Camera;- >open	4464	0.209901	0.407284	0	1	X_{221}
Landroid / hard- ware / Camera;- >takePicture	4464	0.112007	0.315411	0	1	X_{222}
Landroid / telephony / SmsManager;- >sendMultipartTextMessage	4464	0.074149	0.262042	0	1	X_{223}
Landroid / telephony / SmsManager;- >sendTextMessage	4464	0.077285	0.267073	0	1	X_{224}
Landroid / media / AudioRecord;- >startRecording	4464	0.016577	0.127695	0	1	X_{225}

Landroid / telephony / TelephonyManager;- >getCellLocation	4464	0.016801	0.12854	0	1	X_{226}
Lcom / google / android / gms / location / LocationClient;- >getLastLocation	4464	0.000672	0.025918	0	1	X_{227}
Landroid / location / LocationManager;- >getLastKnownLocation	4464	0.122536	0.32794	0	1	X_{228}
Landroid / telephony / TelephonyManager;- >getDeviceId	4464	0.426971	0.494693	0	1	X_{229}
Landroid / content / pm / PackageManager;- >getInstalledApplications	4464	0.074149	0.262042	0	1	X_{230}
Landroid / content / pm / PackageManager;- >getInstalledPackages	4464	0.051971	0.221994	0	1	X_{231}
Landroid / telephony / TelephonyManager;- >getLine1Number	4464	0.173163	0.378431	0	1	X_{232}
Landroid / telephony / TelephonyManager;- >getNetworkOperator	4464	0.24552	0.430443	0	1	X_{233}
Landroid / telephony / TelephonyManager;- >getNetworkOperatorName	4464	0.21595	0.411526	0	1	X_{234}
Landroid / telephony / TelephonyManager;- >getNetworkCountryIso	4464	0.091622	0.288524	0	1	X_{235}
Landroid / telephony / TelephonyManager;- >getSimOperator	4464	0.08871	0.284356	0	1	X_{236}
Landroid / telephony / TelephonyManager;- >getSimOperatorName	4464	0.056228	0.230387	0	1	X_{237}

Landroid / telephony / TelephonyManager;- >getSimCountryIso	4464	0.133065	0.339682	0	1	X_{238}
Landroid / telephony / Tele- phonyManager; - >getSimSerialNumber	4464	0.013665	0.116108	0	1	X_{239}
Lorg / apache / http / impl / client / DefaultHttpClient;- >execute	4464	0.15009	0.357199	0	1	X_{240}
Label	4464	0.798611	0.401083	0	1	y