access to government evidence and exculpatory technologies robot-generated evidence, 142, 153–158 investigative technologies, 158 presumption in favor of open-source technologies, 157–158 pretrial disclosure requirements, 153–156 statutory privacy interests, 156–157 trade secret privilege, 156–157 accessibility of robot-generated evidence, 168, 181–182, 191 acts and omissions, 12, 358 programmers' liaibility, 42 actus reus, 46 attributing criminal liability, 346–349 criminal liability, 76 autonomous vehicle-related crimes, 346–349 hermeneutics of the situation, 336 identification of, 352 legal personhood, 348 manslaughter (USA), 37 programmers' liability, 26, 354 automated weapons-related war crimes, 38–40 autonomous vehicle-related crimes, 37–38	agency and freedom to act. See also anthropomorphizing robots; autonomy narrative autonomous vehicles and criminal liability, 346–349, 354 liberum arbitrium indifferentiae, 347 alcohol interlock devices, 14, 107 algorithm and data-related risks automated weapons systems, 32–34 autonomous vehicles, 27–30, 339–341, 355 human input and cognitive biases, 121 market manipulation, 300 risk assessment models and recidivism, 243–244 robot-asssisted verdicts in criminal matters, 98 robot-generated evidence, 124–125, 253 safeguards to minimize error and bias, 150–153 algorithmic appreciation, 121, 124 algorithmic aversion, 121 algorithmic knowledge, 339–341 allocation of liability, 25, 34–35, 42, 46, 120 driverless taxis, 137 alternative dispute resolution, 97, 131–132 analytical software tools robot-generated evidence,
crimes, 38–40	131–132
crimes, 37–38	robot-generated evidence,
voluntariness, 348-349	210–211, 213
admissibility requirements, 147-150,	anthropomorphizing robots, 113–116.
173, 186	See also autonomy narrative
computer simulations, 154	appearance
adverse legal effects (EU law), 162	interactive style, 119–120

anthropomorphizing robots (cont.)	risks outside, 31-32
physical embodiment, 119–120	user versus, 30-31
robot faces, 118-119	programmers' liability for harmful
interactivity or animacy robots,	events, 12
116–117	public opinion and safety/security
physical presence and physical	concerns, 317–318
embodiment, 117-118	Singapore
Artificial Intelligence Act (EU law), 75	benefits narrative, 319-321, 331
assumption of liability	commercial narratives, 330-332
(Übernahmeverschulden), 59	government's supportive role,
attributing criminal liability	321–323
actus reus, 346–349	media coverage, 314–315, 318–319
mens rea, 349–352	public opinion studies, 314,
robots as criminals, 75–78	315–318
automated data analysis, 248-249	regulation and liability, 327–330
automated driving systems. See	testing and trialing, 323–327
autonomous vehicles	technology and narratology
automated weapons systems, 5, 9	connection, 342–346
criminal liability	users' liability for harmful events,
actus reus, 38-40	23–24
crimes against persons under ICL, 26	autonomy narrative, 115, 281, 283, 291, 301, 306, 308
programmer control, 32	autopilot systems
algorithm and data-related risks, 32–34	liaibility for harm caused by robots, 299, 344–345, 356
risks ouside, 35–36	
user versus, 34–35	biometric identifiers, 254
programmers' liability for harmful	Law Enforcement Directive, 235
events, 12, 24–26	privacy concerns, 143
automation bias, 30	robot-generated evidence, 210, 215
autonomous truck platooning, 325,	breath-alcohol machines
330, 331	safeguards to minimize error and
autonomous vehicles, 8	bias, 147–149, 156
actual driver and legal driver,	bystander behaviour
344–346	risks and failures outside of
criminal liability	programmer control, 31, 32
actus reus, 37–38, 346–349	
mens rea, 349–352	categorisation of data. See taxonomy of
national criminal law, 26	robot testimony
human liability for foreseen but unavoidable harm, 15–16	causation, 11, 46
narratives, 312	adequacy theories, 41 aggravation of risk, 42
•	but-for causation, 40–41
arguments, 313 Singapore government, 319–330	culpability assessments, 43
NTSB investigation, 134–136	international criminal law
programmer control, 27	functional obligations, 42
algorithm and data-related risks,	"meaningful human control,"
27–30	44–46

programming and harm, 12, 40	criminal liability of humans for
automated weapons systems, 26,	harmful events involving
39–40	robots, 14
autonomous vehicles, 31-32,	criminal liability of robots, 86
37–38	legitimacy of, 81–83
but-for/conditio sine qua non test,	parallels with, 77–78
40-41	regulation and limitation, 84–86
proximate cause test, 41	legitimacy of the general concept,
teleological theory, 42	79–81
CE-certification marks	organizational negligence and
surgical robots, 68-70	inadequately trained
cell-phones. See mobile phone records	surgeons, 64
Charter of Fundamental Rights of the	robots responsibility
EU, 103, 142	distinguished, 78
circumstantial evidence, 94, 112	United States, 77–78
eyewitness testimony compared, 112,	Court of Justice of the EU
128–130	(CJEU), 103, 223
circumstantial information, 178-179,	crime detection
185, 186, 190	criminal procedure, 91–92
Code of Conduct of the Swiss Medical	criminal investigations, 92-93
Association, 57	function creep, 93-94
cognitive biases. See also	institutional safeguards, 96-97
anthropomorphizing robots	criminal justice and the use of robot-
eyewitness versus circumstantial	generated evidence, 91, 103-107,
evidence, 112, 128-130	109, 141–144, 248–249
collisions at sea	criminal law and criminal law theory,
liability for harm caused by	5, 21
robots, 299	preventive dimension, 5-6
Comité Européen de Normalisation	prevention of accidents, 7-9
(CEN), 223	suppression of conduct or
Comité Europeén de Normalisation	products, 9-11
Électrotechnique	retrospective dimension, 6
(CENELEC), 223	criminal liability of humans
communications failures	for harmful events involving
risks and failures outside of	robots, 11–16
programmer control, 31–32	criminal liability of
communicative and expressive features	robots, 17–20
of criminal punishment, 19-20	self-defence against robots, 17
conditio sine qua non test, 40–41	criminal liability of humans for
connected devices, 205–207, 253, 262,	harmful events involving
320. See also internet of things	harmful events involving robots, 6
320. <i>See also</i> internet of things consumer products and forensic law	harmful events involving robots, 6 corporate liability, 14
320. See also internet of things consumer products and forensic law enforcement technologies	harmful events involving robots, 6 corporate liability, 14 foreseen but unavoidable harm,
320. See also internet of things consumer products and forensic law enforcement technologies distinguished, 197–198	harmful events involving robots, 6 corporate liability, 14 foreseen but unavoidable harm, 15–16
320. See also internet of things consumer products and forensic law enforcement technologies distinguished, 197–198 Convention on Cybercrime	harmful events involving robots, 6 corporate liability, 14 foreseen but unavoidable harm, 15–16 intent to commit a crime, 15
320. See also internet of things consumer products and forensic law enforcement technologies distinguished, 197–198 Convention on Cybercrime 2001, 224	harmful events involving robots, 6 corporate liability, 14 foreseen but unavoidable harm, 15–16 intent to commit a crime, 15 manufacturers and programmers,
320. See also internet of things consumer products and forensic law enforcement technologies distinguished, 197–198 Convention on Cybercrime 2001, 224 corporate criminal liability for the	harmful events involving robots, 6 corporate liability, 14 foreseen but unavoidable harm, 15–16 intent to commit a crime, 15 manufacturers and programmers, 11–13
320. See also internet of things consumer products and forensic law enforcement technologies distinguished, 197–198 Convention on Cybercrime 2001, 224	harmful events involving robots, 6 corporate liability, 14 foreseen but unavoidable harm, 15–16 intent to commit a crime, 15 manufacturers and programmers,

criminal liability of robots, 6, 17–18, data processing, 94, 247, 248 73 - 74analytical software, 213 actus reus of robot activities, 76 automated processing, 162 "attribution of freedom as a social General Data Protection Regulation, fact," 76-77 221-223, 230-231 corporate criminal Law Enforcement Directive, 232–237 responsibility, 86 Data Protection Directive legitimacy of, 81-83 (EU), 103, 230 parallels with, 77-78 Data Storage System for Automated regulation and limitation, 84-86 Driving (DSSAD), 170, 181, 185 functions of criminal proceedings data storage/retention, 143, 170, and punishments 181-182, 247 communicative and expressive deception and deceiving robots, features of criminal 296-297 punishment, 19-20 defence rights, 99-100, 142, 174 deterrence, 19 due process, 158, 194, 195-196 legal personhood and AI devices, 74 equality of arms, 227, 233, 240-241, mens rea of robot activities, 76 243, 248-249, 250 criminal negligence, 55 presumption of innocence, 97, 194, manufacturers' liability, 135 227, 335 programmers' liability, 43-44 privilege against recklessness and carelessness, 350. self-incrimination, 227 See also recklessness robot-generated evidence, 15-16, users' liability, 135 186-187, 193-197 criminal procedure Denmark detecting crime, 91-92 historical call data records predictive policing, 91-92 function creep, 94 reform relating to robot testimony, deterrence, 19 188-189 digital evidence, 193-194. See also criminal proceedings, 108-109 robot testimony at criminal institutional safeguards, 96-97 trials investigations, 92-93 access and testing robot function creep, 93-94 testimony, 95 risk assessment recommendation access to government evidence and systems, 101-102 exculpatory technologies, 142, robot-assisted verdicts, 97-99 153-158 robots as defendants, 100-101 accuracy, 138 Customs Information System, 224 analytical software tools, 210-211 cybercrime, 224-225, 321 biometric identifiers, 210 challenging algorithms, 124–125 circumstantial data analysis automated data analysis, 248-249 information, 178-179 data collection, 247, 248 court expertise, 249 Fourth Amendment standing, creation of data 259 - 261identity of creator, 213-214 General Data Protection permissions, 214-215 Regulation, 231 purpose of creation, 214 data evaluation, 247, 248 cross-examination, 124

	defense's use of digital evidence, 194–196	<i>dolus eventualis</i> , 44, 339, 350, 352, 355 criminal liability, 350–352, 353
	electronic communications and social media, 201–203	intention and negligence, 351 war crimes, 44
	endurance/resilience of data, 215	doorbell-cameras, 197, 208
	evaluative data, 177–178	connected devices, 262
	factfinding processes, 142, 160–164	robot-generated evidence, 260–261
	automation complacency, 163	driving assistants
	consistency with principles of	robot-generated evidence, 167–168
	human-delivered justice,	drones. See automated weapons
	163–164	systems
	human safety valves,	drowsiness detection, 107
	incorporation of, 161–163	driving assistant alerts, 167–168
	GPS chips, 253	forensic evidence generated by
	growing importance, 239	robots, 169–170
	information content, 179–180	function creep, 94
	internet of things and smart tools,	due diligence
	205–207	legitimate expectation, 50, 66, 68
	interpretation of data, 215-217	negligence, 13
	legal restrictions limiting access or	risk principle, 54–55
	use, 218	robot-assisted surgery, 58–59
	location data, 198-201	certified for trust, 68-70
	measurement data, 176-177	independent surgical robots,
	ownership and possession of data,	61-64
	212–213	remote-controlled
	privacy implications, 217–218	robots, 60-61
	raw data, 175–176	robot warnings, 64–65
	reliability of evidence, 198	trust principle, 65-68
	reliability of robot memory, 125-128	surgeons, 55–58
	right of contestation, 142, 158-160	lex artis, 56–57
	robot-generated evidence	robot-assisted surgery, 58–70
	Fourth Amendment standing,	due process, 194, 195-196. See also right
	260–261	to fair trial
	safeguards to minimize error and	defence rights, 158, 194, 195-196
	bias, 142, 144–153	Dutch Code of Criminal Procedure,
	search histories, 204	225–229, 248
	smart tools, 205–207	duty of care
	Fourth Amendment standing,	surgeons, 55–56
	260–261	due diligence, 55–58
	supportive defense evidence, 194	independent robots, 63-64
	surveillance tools, 207–209	remote-controlled robots, 60–61
	trustworthiness, 189–190	F.:1 P. 1.:: (1.6)
1	vendor records, 204	e-Evidence Regulation (draft)
a	istribution of responsibilities. See	(EU), 246
Г	allocation of liability	electronic communications
L	NA evidence, 93, 128, 165, 197, 210	robot-generated evidence,
	analytical software tools, 211	201–203 Enlightenment parretive 241
	supportive defense evidence, 194	Enlightenment narrative, 341

equality of arms, 240-241	criminal justice and the use of
defence rights, 227, 233, 240–241,	robot-generated evidence, 91,
243, 248–249, 250	103–107, 109, 141–144, 248–249
Erklären-Verstehen controversy, 342	DNA evidence, 93, 128, 165, 197, 210
EU law	analytical software tools, 211
adverse legal effects, 162	supportive defense evidence, 194
Charter of Fundamental Rights of	mobile phone records, 194
the EU, 103, 142	reliability of evidence, 242
Data Protection Directive, 103, 230	eyewitness testimony, 126, 128,
facial recognition, 105	141, 145, 208
General Data Protection Regulation,	Netherlands, 237, 240
103, 222, 230–231, 247	robot-generated evidence,
data collection, 231	125–128, 198
data processing, 221-223, 230-231	reproducibility of robot-generated
Law Enforcement Directive, 222,	evidence, 183
232, 247	robot testimony at criminal trials, 95
biometric identifiers, 235	accessibility of evidence, 181–182
"competent authorities," 232-233	circumstantial information,
data processing, 232–237	178–179
fair processing principles,	evaluative data, 177–178
233–235	evidentiary issues, 170–172
implementation, 236	forensic evidence generated by
protection of personal data,	robots, 169–170
233–235	information content, 179-180
scope, 233	interpretation, 180, 181–182,
sensitive data, 235	183–186
processing data in criminal courts,	measurement data, 176-177
222–223	raw data, 175–176
surveillance state, fear of, 103-104	reproducibility, 183
Eurodac, 224	three-level approach, 183–186
Eurojust, 225	traceability and chain of
European Convention on Human	custody, 182
Rights (ECHR), 223	trustworthiness of robot
right to fair trial, 195, 227, 233	testimony, 189-190
right to privacy, 103	vetting robot testimony, 186–187,
European Telecommunications	190–191
Standards Institute, 223	rules of evidence
Europol, 225	Netherlands, 237
Eurosur, 225	Swiss Criminal Procedure
evaluative data, 177-178	Code, 173
Event Data Recorders (EDRs)	United States, 145-146
accessibility of data, 181	safeguards to minimize error
traceability of data, 182	and bias
evidence. See also digital evidence	admissibility requirements,
circumstantial evidence, 94, 112,	147–150
178–179, 185, 186, 190	algorithmic fairness, 150–153
eyewitness testimony compared,	breath-alcohol machines,
112, 128–130	147–149, 156

robot-generated evidence, 142, 144–153 witness testimony, 145–147 standard of evidence	failure to correctly interpret or predict behaviour, 28–29, 32, 33–34, 74, 82–83, 135 fair process
eyewitness testimony and	criminal proceedings, 96–97,
circumstantial evidence	105–106, 174
compared, 112, 128–130	proportionality, 106
strength of evidence	transparency and
eyewitness testimony and	accountability, 106
circumstantial evidence	First Additional Protocol to the
compared, 112, 128-130	Geneva Conventions, 26, 39–40
traceability of robot-generated	fitness devices
evidence, 182	robot-generated evidence, 206
chain of custody, 182	foreseeability of risk, 29–30, 34, 41–42,
Event Data Recorders (EDRs), 182	44, 46, 352
"meaningful human control," 45	function creep, 93-94, 171
witness testimony	criminal investigations, 93-94
circumstantial evidence	Denmark, 94
compared, 112, 128–130	drowsiness detection, 94
importance, 239	historical call data records, 94
safeguards, 145–147	Denmark, 94
standard of evidence, 112,	
128–130	functionality of robots
	<i>lex artis</i> principle, 56–57,
strength of evidence, 112, 128–130	58–59, 64, 70
unreliability, 126, 128, 141, 145, 208	0.61 ((:1 : :1) 54.55
eyewitness testimony	Gefahrensatz (risk principle), 54–55
circumstantial evidence compared,	gender biases, 125, 151, 338
112, 128–130	gender equality
unreliability, 126, 128, 141, 145, 208	interests or rights of individual
	robots, 10
facial recognition, 104-105, 210	General Data Protection Regulation
analytical software tools, 211, 261	(GDPR), 103, 222, 230–231, 247.
EU law, 105	See also EU law
international law, 105	German Constitutional Court
racial biases, 125	(Bundesverfassungsgericht)
fact-finding processes	fair process, 174
criminal proceedings, 92–93	Germany
expert witnesses, 172	causation
National Transportation Safety	adequacy theories, 41
Board, 132–134	creation or aggravation
robot-generated evidence, 138-139,	of risk, 42
142, 160–164	conditional intent, 14
automation complacency, 163	corporate responsibility, 79–81
consistency with principles of	data storage duration, 234
human-delivered justice,	Erklären-Verstehen controversy, 342
163–164	fair process, 174
human safety valves,	German Criminal Code (StGB), 21
incorporation of, 161–163	dolus eventualis, 44, 350–351
111corporation 01, 101 103	101113 CVCIIIIIIII3, 11, 550-551

Germany (cont.)	dolus eventualis, 351
intentional homicide, 38	harmful events involving
manslaughter, 38	robots, 15
gleichgültig, 351	International Criminal
information content, 179	Court (ICC), 26
Law Enforcement Directive,	international criminal law
236–237	automated weapons systems, 25, 26
no alternative harmless action, 16	"meaningful human control,"
personal guilt, 18	44-46
robot-generated evidence, 142, 189	causation, 42
self-defence, 17	international humanitarian law
tolerance of human	principle of distinction, 33
imperfections, 21	International Organization for
guilt	Standardization, 222
attributing guilt to robots, 18, 81,	internet of things, 311. See also
100–101, 148	connected devices
	robot-generated evidence,
hacking	205–207, 253
risks and failures outside of	
programmer control, 31–32,	judicial regulation, 8
35, 321	Justice and Prosecution Data Act
hermeneutics of the situation	(Netherlands), 235
actus reus, 336	
autonomous vehicles, 336-338	Law Enforcement Directive (LED),
mens rea, 336	222, 232, 247
outward and inward appearances of	"competent authorities," 232-233
intention, 355–358	fair processing principles, 233–235
historical call data records	implementation, 236
function creep, 94	protection of personal data,
human superiority narrative, 283	233–235
human values and morals	scope, 233
interests or rights of individual	sensitive data, 235
robots, 10	legal implementation of technology,
	339–342
indiscriminate attacks	legal personality of robots, 101, 347
war crimes	criminal liability of robots, 74,
automated weapons systems, 12,	348-349
36, 38–39, 44	legal positivism, 341
information content, 179-180	legislative regulation, 8
"input" attacks	soft law
risks outside programmer	standards and guidelines, 8
control, 35	legitimate expectation
integration of knowledge, 342-346	due diligence, 50, 66, 68
intelligent speed assistance, 107	lex artis, 56–57, 58–59, 64, 67, 70
intention, 15	liability for harm caused by robots
criminal liability, 349–352	robots as criminals
appearance and intention,	attributing responsibility,
356–358	75–78

robot responsibility and corporate mobile phone records reponsibility distinguished, 78 evidence, as, 194 smartphone ruling (Netherlands), location data robot-generated evidence, 198-201 227-229 Model Penal Code (USA) "machine as a mere tool" narrative, actus reus of manslaughter, 37 288, 291, 296-298, 299, 301, 306 culpability recklessness/carelessness, 350 machine-readable data, 175 evaluative data, 177-178 measurement data, 176-177 narrative arguments and role of the raw data, 175-176 government manslaughter community benefits of autonomous vehicles, 319-321 actus reus, 37 autonomous vehicles government support for autonomous vehicles, negligent manslaughter, 23, 26, 321-323 programmers' liability, 37-38 regulation and liability, 327-330 mens rea, 43-44 testing and trialing autonomous manufacturers' liability for harmful vehicles, 323-327 events involving robots, 11-13 narratives regarding human-robot interaction, 281-284 autonomous vehicles, 135, 355 corporate criminal responsibility, autonomous vehicles, 333 84 - 85benefits narrative, 331 robot-assisted surgery, 63 commercial narrative, 330-332 market manipulation commercial success, 330-331 deception and deceiving robots, inevitability narrative, 331-332 296-297 Singapore government narrative, "meaningful human control," 12, 319-330 44 - 46, 47autonomy narrative, 115, 281, 283, traceability, 45 291, 301, 306, 308 measurement data, 176-177 context, 287-288 Medical Professions Act human superiority narrative, 283 (Switzerland), 57 "machine as a mere tool" narrative, 288, 291, 296-298, 299, 301, 306 mens rea, 43 attributing criminal liability, narrative defined, 289-291 349-352 unproblematic sidekick criminal responsibility, 349 narrative, 283 culpability, 349 National Transportation Safety Board dolus eventualis, 44, 350-352 (NTSB), 132-134 identification of, 352 negligence, 11, 353 indiscriminate attacks criminal liability, 349-352 recklessness, 44 dolus eventualis, 351 programmers' liability for harmful due diligence, 13, 55-58 risk principle, 54-55 events, 43 automatic weapons systems, 44 programming and harm, 12, 41 autonomous vehicles, 43-44 negligent homicide purposely, knowingly, recklessly, programmers' liaibility, 37-38 and negligently, 349-352 mens rea requirements, 43

Netherlands	privacy
criminal procedure law	data protection law, 107
digital forensics and cybercrime	expectation of privacy, 257
legislation, 224	privacy as a personal good (US
Dutch Code of Criminal	Const, 4th Amend), 256–261,
Procedure, 225–229	263-268
privacy and data protection law, 223	robot-generated evidence, 217–218
data processing in a criminal law context, 222–223	privilege against self-incrimination defence rights, 227
Justice and Prosecution Data Act, 235	programmers' liability for harmful events, 11–13
legitimacy of evidence, 238	actus reus, 26, 354
territorial jurisdiction, 239	automated weapons systems, 12,
Police Data Act, 235	24–26
reliability of evidence, 237	algorithm and data-related risks,
rules of evidence	32–34
establishing substantive truth, 237	distribution of responsibilities,
smartphone ruling, 228–229	34–35
Norway	risks outside programmer control,
Robot Decision, 288–289	35–36
10000 2000000, 200 200	autonomous vehicles, 12, 354
objective data, 245	algorithm and data-related risks,
ownership of data	27–30
robot-generated evidence, 212–213	automation bias (programmers
8	and users), 30–31
Police Data Act (Netherlands), 235	risks outside programmer control,
possession of data	31–32
robot-generated evidence, 212–213	causation, 26
predictive policing	criminal negligence, 43-44
criminal procedure, 91–92	mens rea, 43–44
presumption of innocence, 97, 194	proximate cause test, 41
defence rights, 97, 194, 227, 335	Prüm Treaty, 224
pretrial disclosure requirements,	psychology of HRI in litigation
153–156, 194, 202	anthropomorphizing robots,
prevention of accidents, 5. See also	113–116
regulation of safety and risk	appearance, 118-120
criminal law and criminal law	interactivity or animacy robots,
theory, 7–9	116–117
malfunctioning robots	physical presence and physical
regulation, 7–9	embodiment, 117-118
regulation, 7–9	cognitive biases, 120-121, 123-124
regulation and liability, 327–330	impact
regulation and limitation	appearance, 123
corporate criminal	interactivity and animacy of
respsonsibility, 84–86	robots, 122–123
principle of distinction	physical presence and
target identification, 33	embodiment, 123

public opinion and safety/security right to life, 8 right to privacy, 103 concerns autonomous vehicles, 317-318 right to property, 8 risk principle (Gefahrensatz), 54-55 quantity of data Road Traffic Act (Netherlands), 335, automated search and analysis, 344-345, 356 242-243 Road Traffic Act (Singapore), 328 risk assessment models, 243 Road Traffic Act (Switzerland), 167 robo-judges, 97–99 racial biases, 125 Robot Decision (Norway), raw data, 175-176 288-289, 291 recidivism Court of Appeal, 298-300 narratological analysis, 300-302 risk assessment models, 243-244 recklessness, 11, 14 District Court judgment, 293–295 criminal liability, 349-352, 355 narratological analysis, 295-298 appearance and recklessness, facts of the case, 291-292 356-358 legal causation, 293-294, programming and harm, 12, 41 297-298, 299 war crimes, 44 market manipulation, 292-293 recognition of robots' rights, 10-11 narratological analysis regulation of safety and risk. See also Court of Appeal, 300–302 District Court judgment, prevention of accidents autonomous vehicles, 327-330 295-298 regulatory offenses, 5 robot as stupid narrative, 295-297 prevention of accidents, 7-9 Supreme Court, 305-306 reliability of evidence, 242 Supreme Court, 302-305 eyewitness testimony, 128 narratological analysis, 305-306 Netherlands, 237, 240 robot defined, 1, 6-7 robot-generated evidence, robot testimony at criminal trials, 95. 125-128, 198 See also digital evidence circumstantial information, 178-179 remote harms to other human evaluative data, 177-178 beings, 10 remote-controlled robots evidentiary issues, 170-172 surgeon's liability for harmful forensic evidence generated by events, 60-61 robots, 169-170 reproducibility of robot-generated information content, 179-180 evidence, 183 interpretation, 180 respondeat superior principle, 77, 80, accessibility of evidence, 181-182 reproducibility, 183 82, 353 right of contestation three-level approach, 183-186 robot-generated evidence, 142, traceability and chain of 158 - 160custody, 182 right to be forgotten, 215 measurement data, 176-177 right to bodily integrity, 8 raw data, 175-176 right to dignity, 10, 96, 142 trustworthiness of robot testimony, right to erasure, 215 189-190 right to fair trial, 195. See also due vetting robot testimony, 186-187, process 190-191

robot-assisted surgery	Fourth Amendment standing,
due diligence, 58–59	260–261
certified for trust, 68-70	GPS chips, 253
independent surgical robots,	robot-generated evidence, 205–207
61-64	Smartphone ruling (Netherlands)
remote-controlled robots, 60-61	mobile phone records
robot warnings, 64–65	evidence, 227–229
trust principle, 65–68	social media
robot-generated evidence in litigation.	data ownership, 212
See digital evidence; robot	robot-generated evidence, 104, 195,
testimony at criminal trials	201–203, 217, 277
robots, status of	soft law, 8
Robot Decision, 295–298	standard of care, 12
robots as victims of crime, 6, 21	standard of evidence
Rome Statute, 26, 36, 39–40, 44	eyewitness testimony and
	circumstantial evidence
safeguards to minimize error and bias	compared, 112, 128-130
admissibility requirements, 147–150	standing (US Const, 4th Amend)
algorithmic fairness, 150–153	challenges posed by emerging
robot-generated evidence, 142,	technologies, 265-268
144-153	exclusionary rule, 264-265
Schengen Information System, 224	founding-era understandings, 264
search histories	privacy as a personal good, 256-261,
robot-generated evidence, 204	263–268
Securities Trading Act (Norway), 292	relationship with other
self-defence against robots, 6, 17	Amendments, 263
sex robots, 5, 10	state agency requirement (US Const,
sexual offenses	4th Amend), 261–262
human liability for the use of a	founding-era understanding
robot, 15	warrant requirement, 269–270
signal jamming	private actor involvement, 269-274,
risks ouside programmer control, 35	275–277
simulation heuristic hypothesis,	status of robots
112,129	Robot Decision, 295-298
Singapore	strength of evidence
autonomous vehicles, 319–330	eyewitness testimony and
benefits narrative, 319-321, 331	circumstantial evidence
commercial narratives, 330-332	compared, 112, 128-130
government narrative, 319–330	objective data, 245
government's supportive role,	supervisors' liability for harmful
321–323	events involving robots,
media coverage, 314-315, 318-319	13–14, 67
public opinion studies, 314,	surgeon's criminal liability for harmful
315–318	events involving robots
regulation and liability, 327–330	due diligence, 50–51, 70
testing and trialing, 323–327	surgical robots, 8, 70. See also robot-
smart tools	assisted surgery
digital evidence	definitions and terminology, 51–53

independent surgical robots, 61-64 limitations, 66 remote-controlled robots, 60-61 surgical robots, application to, surveillance footage privacy rights, 214 task sharing among humans, 50, supportive defense evidence, 194, 197, 209 surveillance state, fear of Übernahmeverschulden (assumption of EU law, 103-104 liability), 59 European Convention on Human United Nations Economic Rights, 103 Commission for Europe facial recognition, 104-105 (UNECE) US Constitution, 103 availability and accessibility of surveillance tools data, 181 United Nations Institute for robot-generated evidence, 207–209 Swiss Academy of Medical Sciences, 57 Disarmament Research Swiss criminal law (UNIDIR) due diligence obligations, 53, 54-55 risks outside programmer control, lex artis principle, 59 35 - 36negligence, 60 United States Swiss Criminal Procedure Code corporate criminal responsibility, rules of evidence, 173 77-78,79 Model Penal Code (USA) target identification actus reus of manslaughter, 37 principle of distinction, 33 recklessness/carelessness, 350 taxonomy of robot testimony rules of evidence, 145-146 circumstantial information, 178-179 US Constitution evaluative data, 95, 177-178 Fifth Amendment, 195, 263 information content, 179-180 Fourth Amendment, 103, processed data, 95, 176-177 254, 277 raw data, 95, 175-176 privacy, 255 technological neutrality, 188, 341 standing, 256-261, 263-268 territorial jurisdiction state agency requirement, 255, digital evidence, 239 261-262 Therapeutic Products Act Sixth Amendment, 195, 263 (Switzerland), 59 compulsory process, 157 three-level approach to interpretation right of confrontation, 159 of evidence, 183-184 surveillance state, fear of, 103 establishing element of the offense users' liability for harmful events, charged, 185-186 13 - 14event under examination, 185 autonomous vehicles, 23-24, 135 source of evidence, 184-185 automation bias, 30 traceability of robot-generated evidence, 182 vendor records trade secret privilege, 96, 148, 156-157, robot-generated evidence, 204 172, 211, 218 verdict accuracy, 145 trust principle, 66 Vertrauensgrundsatz. See trust certification-based trust, 68-70 principle division of labour in surgery, 66-67 Visa Information System, 224

war crimes
automated weapons systems
directing attacks against
civilians, 39
indiscriminate attacks, 12, 36,
38–39, 44
automated weapons-related
actus reus, 38–40
dolus eventualis, 44

witness testimony
eyewitness testimony
circumstantial evidence
compared, 112, 128–130
unreliability, 126, 128, 141, 145, 208
importance, 239
safeguards, 145–147
standard of evidence, 112, 128–130
strength of evidence, 112, 128–130