Typology of Human Extinction Risks

Possible timeline	100 000 BC	20 century	Beginning of the 21 century	2030	2050	3000
Main adverse factor of the catastrophe	Natural risks	Natural risks caused by human activity	Based on known technologies	Based on new technologies	Superintelligence as final technology	Remote and hypothetical risks
Energy	Explosions • Big asteroid impact (20 km size) • Supervolcano explosion, flood basalt event • Gamma ray burst, nearby supernova, neutrino from it • Solar flare or CME during weak earth magnetic field • Sun grazing comet lead to large flare • *Ocean catastropic degasation* • *Hypercane (disturbance of stability of the atmosphere)* • Warming of the Earth's core by WIMPs (Rampino), its catastrophic degazation or collapse • *Activisation of Galactic central black hole* • *Relict black holes* • *Collapse of false vacuum*	Accidental start of natural catastrophe • **Runaway global warming (Venusian scenario)** • New Ice Age • Disruption of electric grid because of solar flare	Nuclear weapons • **Nuclear war** • Artificial explosion of supervolcanos • Nuclear winter • *Artificial nuclear winter by explosions in forests* • *Artificial runaway global warming by nuclear explosions on Arctic shelf and methane release*	Giant energy release • **Simple way of creation of nuclear weapons** • Accident on a collider: micro black hole, false vacuum decay, strangelet • Catastrophic magma release due to crust penetration (Stevenson probe) • Creation of superbomb • *Artificial diverting of asteroids to Earth using precise calculations of celestial mechanics (space billiards)*	War with AI • **Different types of AI Friendliness** • Several AI fight each other for world dominance • Nuclear war against AI or against attempts to create it	Artificial explosions in space • Thermonuclear detonation of large gas planets • Artificial black holes
Intelligence	Competitors • Another type of humans (like Homo sapience were for Neanderthals) • *Another type of intelligent specie*	Disjunction Human enhancement leads to competing species	Impairment of intelligence • **Ignorance and neglect of existential risks** • Dangerous memes (fascism, fundamentalism) • Cognitive biases • Risky decisions (nuclear war) • Tragedy of the Commons (arms race)	Failure of control system • Super addictive drug (brain stimulation) • Malfunction in robotic army causes mass destruction • Computer virus with narrow AI uses home robots and bioprinters • Dangerous meme (like ISIS) • GMO parasite that causes mass destructive behaviour • Accidental nuclear war	Unfriendly AI destroy humanity • **As a risk to this AI** • To get resources for his goals (Paperclip maximaizer) • **Realize incorrectly formulated friendliness (Smile maximizer)** • Fatal error in late stage AI (AI halting)	Encounter with alien intelligence • **Downloading Alien AI via SETI** • ET arrive on Earth • METI attracts dangerous ET • Beings from other dimensions • **We live in simulation and it switched off or is built to model catastrophes**
Replication	Organisms • Pandemic • Super pest • Dangerous predator • Dangerous carrier (mosquitoes)	Genetic degradation • Reduction of the medium level of intelligence in population • Decline in fertility • The accumulation of deleterious mutations • Antibiotic-resistant bacteria	Biological weapons • Dangerous pandemic (eg: smallpox) • Mistake of biodefense (contaminated vaccination, SV40) • Artificial pest • Omnivorous bacteria and fungi • Toxin producing GMO organisms (dioxin, VX) • Cancer cell line adapted to live in population (HELA)	Biotech • **Multipandemic based on genetic engineering (10-100 lethal viruses)** • **Home bioprinters and biohackers** • Artificial carriers like flies • Green goo (biosphere is eaten by artificial bioreplicators and viruses) • Fast replicating killers (poisonous locust) Nanotech • Grey goo (unlimited replication) • Nanotech weapons (small robots) • **Universal nanoprinter (creates all other weapons)**	Catastrophe on the level of mind and values • Humans are uploaded but became philosophical zombie without qualia • Mass unemployment caused by automation causes ennui, and suicide • Computer virus used for mass attack on widely implanted brain interface chips	Extraterrestrial robots • ET nanorobots-replicators • ET robots-berserkers, killing civilization after certain threshold
Poisoning	Atmosphere • Atmospheric composition change (disappearance of oxygen) • Release of toxic gases (volcanism, methane hydrates, dissolved gases in the ocean)	Ecology • The accumulation of new toxins in the biosphere and its collapse • Resource depletion	Global contamination • Deliberated chemical contamination • Deliberate destruction of all nuclear reactors by nuclear weapons • Autocatalytic reaction like Ice-9, artificial prions	Doomsday machine • Cobalt superbomb with global contamination • Destruction of electric grid by nuclear explosions in stratosphere • Several Doomsday machines with contradictory conditions	Whimpers • Value system of posthumanity moves away from ours • AI goal is to maximize suffering of as much humans as possible (worse than "I Have No Mouth, and I Must Scream")	Unknown physical laws • Weapons based on them • Unexpected results of experiments • Dangerous natural phenomena • End of the Universe: Big Rip, vacuum state transition • **Unknown unknowns**
Combined scenarios	Classical species extinction • The confluence of a set of many adverse circumstances • Changing environment and competitors	Chain of natural disasters • Epidemic followed by degradation and extinction • Degeneration of ability of the biosphere to regenerate, then loss of the technology and starvation • Death of crops from superpest, than hunger and war	War as a trigger • Nuclear war leads to use or release of biological weapons • World War leads to arms race and creation of Doomsday Machines • System crisis caused by many factors	Control systems failure • As a result of the civilizational crisis geoengineering system of termoregulation fails and a sharp global warming results (Seth Baum) • Failure of Bioshield or Nanoshield where it malfunctions and threatens humanity or the biosphere	Catalysts of bad scenarios • Cold War leads to creation of Unfriendly AI • Asteroid impact causes accidental nuclear war • Scientists studying deadly viruses accidentally release them	Complexity crisis Unpredictably, chaos, and black swans lead to catastrophe
Probability	From 1 to 1 000 000 to 1 to 100 000 a year based on historic risks and other species survival time	Small, as such risks are long-term, but more dangerous risks of new technologies could happened much earlier	0.1 – 1% a year	10 – 30% total	50% total	Small

Most important risks are in **bold.** Most hypothetical are *italic*. This roadmap is accompained by another one about the ways of prevention of existential risks.

© Alexey Turchin, 2015, GNU-like license. Free copying and design editing, discuss major updates with Alexey Turchin.

http://immortality-roadmap.com/ – last updated version here