true

The Birth of Jordan Hayes

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A few dozen small autonomous spider-like robots bury into the womb, although if the birther has their own neural-interface, all feeling in the area can easily be disabled. The robots then incase the fetus completely. Each robot locks itself onto the creature, anchoring using bone and flesh to make sure the process takes place in a stable environment. Billions of pins thinner than a micrometer are pulled out of the robots' stores and inserted delicately through the skin. The heads of these pins are slightly larger — around five micrometers — and they guide the pins into positions with their pre-programmed route. Only minor corrections are made on the journey by its onboard "computer", if you could call it one, since it is little more than a single artificially engineered cell with cilia and a biological instruction set. The patient is to remain perfectly still during the procedure, which lasts around five-or-so minutes. Once the pins are in position, the heads self-destruct and the coating on the ends begins its work. The organic polymers of the pins are produced by most cells in the human body, so the coating serves to repair and maintain the pins' position by tricking cells into maintaining the pins' structures. When the coating runs out and the pin begins to drift, more can be sent down the tubule to the end. Neurotransmission only occurs at the end of each pin where the head dissolves, so only the end needs to be secured in place.

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The pupils of each eye are false, a camera resides on the inside, usually surrounded by mineral oil. Colors and the design can be customized to personal preference, but the first set is designed to look identical to the original eyes. With such powerful sensors, most eyes record with over a hundred million pixels, and thousands of captures each second. The eyes can switch between high capture rate and high resolution at the behest of the user: at higher resolutions, the extra captures are interlaced with previous captures to produce a better image, reducing the number of captures while improving each image. Small refillable reservoirs of chemicals reside in the back of the eyes for transmission down any tubule whenever necessary. Lenses also allow the user to zoom to different magnifications, as well as see in other light spectrums, mostly infrared. But, the biggest use case of these machines — colloquially called "neural-vision" — is their ability to work in tandem with a "neural-interface", which connects to the spine and brain. Neural-interfaces are installed in the womb, as doing so later on in life with a less plastic brain isn't possible as far as people know [this is why some people are "un-interfaced"]. The interface needs to be exposed to each unique nervous system since birth to make sure signals are handled properly. Their installation in the womb is standardized, at least one pin per hundred neurons — including the spine and peripheral nervous system, or less if one can afford it. Each pin is coated in a special substance to trick neurons into constructing connecting synapses. These coerced synapses also connect to each pin's tubule for chemical neurotransmission.

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It is standard to give a neural-interface to every baby, but it is less standard to install any sensory devices beyond neural-vision. Many other such devices do exist, but the core functionality neural-vision allows for is critical to most modern jobs and education, so it is installed by default. Most modern academies now exclusively use neural-vision overlays for teaching. There is a movement against this, but it is small, and no noticeable movement exists against installing neural-interfaces by default, since they can be disabled by just filling your port with any non-conductive plug, and since they can only be installed in the womb. Overall, artificial enhancements are broken down into two categories: physical and cognitive. These are broken down into further subcategories such as: sensory, memory, endurance, strength, etc. Many people chose to install more invasion physical enhancements: skull, rib, and bones, fitted with reinforced plating and special membranes to allow blood and other fluids to flow; high-performance hearts for increased stamina; synthetic livers, intestines, kidneys, and other digestive organs for aid in processing less-than-high-quality food as well as improving nutrient uptake and retention; artificial neural-audio implants for enhanced hearing. Olfactory enhancements exist, but they are yet to be on par with natural smell. Cognitive enhancements — which often function without the need for a specific neural-engine — are often more popular: "calculator" add-ons to allow a user to do basic math without needing a neural-engine; digital memory storage in the brain to preserve long term memories outside of any system via neural-engine; encryption suites which account for the plaintext nature of unciphered organic memory, often installed with parental consent or at adulthood; organic memory management suites intended to annihilate or recover organic memories; deadman switches with the ability to annihilate digital and organic memories postmortem. Plenty more exist.

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All humans also have slightly different neural characteristics, often referred to as a whole as the "neural-signal" of a person. This neural-signal is used by encryption suites in lieu of an organic memory password — which, as with all organic memories, is encrypted by the suite already — with the datakeys stored on the security chip. Impersonating another's neural-signal is incredibly difficult, but possible with enough time to directly access their neural-interface. Another mind can infiltrate their target's mind and impersonate them to decrypt their engram pattern and steal their memories, but, even with the neural-signal, if the target is secure enough, infiltrating their system in the first place may prove to be even more difficult. There is really no exfiltration proof way of storing information, and with enough work, any person's security can be broken. Many enhancements require special, or even proprietary neural-engine software to function — but many can function (fully or limited) without the use of a neural-engine, such as neural-vision and most cognitive enhancements. Plenty of honeypots have been created by different organizations, but as long as a user sticks to their own homegrown software or software from trusted sources, getting yourself stuck in a honeypot is incredibly difficult.

Besides individual use of neural-engines, people often connect to what is called the "net": a collection of computers each running an instance of some communication protocol, normally the "network protocol", which allows for other protocols to run on top of it. Connecting requires a direct line between your neural-engine and the computer serving your local hub — which connects to other hubs and so on eventually forming a global ad hoc network. Plenty of computers have open lines when connecting to hubs to allow other users to interact; this is the main way people use the network. Various social hubs, archives, entertainment and the like exist on these different hubs, the most popular sometimes hosting thousands or even millions of users at a time. Unlike physical connections with group-use neural-engines, hubs have some amount of latency depending on the number of hubs your connection has to connect to on its journey, which when attempting to interact in real time with the environment or other users can definitely break emersion to some degree if you're deranged enough. Plenty of hubs also let you open datastreams3 into neurons or other things to give you access to more data than your neural-engine's maximum capacity.

Various overlay communication protocols exist for different purposes. Some allow two or more users to inhabit the same avatar in a hub, both having their neural-interfaces meshed together — two minds in one body. Others allow you to have a "proxy" avatar — which appears as you or a pseudonym — but is nothing more than a replica intended to protect you from any net-hackers4 by redirecting their attacks. There are protocols which allow two users to create a "virtual" hub across the network for personal use, such as crypt-room, and many others for secure one-on-one communication outside of hubs. Most importantly, some, like the infamous "Cipher" (which uses its own proxying system), allow users to visit hubs anonymously, with persistent avatars if desired. The implications of Cipher are horrifying to most, and to some, a gamble worth taking: they are the primary motivator behind the usage of the protocol.

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Neural-engine software varies in impact from just an overlay in your vision, to complete immersion in another environment. Databanks can be attached externally for mass data storage, such as books and indexes of information. Most neural-engines have at least a few terabytes of storage, but with home setups, it can balloon to hundreds or even thousands of terabytes. Neural-record software also allows you to record your mind, that being the sum total of your experiences, emotions, and sense of the world during the recorded period. Different resolutions can be selected when recording your mental state: at low resolutions, the experience may just feel like a dream, but at high enough resolutions — which often take terabytes per second to record — it’s indistinguishable from reality. This is the modern equivalent to cinema; production houses often buy out huge databanks to record weeks or even years of neural-records, which are normally called “neurons”. These ultra-high-quality neurons often need to be streamed over the network since most people don’t just have a few exabytes of storage sitting around. The playback speed when reliving a neuron can be set to whatever you want, with the experiences in your mind still taking just as long. Many people put themselves into week-long neurons and come out as if just a few seconds passed. Of course, the obvious use of this technology is pornography, and the vast majority of neurons on the network amount to nothing more than this.

It is standard to give a neural-interface to every baby, but it is less standard to install any sensory devices beyond neural-vision. Many other such devices do exist, but the core functionality neural-vision allows for is critical to most modern jobs and education, so it is installed by default. Most modern academies now exclusively use neural-vision overlays for teaching. There is a movement against this, but it is small, and no noticeable movement exists against installing neural-interfaces by default, since they can be disabled by just filling your port with any non-conductive plug, and since they can only be installed in the womb. Overall, artificial enhancements are broken down into two categories: physical and cognitive. These are broken down into further subcategories such as: sensory, memory, endurance, strength, etc. Many people chose to install more invasion physical enhancements: skull, rib, and bones, fitted with reinforced plating and special membranes to allow blood and other fluids to flow; high-performance hearts for increased stamina; synthetic livers, intestines, kidneys, and other digestive organs for aid in processing less-than-high-quality food as well as improving nutrient uptake and retention; artificial neural-audio implants for enhanced hearing. Olfactory enhancements exist, but they are yet to be on par with natural smell. Cognitive enhancements — which often function without the need for a specific neural-engine — are often more popular: “calculator” add-ons to allow a user to do basic math without needing a neural-engine; digital memory storage in the brain to preserve long term memories outside of any system via neural-engine; encryption suites which account for the plaintext nature of unciphered organic memory, often installed with parental consent or at adulthood; organic memory management suites intended to annihilate or recover organic memories; deadman switches with the ability to annihilate digital and organic memories postmortem. Plenty more exist.

Installation of cognitive enhancements is usually the least invasive, and therefore more popular. Since a neural-interface is sure to already be installed, chips — no more than a centimeter in size — are encased in a protective material and "injected" at the base of the neck through a small slit which is opened prior. To best utilize the operation, it is common to get many enhancements at the same time. The chips have their own mobility through their own "spider legs", which once inside the brain case, go to work positioning the chip onto, or in the brain itself. The legs then split into a few dozen mandibles each for use in finding neural interface pins to disconnect from the main bus and onto the chip, or, if the chip is intended for use alongside a neural-engine and not independent of it (which is rare), a dedicated wire unspools and connects to the neural-engine's main wire. More physical enhancements often have to be installed by a human operator through actual surgery, like bone plating, which is installed by cutting into the torso and every limb down to the bone, and then pouring molten metal (with its spread contained by small buffers placed on the flesh to either side of the bone) onto them. This has to be repeated from all angles to cover the entire bone, and it often takes days or even weeks to fully install, but the patient can be put into a temporary coma using their neural-interface, so the procedure can go uninterrupted. Organ replacements are likewise quite invasive.

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The pin roots, still attached to the robots, are connected to a single conductive wire — which runs down the spine and to the base of the brain, with each tubule expanding to a small reservoir connected to a few main reservoirs for replenishment. When more fluid is needed, it is injected using a syringe into the reservoirs which have self-healing walls. The same process is used for the separate supplementary eye reservoirs. Prior to insertion, each pin is designed to only respond to certain frequencies, with pins close to each other having similar but different frequencies. Therefore, all pins connect to the same cable, with frequencies being modulated on the cable to control specific pins. Pins are made of extremely high-strength materials, but the cable is normally just made of copper or some other cheap metal encased in silicone as it runs down the back. It is around a millimeter in size as opposed to the micrometer-sized pins. The cable — with small tubes for each fluid, gates at each pin tubule — and all the reservoirs fit in the back of the neck taking up only a few cubic centimeters; the cable leaves the body at the base of the skull. It is small (no more than the size of an average consumer cable port), and to accommodate for the user, the port is female. Only one signal [not to be confused with Network signals] — split into many frequencies — is passed in, and on a different set of frequencies the signal is read out again. The cable port is circular and around a centimeter in diameter with a small metal rim; it receives a small coax-like cable for connection.

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Besides individual use of neural-engines, people often connect to what is called the "net": a collection of computers each running an instance of some communication protocol, normally the "network protocol", which allows for other protocols to run on top of it. Connecting requires a direct line between your neural-engine and the computer serving your local hub — which connects to other hubs and so on eventually forming a global ad hoc network. Plenty of computers have open lines when connecting to hubs to allow other users to interact; this is the main way people use the network. Various social hubs, archives, entertainment and the like exist on these different hubs, the most popular sometimes hosting thousands or even millions of users at a time. Unlike physical connections with group-use neural-engines, hubs have some amount of latency depending on the number of hubs your connection has to connect to on its journey, which when attempting to interact in real time with the environment or other users can definitely break emersion to some degree if you're deranged enough. Plenty of hubs also let you open datastreams3 into neurons or other things to give you access to more data than your neural-engine's maximum capacity.

Various overlay communication protocols exist for different purposes. Some allow two or more users to inhabit the same avatar in a hub, both having their neural-interfaces meshed together — two minds in one body. Others allow you to have a "proxy" avatar — which appears as you or a pseudonym — but is nothing more than a replica intended to protect you from any net-hackers4 by redirecting their attacks. There are protocols which allow two users to create a "virtual" hub across the network for personal use, such as crypt-room, and many others for secure one-on-one communication outside of hubs. Most importantly, some, like the infamous "Cipher" (which uses its own proxying system), allow users to visit hubs anonymously, with persistent avatars if desired. The implications of Cipher are horrifying to most, and to some, a gamble worth taking: they are the primary motivator behind the usage of the protocol.

The Birth of Jordan Hayes

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It is standard to give a neural-interface to every baby, but it is less standard to install any sensory devices beyond neural-vision. Many other such devices do exist, but the core functionality neural-vision allows for is critical to most modern jobs and education, so it is installed by default. Most modern academies now exclusively use neural-vision overlays for teaching. There is a movement against this, but it is small, and no noticeable movement exists against installing neural-interfaces by default, since they can be disabled by just filling your port with any non-conductive plug, and since they can only be installed in the womb.

Overall, artificial enhancements are broken down into two categories: physical and cognitive. These are broken down into further subcategories such as: sensory, memory, endurance, strength, etc. Many people chose to install more invasion physical enhancements: skull, rib, and bones, fitted with reinforced plating and special membranes to allow blood and other fluids to flow; high-performance hearts for increased stamina; synthetic livers, intestines, kidneys, and other digestive organs for aid in processing less-than-high-quality food as well as improving nutrient uptake and retention; artificial neural-audio implants for enhanced hearing. Olfactory enhancements exist, but they are yet to be on par with natural smell. Cognitive enhancements — which often function without the need for a specific neural-engine — are often more popular: "calculator" add-ons to allow a user to do basic math without needing a neural-engine; digital memory storage in the brain to preserve long term memories outside of any system via neural-engine; encryption suites which account for the plaintext nature of unciphered organic memory, often installed with parental consent or at adulthood; organic memory management suites intended to annihilate or recover organic memories; deadman switches with the ability to annihilate digital and organic memories postmortem. Plenty more exist.

Installation of cognitive enhancements is usually the least invasive, and therefore more popular. Since a neural-interface is sure to already be installed, chips — no more than a centimeter in size — are encased in a protective material and "injected" at the base of the neck through a small slit which is opened prior. To best utilize the operation, it is common to get many enhancements at the same time. The chips have their own mobility through their own "spider legs", which once inside the brain case, go to work positioning the chip onto, or in the brain itself. The legs then split into a few dozen mandibles each for use in finding neural interface pins to disconnect from the main bus and onto the chip, or, if the chip is intended for use alongside a neural-engine and not independent of it (which is rare), a dedicated wire unspools and connects to the neural-engine's main wire. More physical enhancements often have to be installed by a human operator through actual surgery, like bone plating, which is installed by cutting into the torso and every limb down to the bone, and then pouring molten metal (with its spread contained by small buffers placed on the flesh to either side of the bone) onto them. This has to be repeated from all angles to cover the entire bone, and it often takes days or even weeks to fully install, but the patient can be put into a temporary coma using their neural-interface, so the procedure can go uninterrupted. Organ replacements are likewise quite invasive.

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The pin roots, still attached to the robots, are connected to a single conductive wire — which runs down the spine and to the base of the brain, with each tubule expanding to a small reservoir connected to a few main reservoirs for replenishment. When more fluid is needed, it is injected using a syringe into the reservoirs which have self-healing walls. The same process is used for the separate supplementary eye reservoirs. Prior to insertion, each pin is designed to only respond to certain frequencies, with pins close to each other having similar but different frequencies. Therefore, all pins connect to the same cable, with frequencies being modulated on the cable to control specific pins. Pins are made of extremely high-strength materials, but the cable is normally just made of copper or some other cheap metal encased in silicone as it runs down the back. It is around a millimeter in size as opposed to the micrometer-sized pins. The cable — with small tubes for each fluid, gates at each pin tubule — and all the reservoirs fit in the back of the neck taking up only a few cubic centimeters; the cable leaves the body at the base of the skull. It is small (no more than the size of an average consumer cable port), and to accommodate for the user, the port is female. Only one signal [not to be confused with Network signals] — split into many frequencies — is passed in, and on a different set of frequencies the signal is read out again. The cable port is circular and around a centimeter in diameter with a small metal rim; it receives a small coax-like cable for connection.

Unmentioned and widely unpopular despite its functionality, is the use of neural-interfaces in human–machine interaction [outside and independent of the Network]. Plenty of devices can interact with neural-interfaces however, and their military application is obvious. Jets and other high performance vehicles are almost required to have support for piloting via neural-interfaces, otherwise their competitive statuses would plummet quickly. In spaceflight, neural-interfaces are often used to put the user in a coma during interplanetary voyages, or on ice (dead) for interstellar missions. As long as the position and health of the neurons is preserved on a journey when the pilot is put on ice, if the neural activity was recorded at the instant before the body was killed but preserved, these pins may be able to stimulate the exact same activity once the body is unfrozen. Of course, this has never actually worked, but that hasn't stopped humans from damning their own kind to the void in hopes of fulfilling their colonial ambitions. Furthermore, the dreams of immortality held by the few are likewise fruitless.

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The apparatus is placed on each head with vice grip pressure; metal bands circle right above the ears. Connected are two flat metal rings which slope off from the metal bands smoothly. They each hover over an eye with the same profile as the metal bands; the mandibles reside on its edge, each with a mind of its own, each pulsating on its own clocks. The violence of extraction is short lived: each eye is drained of its fluid via a large extendable syringe attached with a tripod to the ring. Tubes run from the end of each syringe to a small flask placed on either side of the patient. The mandibles handle the remaining flesh quickly cutting it, with a few hoisting the trimmings out of the socket. As they are trimmed, the nerves are handled with extra care, and after completion, the careful dance of each wire follows. Hundreds of mandibles sever nerves and stitch them to millions of wires, each with an attached tubule for the transmission of miscellaneous fluids. Busying away, they have a pleasant clicking sound like metallic raindrops. Finally, the wires are quickly soldered by the mandibles onto the back of the new eyes as they descend into the socket. Lubrication follows: a sticky fluid is pumped under each eyelid by an operator, and the body is forced to accept the new eyes through careful manipulation and calibration of the fluid prior to its injection. Furthermore, the eyes are carefully designed to have the same size and pressure as the original, so the muscles don't take long to adapt. Since the operation is often performed on newborns, the backplate of each eye is removable so the eyes can be swapped out when needed, although the back plate cannot. Thus the process is complete, the new eyes swivel limply for a few seconds before the muscles and nerve endings are reactivated.

The pupils of each eye are false, a camera resides on the inside, usually surrounded by mineral oil. Colors and the design can be customized to personal preference, but the first set is designed to look identical to the original eyes. With such powerful sensors, most eyes record with over a hundred million pixels, and thousands of captures each second. The eyes can switch between high capture rate and high resolution at the behest of the user: at higher resolutions, the extra captures are interlaced with previous captures to produce a better image, reducing the number of captures while improving each image. Small refillable reservoirs of chemicals reside in the back of the eyes for transmission down any tubule whenever necessary. Lenses also allow the user to zoom to different magnifications, as well as see in other light spectrums, mostly infrared. But, the biggest use case of these machines — colloquially called "neural-vision" — is their ability to work in tandem with a "neural-interface", which connects to the spine and brain. Neural-interfaces are installed in the womb, as doing so later on in life with a less plastic brain isn't possible as far as people know [this is why some people are "un-interfaced"]. The interface needs to be exposed to each unique nervous system since birth to make sure signals are handled properly. Their installation in the womb is standardized, at least one pin per hundred neurons — including the spine and peripheral nervous system, or less if one can afford it. Each pin is coated in a special substance to trick neurons into constructing connecting synapses. These coerced synapses also connect to each pin's tubule for chemical neurotransmission.

A few dozen small autonomous spider-like robots bury into the womb, although if the birther has their own neural-interface, all feeling in the area can easily be disabled. The robots then incase the fetus completely. Each robot locks itself onto the creature, anchoring using bone and flesh to make sure the process takes place in a stable environment. Billions of pins thinner than a micrometer are pulled out of the robots' stores and inserted delicately through the skin. The heads of these pins are slightly larger — around five micrometers — and they guide the pins into positions with their pre-programmed route. Only minor corrections are made on the journey by its onboard "computer", if you could call it one, since it is little more than a single artificially engineered cell with cilia and a biological instruction set. The patient is to remain perfectly still during the procedure, which lasts around five-or-so minutes. Once the pins are in position, the heads self-destruct and the coating on the ends begins its work. The organic polymers of the pins are produced by most cells in the human body, so the coating serves to repair and maintain the pins' position by tricking cells into maintaining the pins' structures. When the coating runs out and the pin begins to drift, more can be sent down the tubule to the end. Neurotransmission only occurs at the end of each pin where the head dissolves, so only the end needs to be secured in place.

The pin roots, still attached to the robots, are connected to a single conductive wire — which runs down the spine and to the base of the brain, with each tubule expanding to a small reservoir connected to a few main reservoirs for replenishment. When more fluid is needed, it is injected using a syringe into the reservoirs which have self-healing walls. The same process is used for the separate supplementary eye reservoirs. Prior to insertion, each pin is designed to only respond to certain frequencies, with pins close to each other having similar but different frequencies. Therefore, all pins connect to the same cable, with frequencies being modulated on the cable to control specific pins. Pins are made of extremely high-strength materials, but the cable is normally just made of copper or some other cheap metal encased in silicone as it runs down the back. It is around a millimeter in size as opposed to the micrometer-sized pins. The cable — with small tubes for each fluid, gates at each pin tubule — and all the reservoirs fit in the back of the neck taking up only a few cubic centimeters; the cable leaves the body at the base of the skull. It is small (no more than the size of an average consumer cable port), and to accommodate for the user, the port is female. Only one signal [not to be confused with Network signals] — split into many frequencies — is passed in, and on a different set of frequencies the signal is read out again. The cable port is circular and around a centimeter in diameter with a small metal rim; it receives a small coax-like cable for connection.

Unmentioned and widely unpopular despite its functionality, is the use of neural-interfaces in human–machine interaction [outside and independent of the Network]. Plenty of devices can interact with neural-interfaces however, and their military application is obvious. Jets and other high performance vehicles are almost required to have support for piloting via neural-interfaces, otherwise their competitive statuses would plummet quickly. In spaceflight, neural-interfaces are often used to put the user in a coma during interplanetary voyages, or on ice (dead) for interstellar missions. As long as the position and health of the neurons is preserved on a journey when the pilot is put on ice, if the neural activity was recorded at the instant before the body was killed but preserved, these pins may be able to stimulate the exact same activity once the body is unfrozen. Of course, this has never actually worked, but that hasn't stopped humans from damning their own kind to the void in hopes of fulfilling their colonial ambitions. Furthermore, the dreams of immortality held by the few are likewise fruitless.

Unlike the actual neural-interface, a neural-engine can be replaced whenever, or entirely avoided. People often call the neural-engine the "neural-interface", even though they're different. Neural-engines can be swapped out whenever by just unplugging one and plugging another in, but they should be turned off during this swap to avoid any issues. People often use different neural-engines for different things: low-powered ones can fit flush to a person's back, even blending in with a person's skin color or hosting elaborate designs; high-powered stationary setups that take up entire rooms can give users more power for whatever use they may have; group-use neural-engines have multiple ports to connect users to each other's minds with low latency; hidden ultra-low power neural-engines which fit into the actual plug flush against a person's back, although these are mostly used to protect against any person trying to connect something to your cable port ("plug-jacking" done by "plug-jackers"). These ultra-low power neural-engines normally can't do more than overlay a task list or what the weather is in your vision space. Neural-vision, and most other standard sensory replacements work without external software, but with the addition of a neural-engine and a neural-interface, the output can be modified however the user wants by simply passing the output directly into individual specialized pins for processing. This is normally already setup if pins are placed in the ocular nerve; the mandibles automatically connect a few of them, and once the new eyes are in position, they will send an initialization signal down the pins to tell the neural-engine that "these pins are in use by me", or in reality, a high-voltage signal that the body cannot naturally produce, then a binary–analog signal which gives information about the hardware and that it is operational.

Neural-engine software varies in impact from just an overlay in your vision, to complete immersion in another environment. Databanks can be attached externally for mass data storage, such as books and indexes of information. Most neural-engines have at least a few terabytes of storage, but with home setups, it can balloon to hundreds or even thousands of terabytes. Neural-record software also allows you to record your mind, that being the sum total of your experiences, emotions, and sense of the world during the recorded period. Different resolutions can be selected when recording your mental state: at low resolutions, the experience may just feel like a dream, but at high enough resolutions — which often take terabytes per second to record — it's indistinguishable from reality. This is the modern equivalent to cinema; production houses often buy out huge databanks to record weeks or even years of neural-records, which are normally called "neurons". These ultra-high-quality neurons often need to be streamed over the network since most people don't just have a few exabytes of storage sitting around. The playback speed when reliving a neuron can be set to whatever you want, with the experiences in your mind still taking just as long. Many people put themselves into week-long neurons and come out as if just a few seconds passed. Of course, the obvious use of this technology is pornography, and the vast majority of neurons on the network amount to nothing more than this.

It is standard to give a neural-interface to every baby, but it is less standard to install any sensory devices beyond neural-vision. Many other such devices do exist, but the core functionality neural-vision allows for is critical to most modern jobs and education, so it is installed by default. Most modern academies now exclusively use neural-vision overlays for teaching. There is a movement against this, but it is small, and no noticeable movement exists against installing neural-interfaces by default, since they can be disabled by just filling your port with any non-conductive plug, and since they can only be installed in the womb. Overall, artificial enhancements are broken down into two categories: physical and cognitive. These are broken down into further subcategories such as: sensory, memory, endurance, strength, etc. Many people chose to install more invasion physical enhancements: skull, rib, and bones, fitted with reinforced plating and special membranes to allow blood and other fluids to flow; high-performance hearts for increased stamina; synthetic livers, intestines, kidneys, and other digestive organs for aid in processing less-than-high-quality food as well as improving nutrient uptake and retention; artificial neural-audio implants for enhanced hearing. Olfactory enhancements exist, but they are yet to be on par with natural smell. Cognitive enhancements — which often function without the need for a specific neural-engine — are often more popular: "calculator" add-ons to allow a user to do basic math without needing a neural-engine; digital memory storage in the brain to preserve long term memories outside of any system via neural-engine; encryption suites which account for the plaintext nature of unciphered organic memory, often installed with parental consent or at adulthood; organic memory management suites intended to annihilate or recover organic memories; deadman switches with the ability to annihilate digital and organic memories postmortem. Plenty more exist.

Installation of cognitive enhancements is usually the least invasive, and therefore more popular. Since a neural-interface is sure to already be installed, chips — no more than a centimeter in size — are encased in a protective material and "injected" at the base of the neck through a small slit which is opened prior. To best utilize the operation, it is common to get many enhancements at the same time. The chips have their own mobility through their own "spider legs", which once inside the brain case, go to work positioning the chip onto, or in the brain itself. The legs then split into a few dozen mandibles each for use in finding neural interface pins to disconnect from the main bus and onto the chip, or, if the chip is intended for use alongside a neural-engine and not independent of it (which is rare), a dedicated wire unspools and connects to the neural-engine's main wire. More physical enhancements often have to be installed by a human operator through actual surgery, like bone plating, which is installed by cutting into the torso and every limb down to the bone, and then pouring molten metal (with its spread contained by small buffers placed on the flesh to either side of the bone) onto them. This has to be repeated from all angles to cover the entire bone, and it often takes days or even weeks to fully install, but the patient can be put into a temporary coma using their neural-interface, so the procedure can go uninterrupted. Organ replacements are likewise quite invasive.

1Encryption suites work with both organic and digital memories: for organic memories, the specific engram2 formation pattern of neurons is manipulated into a cipher pattern. Neurons are manipulated to interact differently with ciphered patterns. Digital memories are, of course, much easier to encrypt, and more secure, as the position of information is lost completely upon encryption, unlike with engrams where the position of neurons can only be ciphered to a limited degree without the information being lost. The highest security available on the market for organic memory encryption is around eighty-five bits of security, which with modern technology would take beyond a responsible time to break anyways, but for digital memories, the security is at minimum two-hundred and fifty-six bits strong, impossible to break by all known theoretical means. Thought patterns and general brain activity are also ciphered by the encryption suite to make mental activity secure, this is less secure then individual memory encryption since it is encrypting the patterns of neurotransmission on the fly, and the attack surface is much larger, that being the entire brain. So, if an adversary were to place a malicious neural-engine into their victim, if they have their organic memory encrypted, without access to the encryption suite (which is not connected to the neural-engine; the user uses it in tandem with the neural-engine as middleware) and the neural-signal, decrypting thoughts and memories is impossible. The encryption suite also stores its datakeys off the neural-interface in a protected chip, but older models do have plenty of vulnerabilities in their security chips, and the datakeys are still accessed — although to volatile storage — by the system when encrypting organic or digital objects.

All humans also have slightly different neural characteristics, often referred to as a whole as the "neural-signal" of a person. This neural-signal is used by encryption suites in lieu of an organic memory password — which, as with all organic memories, is encrypted by the suite already — with the datakeys stored on the security chip. Impersonating another's neural-signal is incredibly difficult, but possible with enough time to directly access their neural-interface. Another mind can infiltrate their target's mind and impersonate them to decrypt their engram pattern and steal their memories, but, even with the neural-signal, if the target is secure enough, infiltrating their system in the first place may prove to be even more difficult. There is really no exfiltration proof way of storing information, and with enough work, any person's security can be broken. Many enhancements require special, or even proprietary neural-engine software to function — but many can function (fully or limited) without the use of a neural-engine, such as neural-vision and most cognitive enhancements. Plenty of honeypots have been created by different organizations, but as long as a user sticks to their own homegrown software or software from trusted sources, getting yourself stuck in a honeypot is incredibly difficult.

Besides individual use of neural-engines, people often connect to what is called the "net": a collection of computers each running an instance of some communication protocol, normally the "network protocol", which allows for other protocols to run on top of it. Connecting requires a direct line between your neural-engine and the computer serving your local hub — which connects to other hubs and so on eventually forming a global ad hoc network. Plenty of computers have open lines when connecting to hubs to allow other users to interact; this is the main way people use the network. Various social hubs, archives, entertainment and the like exist on these different hubs, the most popular sometimes hosting thousands or even millions of users at a time. Unlike physical connections with group-use neural-engines, hubs have some amount of latency depending on the number of hubs your connection has to connect to on its journey, which when attempting to interact in real time with the environment or other users can definitely break emersion to some degree if you're deranged enough. Plenty of hubs also let you open datastreams3 into neurons or other things to give you access to more data than your neural-engine's maximum capacity.

Various overlay communication protocols exist for different purposes. Some allow two or more users to inhabit the same avatar in a hub, both having their neural-interfaces meshed together — two minds in one body. Others allow you to have a "proxy" avatar — which appears as you or a pseudonym — but is nothing more than a replica intended to protect you from any net-hackers4 by redirecting their attacks. There are protocols which allow two users to create a "virtual" hub across the network for personal use, such as crypt-room, and many others for secure one-on-one communication outside of hubs. Most importantly, some, like the infamous "Cipher" (which uses its own proxying system), allow users to visit hubs anonymously, with persistent avatars if desired. The implications of Cipher are horrifying to most, and to some, a gamble worth taking: they are the primary motivator behind the usage of the protocol.