Questions to the man-machine interface of the manual digital text input process.

(Interim study to involve co-authors and co-workers)

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1. The place of the man-machine interface in the total reality

The man-machine connection is in essence dialogue of the human person with the artificial environment.

What, why the human person, that sovereign, emotional and rational is, has to communicate to the environment? Most part of which is artificial environment since the humankind is existing. Full of artificial tools, lacking which the humankind could not exist in his way. That is using to show itself not only with its sovereignty and emotions (as any other living being with central nervous system) to this real environment which is sensed by sensory organs, but especially with its reason (being owned only by humans).

Our (the humankind's) set of artificial tools is incalculably expanding. The number of tools is huge and increases in even greater and greater rate. Though it is not endless, it is incalculable, and the rate of the expansion is uncatchable. This is exclusively the product of the deeds by the finite count team of the humankind during the history. Count of this team is few hundred or few thousand billions and

each members are different, unrepeatable. Just only, for the reason that they collected – are collecting the learnings, which constitute not unessential part of them, the person, from the ever-changing reality around them only in a small timespan of the history. I call person in this view exclusively those information package, a part of which can be found "wired" in the human body, and another part collects as experience by elapsing the life, a part of which experience is that particle of the total information owned by the humankind, which the given person acquired. Moreover, I mean the information package that I regard as person in its wholeness consists totally of three parts: that is sovereignty, emotion and reason. In this view, I am reasoning the man-machine connection.**<<**INDEX

2. Command – manifestation of the human person

The tools, either natural as the parts of our body or artificial, can be called tools, because the person wants to communicate something to the environment by them, and waits for its response through the sense organs.

What is the simplest thing, which it wants to communicate? This is that I am sovereign; I want to command. It is a simple, *digital* yes-no command. It is command, because it waits for response. What for a response waits it? Anything in this simplest case, only it wants to know, that the response is for its command. In these whirling surroundings with changes, it wants to notice only, that it also is able to cause change. From what does it know that whatever change was caused by its command? Only by repeating the command more times, can it perceive, learn and experience this with satisfaction.**<<**INDEX

3. Dialogue with the environment

However, we should try just to explain what the difference is in the man-machine connection, especially in the person's dialog with the artificial environment, between the *digital* message and the not digital, that is *analogue* message, when the person tells command to the artificial tools!

Pieces of the dialogue can be viewed from two aspects. They are either sent or received by the person or, the other aspect is whether they require an answer or not.

	sent	received
answerable	commands	option
not answerable	input	learnings

Either sent or received, command, input, option or only a piece of learning can be either digital or analogue. Digital communication in a given instant sends the selected value of a possible finite countable set of values. Analogue communication sends one value from a possible domain's possible infinite number of values. Digital receipt gets one of a possible finite countable set of values or not. Analogue receipt gets one value from a possible domain's possible infinite number of values or nothing.**<<INDEX**

4. Structure of the messages

One can perhaps make a statement as
lemma (1), that **every message issued by the person is made up of elementary digital motoric commands**[1],
is it either command or input,
either analogue or digital.
This may be inferred from the neuron's known pulsed way of working.
In order to prove this lemma there would be needed to know the coding of the elementary motoric commands with the motoric pulses. One should know what pulses in what nerves are caused by an elementary command and what strain force of what muscle fiber is its consequence.
One had to map structurally and functionally the neural control of every muscle fiber that is capable to contract.
Question that follows is whether can be operated separately the muscle fiber that otherwise separately is capable to contract?
I assert by introducing again "perhaps making a statement as
lemma" (2) that **yes, every separately "innerved" muscle fiber is originally separately voluntarily controllable**,
only as the life passes these get compiled through learning into practically usable, in the practice exclusively used command systems – as the operating system of the computer.
A part of this "operating system" is obviously inherited, but a large part of it shapes up while the person gets adult.
Essentials of our lemmas is that they lifelong exist, and are, at least theoretically, the commands that separately control every separately "innerved" muscle fiber, voluntarily separately issuable.
When the simplest commands ("I'm sovereign, I want to command") occur
the nerves communicate towards the muscles, the elementary commands that

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[1] These are commands to the environment, that is either natural, consisting of the members too or artificial, as the machines.

separately control the single muscle fibers or,

inherited system commands invoke such ones.

That is, the environment (the member moved by the given muscle fiber) must move that way, how I command.

E.g., a finger on my hand, in the womb already or, when getting out from there, the voice space around me, as from my lungs the vital capacity is able to rush out hissing.

The moving, i.e. motoric command signals the environment the presence of the sovereign human person. The tool for the communication is the natural environment itself, which is only partially independent of us, also the separately innerved muscle fibers included.

This way the command communicates also **more**, than wishing to let move. The memory about the first operating the separate innervation contains also **that muscle fiber** moved by the command.**<<**INDEX

5. Emotional judgment about messages from the environment

Thus far, our talk was only about the person's communication in the person/environment dialog. There is on the other side the environment's communication towards the person to communicate the consequence of the reporting command "I want to command" received from there with the signals of the sensory organ.

The signals partly show the person that the motoric innervation is working. That it cannot only hope to be sovereign, but can also experience it, though between barriers of the abilities and possibilities. On the other hand, the person begins, incomparably to others in the surroundings, being this only the human person's property, to reason sovereignly. The reasoning creates a judgement about the received signal. It decides whether it is to look for or is to avoid. It makes a plan based on its fresh reminiscences, which command it should try with repetition. Immediately begins to try out the effects of motoric commanding acts. There exist aims to try out! It wants to tell its emotional judgement about the whirling of the signals from the sensory organ in the environment. It expresses acceptation or rejection. born141123Eszti's40thday.wmv It sovereignly delivers the sentence: is it good for him or not.

However, it delivers such a sentence only about a small part of its time, i.e. of the whirling surrounding it, since it is sovereign. Therefore, it continues to emit motoric commands mostly without a direct purpose too. In the meantime, it watches how the environment obeys him. It continues to reason as well. It tries

repeatedly to reach accepting judgement. It associates to all of such judgements the motoric commands evoking these sense signals, if it recognizes such evoking dependency. There exists a precondition to this of course to identify the motoric commands already before their emission and the arousal of the sense organ response. The person has to know without emitting a motoric command that the one command (e.g. moving the finger on the hand) and the other (e.g. moving the voice space of the environment) are different. Questionable is, weather between the person's three identifier properties which one has this differentiating function: the sovereign, the emotion or, the reason. I think that between those three the sovereign owns independent of the environment the ability to identify the motoric commands. The inborn inner contacts of the brain's neuron nets can be associated with the predestinate given possibility in the person to differentiate the motoric commands before their execution. Therefore, the person being yet "clean", newborn rules a finite countable set of motoric commands. Repeatedly tries them, for the time being in lack of memories. born141123Eszti's41stday.mp4 But the motoric commands identified by the person invoke with the environment's altering steadily different sense signals. The command that moves the hand's forefinger will conclude radically different consequences when changes in the person itself, the body belonging him, the environment both natural and artificial are occurring. This is the difference between the baby's movement experience and pressing a knob that starts fireworks. Both are consequence of the same motoric command. Invoking the command is motivated in both cases by wishing to attain positive experience, and this is so eventually in **all** other cases, i.e. the intention to get sensory signals that cause delivering accepting sentence. After it had sentenced, evaluates and repeats commanding, but usually not the same command. It repeats the same only when its sentence was accepting and the environment and it did not change. This case the desire to repeat the joy of acceptance challenges him to repeat the same command. It evaluates by reason the environment's identity or change occurred. Nevertheless, if it could not deliver an accepting sentence, or the environment or it same change, it repeats by evaluating with reason its memories at hand and changing the motoric command. This learning algorithm is the same independently of age, person and environment. It seems only different in different cases when meaningful differences exist in the applicability of the person's definitive attributes that is of the sovereignty, emotion and reason. Learning is only on the one hand the consequence of the algorithm's continuous execution. The consequence is much more important, as for us, that the memory of the person's experiences becomes richer. The enrichening is composed rather of acceptance experiences because of

the steady desire to repeat the joy of accepting. So is it, if only the environment is not extremely unfavorable. However, the consequent violent search for repeating the acceptance's joy with the motoric commands selected from the memory can help just in the mostly unfavorable environment to better the memory of experiences. The memories are steadily multiplying with the repeated sweeping-like trying along and records of new and new "discoveries". The discoveries contain on one part that "hurrah, I found again a new command that works, this way too I can command my environment, sovereignty is a good matter", on the other that weather the consequence that is transposed by sense organs I accepted or, had to reject it or just only I can remember that already occurred such one. born141123Eszti's47thday.mp4 The reason can work with such infinitely multiplying "discoveries" in the memory, i.e. the memories about the facts of the past being-states, occurrences, deeds and them connected consequences, in order to establish the person's rule over the environment, the sovereignty, with the appropriate selection and issue of the motoric commands along the environment's state in the given instance. The person handles these memories as chance to be able to repeat what has been past. The motoric command evocable in the memory is a means to increase or decrease the chance. The reason moreover records not only the memories but also their links that are how they are beside and follow each other, their chaining emerging in eventual identity of their consequences and beginning preconditions. Sooner or later the "discovery" of command group member's simultaneous issues can emerge even protrude as a new memory or, to possibly reach a longed acceptance experience by a command chaining execution, even being possible with the execution of the beginning command to accomplish the full chaining, distinguished the separate execution of the beginning command from its execution as to begin the chaining.**<<INDEX**

6. Digital command to the machine

In this case **the simultaneous issue of multiple commands** (e.g. to arouse a consonance) is a single motoric command, same as the issue of the chain starting command in order to **carry out the whole command chaining automatically** (e.g. the fight movement of a fencer) - **these are mostly analogous communications** or, separately issued elementary, "primitive" component commands of them **are generally the digital communications**. Really there is a need to use over the numerous elementary commands also their combinations and chaining as separate commands in order to achieve possible fullest enforcement of the sovereignty that is limited with possibilities and capabilities in the circumstances

of the unforeseeable changes in the natural environment and of the enrichment of the artificial environment. The signals which carry the contents of the communication are of **analogous** character if the selection of the reply to be executed from all the possible ones belongs to the functions of the accepting side - in general with infinitely numerous but anyway of very large number of possible replies. Take as examples for this the steering commands to the automobile or, the man-machine connection with the electrical scoring apparatus in the fight movement of the fencer and, of course, every command directed to a machine that executes signal processing. But the signals are **digital**, when this selection is done by the command sending side, and the accepting side receives in the contents of the command that which reply is to be executed from all the possible ones of not too large number. Take as example for this the controlling of the computer with **digital** code – included the manual text input with keyboard or other device.**<<**INDEX

7. The machine is power over the environment

Serious question is, how the barriers of the sovereign's freedom can be better untightened: with elementary commands or, with combinations of them, or with chaining – issued them as separate commands. I.e.: weather the
– unique voluntary operation of every separate muscle fiber or,
– operation of trained groups of separately innerved muscle fibers with a single command or,
– evoking the trained chain of the previous ones with a single command
can better untighten the barriers? It seems to be evident all the three ways being possibly very effective. One can deliver different statements, but only series of experiments done with experimental persons can reach serious answer. The series have to contain statistically numerous repetitions of acceptance, refusal and neutral experiences among comparable circumstances while measuring some such parameter of every event that should characterize the grade of limitedness of the experimental person's freedom. In this sense what may be the measurement of the limitedness of the freedom? Namely, one must regard as fact Eva Szörényi's (Hungarian star actress flown from the Russian military invasion) testimony before the UNO's investing committee in 1957, that the person's freedom has not any measurement of grade: it is either free or not. KeyexcerptfromEvaSzoerenyisUNOhearing1957marked It is free, if it executes a motoric command with the expectation to feel an acceptance experience and that satisfies. However, it is not free, when the satisfaction fails, or the reply is neutral or rejecting. The satisfaction respectively is the outcome of recognizing perfectly the correspondence with the experience-memories and while sensing the

consequence, the recognition and judgement of the acceptability. I.e. it depends on the greatly changeable environment. Exactly the same way as the person's sovereignty experience is changing with the environment's changes. Yet how could one separate from and make independent of the sovereignty experience's achievability the changing environment.[2] Only if one expands its command's effect to the environment's changes. That is, it builds up an artificial environment that is possible to command. It builds machine. That's why the humankind's set of tools is expanding incalculably. One has to answer the question to this existing, incalculably expanding machine set, that which way, with what means adequate for the elementary, grouped or chained operation of our muscle fibers given by the nature can we better untighten the barriers of our abilities and possibilities. It is evident, that all the three ways are fruity. However, there exists seemingly a tendency that predominates in the preparation of the machines. This is to shift functions from the human to the machine, accordingly. The conclusion would be that the best way to untighten the human barriers with the preparation of machines would be doing that by operating artificially more and more functions with elementary muscle fiber commands.**<<**INDEX

8. To load work to the machine increases the sovereignty, but to shift the decision to it decreases the same

I would lean to conclude that I have reached my set aim, to verify mentally that it is of benefit using the simple – circa of 1 cm measurement postures to communicate the machine seemingly elementary human digital commands and to prepare an experimental tool to attain the proof for that. Investing closer the imagination one realizes that setting such postures of the fingers is not at all an elementary digital command. It is far from being capable to be satisfied with a command given to move separately a single muscle fiber. human-robotics 2013-IEEE-Bookreview. pdf To reach such a posture with the hand's finger is an aiming operation. It starts from somewhere and states the movement's course for the aim. This can be the function of a single muscle fiber. However, during the move one has to correct the effect of the starting muscle fiber with another or rather with more other muscle fibers. There is necessary to slow, modify the course, or turn it: one has command chain to execute. These command chains are very well attainable to practice so that one dos not need separately command the single muscle fibers for different modifications in order to aim with result – think only of the effective fight movement of the fencer. It would be accordingly purposeful to

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[2] To be clear: Yet how could one separate the sovereignty experience's achievability from the changing environment and make it independent of that?

use the above-mentioned postures along the finger's natural movement line for elementary man-machine commands. Noticeable is however that this aim-requirement command accepting technic is far not prevailing in the set of tools of machines. Considering the most important requirement namely (to shift functions from the human to the machine), the repeated correction process of the aim operation is possible to simplify or avoid at many devices. Instead of operating muscle fibers that correct the started movement, mostly useful is to start the movement in a direction where one reaches the aim with collision. That is why the usage of knobs, keyboards is widespread. However, there are obviously circumstances where usage of these is disadvantageous or impossible. Even so, how is it possible, how has one to effectuate the requirement to shift the functions to the machine? Only so, that one has to analyze by commands – intended to trigger elementary, grouped or chaining operation -- the whole process of the execution and to design, adjusting to the given circumstances, how could one shift to the machine muscle fiber functions, and to construct the commands triggering those separately, in-group or in chaining.

Design and construction are engineering science, the above detailed (I hope it has been rational enough) research aim could be a topic of the neuromechanics engineering branch. I suggest a construction aim to start research. That aim is the bioengineering redesign, reconsideration, revision of a widely used tool family, the tools of the ***manual digital text input***. One has to be acquainted for this with all the muscle fibers of the hand, their functions and commands.

Based on the former expositions it requires justification the selection of such a narrow segment in the man-machine connection with the waited result of being able of largest extent to untighten the barriers of the human activity. We have shown namely that we used to give commands toward our environment (should it be either natural or artificial) not only with text input, not only digitally and not only with the hand's movements. We have shown also that there is a tendency in the development of the man-machine connection to shift the functions from the human body to the machines. While issuing digital commands however just one of the most demanding functions, the selection between all the possible consequences is not transferred to the machines. So the man ('s nervous system) is not released from the decision of selecting. We have shown however the predominance of another tendency also, namely that primary motivation to issue the commands is the steady longing to repeat the acceptance enjoyment. Within the contacts maintained with the environment prevails the consequent violent search to repeat the acceptance enjoyment. The sovereignty experience will

securely increase only when the person executes a command with the expectation to attain an acceptance experience and that will accomplish it. However, the sovereignty experience decreases when the change occurring in the environment in consequence of the command does not get acceptance but concludes in neutral or reluctant experience.**<<**INDEX

9. Technological goal

This is simple: One has to plan a machine to which we can, even incidentally, not issue other command than that which causes the determined outcome, and when we issue that, the machine will not evoke, even casually, other change of the environment, than determined. Therefore, our acceptance experience will certainly result. That is, the machine has to be mind reader, and incapable to become faulty.

The nowadays-attainable machinery devices for the manual digital text input are satisfying just these requirements although a little bit restrained, namely just using the simple, circa in 1 cm distances divided postures of the fingers. The most precise tool is the keyboard; nevertheless, the experimentations do not cease to neglect its application because of its size.

It would be a more restrained requirement to ease in possibly largest extent to select and digitally communicate the intention. Parallel to the process of transmitting the communication the user's intention could be better satisfied with backward signaling and provision of the correction's possibility. As a first step this would yet lessen the text input's speed, but the accurateness, the accustoming, the released work power hopefully would be rewarding. It would be much significant, when without any keyboard attached to a tablet one could make text input with equal worth.

One could make easier the selection so, that instead of offering parallel the lot of keys on the keyboard, the input of one letter would occur in three steps. First there would be offered a letter group, secondly a subgroup and in the third step the letter insisted to input would be offered. These three steps would offer a feeling experience that is similar to the cursive writing with the use of 1 cm division fields of the touch screen that is supposedly of satisfactory speed, but at any rate secure, little fatiguing and amounted to a write process well exercisable, requiring little attention. With regard to the graduated display of the letter, one could call this text input ***letter builder writing***. The three subtasks that follow would bring us nearer to accomplish the device.

1. Model driven development of the state machine of a limited ***letter build*** process.

There is to do a model driven development work to create a state machine workflow application that operates a limited character set ***letter building*** input process with the touch screen user machine interface. It will be to serve as proof for the benefits of the ***letter builder writing***. Namely it has to render a subset of the whole function set of the typist's keyboard: the letter builder input of the **m**, **b**, and **p** and **a** letters.

2. Development of the program that takes measurements to check the writing's goal parameters from the limited ***letter build*** process.

There is to make a control program for the experimental activity that displays the input text - letters, words, sentences composed from the limited, declarable set of letters for the operator as a visual command, measures the execution time and records the faults.

3. Biomedical questions to the man-machine interface of the manual digital text input process.

Designing the activator and sensor side of the letter builder writing's man-machine interface could be supported by surveying the operation of motoric muscles during motions which alter the stylus's posture along a led straight line or an automatically arched line and, alternatively which change the distance of the fingertips.

One should compare these motoric muscle operation survey maps with similar maps from the motions of the cursive handwriting and those of the conventional keyboard usage and from the motions of other different text input methods.**<<**INDEX

10. Concluding remarks

One could evoke a lot of arguments to support the hope and assert the conviction to be benefitting to make a character input with hand into a machine in three steps in order to establish a new, more secure, less fatiguing, easier to become dexterous, requiring less attention, resembling the cursive handwriting manual text input method. It does no matter for our 8-month actor to use its voice, arms, face, hands, lips or fingers when it wants vigorously to show its existence simply

by making its own changes in this environment whirling with changes. You can observe that both natural and artificial tools are at hand, are coequally manipulated and both simple and sophisticated operations occur while contacting the elements in the natural and artificial environment. The only purpose is to show its importance and it is awaiting no direct response – replays a monologue only.

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However, it uses same operations to receive acceptance as based on recent memories it is expectable – opener and kinder it plays a dialogue with the environment.

born141123Eszti's257thday-dial.mp4
born140729Dalma's363rdday-facestherobot.mp4

The richness in communicating its emotional decisions with any – natural and artificial – tools with ever and ever more sophisticated operations, moreover the sentience in attending, noticing and evaluating the caught environmental – either replying or only indifferent – changes is a secure proof for being our above drawn intent realizable and benefitting.**<<**INDEX