From Alan Turing's Imitation Game to Contemporary Lifestreaming Attempts

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Abstract. Among his various productive contributions, Alan Turing has imagined to turn the question "can machines think?" into what he called an *Imitation game,* with specific rules and play conditions ([23], [25]). Reusing the notion of dynamic continuum from *ludus* to *paidia*, as introduced by Roger Caillois in his famous study *Man, Play and Games* ([4]), we claim, with most computer scientists, that the Turing *Imitation game* is strongly *ludus*-tagged, mostly because it is not attractive and playful enough to be spontaneously played: the contrast is strong, compared to some later *paidia*-tagged game involving computing machineries, like *Interactive information and digital content browsing and retrieval.* As far as designing our interactive Artificial Intelligence systems is concerned, why should we have to choose between *ludus* and *paidia* or to deny their eternal competition? On the contrary, this paper proposes to dare to establish that irreducible concurrency between *ludus* and *paidia* as the heart of our future systems, rediscovering the importance of the Greek notion of *kairos.*

1 HAPPY BIRTHDAY DR. TURING!

During this year 2012, we shall celebrate the centenary of Alan Turing's birthday.

Apart from the recurrent scientific manifestations that pay homage or tribute to Alain Turing, such as the yearly Turing Award, 2012 will be marked up by many special events, among them scientific conferences or workshops all around the world, competitions (like the Turing Centenary Research Fellowship and Scholar Competition), and socio-political events like the amazing attempt to grant a pardon to Alan Turing, far exceeding the computer science communities.

The reason why Turing stays so famous among computer scientists not only relies on Turing's unique impact on mathematics, computing, computer science, informatics, morphogenesis, artificial intelligence, philosophy and the wider scientific world. It has something to do with the mystery of his life and the complexity of his various theories, borrowing inspiration to many different fields and crossing them boldly. For example, the present paper authors, as computer scientists involved in digital arts and interactive computer games, regularly mobilize some Turing scientific contributions, as several from their colleagues use to do so ([16], [12]), not only for technical purposes but also for cross-disciplinary connections and attempts to innovate.

This papers aims at coming back on one of the most extraordinary Turing's contributions, namely his *Imitation game,* built up "to replace the question 'can machines think?' by another, supposed to be closely related to it and expressed in relatively unambiguous words" ([23]).

The first section is dedicated to the description of some preliminary considerations about the *Imitation game* and Test, as designed in 1950 by Turing in his famous paper, concentrating on some specific considerations, supported by the sociologist Roger Caillois study about *Man, Play and Games.*

The second section describes a contemporary domain for *Imitation games* application, namely the interactive information browsing and retrieval process, analysed from a Turing Test point of view and perspective. A comparative approach with the general tracks put forward by Turing will allow us to introduce the innovative idea of Collection-centred analysis and design.

The third section will be dedicated to the development of this *Collection-centred analysis and design concept,* aiming at some specific research and applications, among them the contemporary lifestreaming attempts.

2 THE IMITATION GAME

Since the publication in 1950 of his 27 pages long paper in the 59th volume of *Mind* [23], Alan Turing ideas about Computing Machinery and Intelligence has been commented a lot, without any significant lassitude or interruption.

Some authors, usually computer scientists, have put forward some constructive criticism around Computing Machinery coming from their technical experience ([21], [1], [2], [3]), while others, usually philosophers of mind, have put forward some theoretical proposals to reframe or resituate Turing ideas about *intelligence* ([18], [9], [10]).

This section does not pretend at an exhaustive review of those contributions, nor at producing one more contribution to be considered within the permanent flow of it: we only aim at pointing out some particular aspects of Turing ideas about Computing Machinery and Intelligence that will be extended and mobilised within the next section.

2.1 Principle, framework and object

First of all we would like to redraw quickly the principle, framework and purposes of the *Imitation game* (and its Test version), such as described by Turing in his paper.

The notion of *game* relies in the heart of Turing key-concepts from the beginning of his scientific career, as it is central within the cybernetic approach ([7]): in [24], Turing will thus sketch a game typology by distinguishing *game with complete knowledge theory* from *games with incomplete one.*

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Notice that *the Imitation game* is managed by an interrogator-oracle: C is that interrogator who tries "to determine which of the other two is the man (A) and which is the woman (B). He knows them by labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. The interrogator is allowed to put questions to A and B. […] It is A's object in the game to try and cause C to make the wrong identification. […] The object of the game for the third player (B) is to help the interrogator".

Notice also that there is a Test version of the *Imitation game,* characterised by the omission of B: "the game (with the player B omitted) is frequently used in practice… […]. They will then probably be willing to accept our test".

Then we can sketch this simple matrix that help to keep in mind the main configurations and objects of the Turing proposals:

	A is a Human	***A is a Computing Machinery***
A and B face C	classical game	Turing *Imitation game*
A or B faces C	*viva voce*	Turing Test

Fig.1: matrix representing the actors configurations in the Turing proposals

To go forward, we propose to use the erudite considerations of Roger Caillois in his famous book *Man, Play and Games* ([4]) written in 1967 and translated to English by Meyer Barash in 2001.

2.2 Caillois' classical study

In his study, Caillois defines *play* as a free and voluntary activity that occurs in a pure space, isolated and protected from the rest of life. *Play* is uncertain, since the outcome may not be foreseen, and it is governed by rules that provide a level playing field for all participants. In its most basic form, *play* consists of finding a response to the opponent's action — or to the play situation — that is free within the limits set by the rules.

Caillois qualifies types of *games* — according to whether competition, chance, simulation, or vertigo (being physically out of control) is dominant — and ways of playing, ranging from the unrestricted improvisation characteristic of children's play to the disciplined pursuit of solutions to gratuitously difficult puzzles. Caillois also examines the means by which *games* become part of daily life and ultimately contribute to various cultures their most characteristic customs and institutions. According to Roger Caillois and Meyer Barash, *play* is "an occasion of pure waste: waste of time, energy, ingenuity, skill, and often of money". In spite of this — or because of this — play constitutes an essential element of human social and spiritual development.

Thus is it possible to sketch a second matrix pointing out, for each *game* feature studied by Caillois (pp. 42-43 of the French edition), the main characters of Turing *Imitation game* and Test.

2.3 Caillois applied to Turing *Imitation games*

Games have to be **separate** (within space and time constraints, fixed in advance):

- As far as time is concerned: the response delays of C's interlocutors (A and B) are artificially temporised to prevent easy information towards C;
- As far as space is concerned: the physical placement of A and B is governed in such ways that direct perception is not possible for C, either visual, tactile or acoustic;
- As far as truth is concerned: the Computing Machinery A is able to simulate some mistakes, imitating the famous *Errare humanum est,* just to mask its unlikely aptitude to calculate (thus, the addition 34957+70764=105621, mentioned into the Turing paper, is false). Notice that other kinds of mistake (such as language slips) are not taken into account.

Games have to be **regulated** (submitted to some particular conventions that suspend ordinary laws):

- As Turing paper readers, we know nothing accurate about the dialogue process between C and A and/or B: Who is supposed to be interrogated first by C? Is it compulsory, for C, to alternate rigorously the different tirades? Could C concentrate on one particular protagonist by asking him/her several successive questions?
- How does the dialogue stop (as far as the universal Turing Machine is concerned, we know the importance of the stop conditions)? How to limit the *Deus Ex Machina* effect?

Games have to be **uncertain** (the process cannot be fully predictable, some inventions and initiatives being required by players):

- As far as the nature of questions/responses is concerned: How can the interrogator be convinced enough to decide between « (X is A and Y is B) or (X is B and Y is A) »? There is no precise response to that interrogation;
- Sometimes one single response tirade is enough to inform C, typically in case of practical examination, like some arithmetic instruction execution, or some particular movement of a given chess piece in a given game configuration;
- Unfortunately, this type of question does not prove that a good answer is necessarily due to a deep understanding of the respondent — rather than a lucky choice — nor that a bad response is not a mistake coming from a wrong practical application of a very correct theory;
- That is why it seems also possible for C to describe some different knowledge regions being first mapped, like sonnet writing (about Forth Bridge), arithmetic mastering (add 34957 to 70764) or chess challenging (I have K at my K1, and no other pieces. You have only K at K6 and R at R1. It is your move. What do you play?). The heuristic is there to multiply examination scopes and to diversify the interrogation domains to reduce the evaluation hazards — but this remains a very inductive and empiric method;
- At least, questions looking for a complex answer or a sophisticated demonstration (such as "What do you think of Picasso?" or "Consider the machine specified as follows… Will this machine ever answer 'Yes' to any question?") are forbidden;
- The interrogator can get around by describing a systematic structure built by *a priori* knowledge. This is the literary criticism example, where the interrogator tests the capacity of the (human or machinery?) poet to behave differently from a parrot, by evoking successively rhyme, metaphor and metonymy as creative knowledge about sonnet writing.

Games have to be **unproductive** (playing cannot create any goods or wealth):

- "I believe that in about fifty years' time it will be possible, to programme computers, […], to make them play the *Imitation game* so well that an *average* interrogator will not have more than 70 per cent chance of making the right identification after five minutes of questioning";
- To challenge that prophecy without breaking the rule and aiming at game productivity, Turing prospects towards what

he calls Learning Machine, which, according to him, has to be unpretentious, accepting ignorance, including random, fallibility and heuristic approaches. According to Turing, Computing Machineries have to train their skills, pushing the *Imitation game* towards *ludus* rather than *paidia* ([4], pp. 75-91 of the French edition).

Games have to be **fictitious** (players can easily access to the unreality feature of the game, compared with current life) and **free** (playing is not obligatory):

- In 1950, Turing admitted that Computing Machineries will have to wait for being able to attend an *Imitation game* managed by an educated interrogator, recognizing that the **fictitious** feature of *Imitation games* was too obvious, the real problem being more the lake of **addictive** available feature to be experienced by the players;
- The Turing *Imitation game* is clearly not funny enough: what could really encourage the interrogator to participate? What makes him continue to play the game? How to turn *Imitation games* into real entertainments for real *average* players?

2.4 A socio-technical analysis

Caillois places forms of *play* on a continuum from *ludus*, structured activities with explicit rules *(games),* to *paidia*, unstructured and spontaneous activities (playfulness), « although in human affairs the tendency is always to turn *paidia* into *ludus*, and that established rules are also subject to the pressures of *paidia*. It is this process of rule-forming and re-forming that may be used to account for the apparent instability of cultures ». Thus Paul Valery proposed as a definition of play: "L'ennui peut délier ce que l'entrain avait lié" (boredom can untie what enthusiasm had tied).

In general, the first manifestations of *paidia* have no name and could not have any, precisely because they are not part of any order, distinctive symbolism, or clearly differentiated life that would permit a vocabulary to consecrate their autonomy with a specific term. But as soon as conventions, techniques, and utensils emerge, the first games as such arise with them. At this point the pleasure experienced in solving a problem arbitrarily designed for this purpose also intervenes, so that reaching a solution has no other goal than personal satisfaction for its own sake ([27], [8]).

Turing has tried to form *ludus* rules to turn the *paidia* question "Can machines think?" into an other, "supposed to be closely related to it and expressed in relatively unambiguous words". He built up the *ludus* rules… but failed to turn his *free* and so *fictitious* game into an *addictive* enough one, providing enthusiasm and entertainment to players. Several contributions discuss that question, directly or indirectly ([5], [6], [11], [22], [15], [19], [28]).

We now understand enough the *Imitation game* theory to go forward. If an *Imitation game* can be turned into a Turing Test (with the player B omitted), why not adapt it to some different use cases, like interactive information browsing and retrieval through the Web, using some search engine?

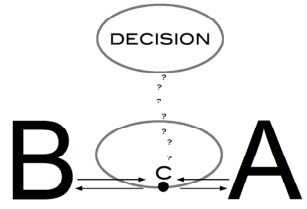

Fig.2: decision making in interactive information browsing and retrieval

The idea is to study this very common contemporary situation, that involves daily thousands of *average* users, and to describe what happens to the Turing key concepts. Turing would have dream to access such a huge panel of various practices!

3 THROUGH THE WEB

In their everyday life, thousands of people stay in front of their computer, mobile phone or tablet, to use some engine for searching information and browsing the Web. They belong to different generations, different countries, different cultures, they have different professions, but they all spend time for that, most of the time spontaneously, if not compulsively.

They enter into more or less long sessions, interacting with the search engine, and suddenly decide to get out of the session, stopping their collaboration with the Computing Machinery, that is supposed to be cooperative.

Most of the time nobody is here to investigate, checking why do the users stop collaborating at this precise moment, asking them if they are satisfied with the Machinery cooperation, elaborating some survey about what they exactly do when they communicate key-words to the searching engine or when they receive URLs lists in return to their queries.

In this section, we should like to elaborate around that phenomenon, asking some help to Turing ideas and intellectual devices, and practising by differential analysis.

3.1 Interactive information browsing

Somebody is looking for something and browses the Web, entering suddenly the interface of a given search engine. He/she put forward some keywords, just to see how the computer machinery would react to his/her provocation. The artificial system is offering back to its user an ordered list of URLs, accompanied by some surface information about the URLs content.

Now the user has a surrounded view; then, accesses to some URL and visits some associated contents; then, browses the URLs collection and chooses at a glance a new one to explore. Like in a museum, faced to an exhibition — *the screen of the machinery* —, he/she visits — *browses* — the piece of art — *the URLs contents* — of a collection. Suddenly the user C is becoming the advanced user C', mode skilled, more concerned about the current session, with more accurate concerns and projects in a better understanding situation: C' is entering some new interaction with the Machinery, C' is now different from C who he/she was. Thanks to that role he/she played when analysing the system reactions/proposals, C' has got news ideas for asking questions to the computer, choosing *better* keywords and descriptors to communicate, knowing *better* what he/she is *really* looking for.

Later on, C'' (and soon C^n) will have so much changed his/her mind that it would not be possible anymore to trace his/her initial project: because of the successive interpretation layers he/she did, but also because of the combinatorial explosion of the interpretation possibilities, mixing intuitions coming from different layers of the whole session, that still keep present to the mind of a human interpreter. The future does not rely only on the present.

At a first glance, the Machinery interrogator (C) seems to be alone in front of it, tending to personify it, like in a special kind of Turing Test (with the second player B omitted) where the player A, which tries to help the interrogator, is the cooperative Machinery

(for readability reasons we prefer to keep the letter A for the Machinery — even if it is cooperative — which normally deserves the letter B).

	Actors in presence	***Similarity with Turing approaches***
I am (C) alone in front of the Machinery A	C, A	Turing Test
I split myself into C and B~C, in front of the Machinery A	C, A, B~C	Imitation game (C'←C observes the dialogue between A and B~C)
I multiply myself in front of the Machinery A ***I evolve by building up:*** (B^n~C^n)←…←(B''~C'')←(B'~C')←(B~C)	C, A, B~C, B'~C', B''~C'',… , B^n~C^n	Vertigo of a simulacrum (The present time does not sum up the past)

Fig.3: actors' configurations within some browsing and retrieval situation

3.2 Vertigo of simulacrum

The similarity with the *Imitation game* only appears when analysing more accurately the situation: we can distinguish a third role, certainly played by the person of the interrogator C, but distinct from his/her strict interrogation role. This third role looks like the cooperative woman B one in the Imitation game, trying to support the interrogator. Let us call B~C this role, to differentiate the roles B from C, but to claim the identity of the common physical player. B~C interprets the tirades exchanged between C and B to help the up-to-date C' / C'←C (C', formerly C) to reformulate the next question of his/her interrogation session.

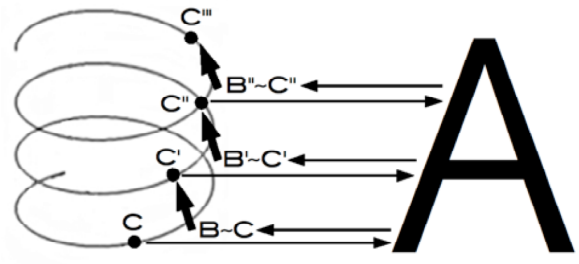

Fig.4: decision making in browsing and retrieval situation

When the Machinery A is the provocative black box, C enjoys splitting to create his/her new role B~C: C is certainly the interrogator, but he/she also learns how to become, tirades after tirades, some (B^n~C^n) such as (B^n~C^n)← …←(B''~C'')←(B'~C')←(B~C) able to better use the Machinery B. Then the dialogue is far more complex than a linear succession of tirades, where the future only depends on present times, the past having being totally absorbed by the present: the process is not at all a Markov chain, the future is a recollection of precedent states collection, not limited to the lonely present. We are faced to ***vertigo of simulacrum***, as pointed out by Caillois (page 92 of [4]).

3.3 Back to Caillois' categories

Games have to be **separate** (within constraints, fixed in advance), **fictitious** (players can easily access to the unreality feature of the game, compared with current life) and **free:**

- Because the user is changing his/her mind during the session, until meeting his/her content *search,* those interactive information browsing and retrieval use-case are not so separate from the current life, players being often unable to access to the unreality feature of the game. Their tend to play spontaneously, the Machinery being always available, and to forget the separations fixed in advance: if it could be dangerous within Serious games, this feature is however required in Virtual realities and Social games approaches;
- With the coming advent of Massive Social Networks and Life Streaming technologies and services ([20]), this tendency will probably be more and more heavy: the **separate** and **fictitious** requirements for artificial games will be more and more difficult to fulfil, addiction becoming a real risk for *average* users.

Games have to be **regulated** (submitted to some particular conventions that suspend ordinary laws):

- Remember that games have to be governed by rules, under conventions that suspend ordinary laws, and for the moment establish new legislation, which alone counts, and have to make-believe, in the meaning that they generate a special awareness of a second reality or of a free unreality, as against real life. These diverse qualities are somehow contradictory;
- As Roger Caillois wrote (turned into English by Meyer Barash): "those qualities do not prejudge the content of games. Also, the fact that the two qualities — rules and make-believe — may be related, shows that the intimate nature of the facts that they seek to define implies, perhaps requires, that the latter in their turn be subdivides. This would attempt to take account not of the qualities that are opposed to reality, but of those that are clustered in groups of games with unique, irreducible characteristics".

Games have to be **uncertain** (the process cannot be fully predictable, some inventions and initiatives being required by players) and **unproductive** (playing cannot create any goods or wealth: only property is exchanged):

- [Turing 50] put a very strong accent on Learning machines, and Turing imagines a role for the experimenters judgment, especially when he writes: "Structure of the child machine = hereditary material, Changes of the child machine = mutation, Natural selection = judgment of the experimenter. One may hope, however, that this process will be more expeditious than evolution. The survival of the fittest is a slow method for measuring advantages. The experimenter, by the exercise of intelligence, should he able to speed it up";
- But the very fact he did not succeed in designing an efficient *ludus* system made his forecast and ambition fail;
- With interactive information browsing and retrieval, back to *paidia,* the experimenter judgments can more easily be involved through machine learning processes, giving life to a real A^n ←…← A''←A'←A sequence. And of course, users being themselves involved into social communities of practice, their cooperation can amplify the machine learning complexity;
- The Learning Machine concept originally put forward by Turing becomes Persons/Machines Learning Systems, where Persons/Machines dialogues can inspire both persons and machines learning.

3.4 Analysis and perspectives

Curiously, it appears that: 1° the original Turing *Imitation game* and Test was a poor *ludus* designed for few users (Joseph Weizenbaum's friends testing ELIZA in some MIT lab in 1965?), whereas 2° the *Interactive information browsing and retrieval* activity is a great spontaneous *paidia* for many different people through the world. The temptation could be to turn back this *paidia* to some improved new-generation *ludus:* but we have learnt from Caillois how vicious is that circle. Trying to regulate the new game and organising some canonical machine learning, the risk is strong to come back to a poor *ludus* game, quickly abandoned by massive user communities.

The solution could be to use tension between *ludus* and *paidia* in the heart of our interactive systems, rather than trying to deny or reduce it. That will be the role plaid by a *Collection-centred analysis and design* concept we shall introduce in the next section of this paper. The basic idea is to consider *seriously* the activities of collecting: we claim that collectors and curators play a central archaic role in the constitution of our current usual knowledge.

4 COLLECTION-CENTRED DESIGN

Collection-centred analysis and design will be presented in this section, as an attempt to inherit from our deepest cognitive social and ancestral behaviours (human beings definitely are collectors, and collections are good places for welcoming the eternal *ludus* and *paidia* competition in the centre of our practices) towards modern ways of thinking and building our future kairos-centred AI systems, which could perfectly be characterized by recent lifestreaming attempts.

Here it is important to distinguish between figural and non-figural collections. This subtle distinction, introduced in the 1970s by Piaget and his research teams of child psychologists, brings more light to the situation. On the one hand it is certain that *non-figural* collections exist because they are completely independent of their spatial configuration. In that, they are already close to classification, of which they can only envy the formal completeness. On the other hand, there are collections we can label as *figural* because both their arrangement in space and the private properties of the collected objects determine their meaning.

4.1 Figural *vs.* non-figural collections

Because our collections seem to be nearer to order than disorder, attempting to assimilate them in classes according to predefined schemes, as in *ludus* approaches, is not so surprising: the necessary elicitation of implicit knowledge that requires class building has to do with the necessary evolution of games from *paidia* to *ludus*. At least, collections look like they are waiting for their completion within a classification order, with the aim of turning into canonical achieved structures made of objects and classes. But something is also resisting that assimilation, as artists and philosophers have always noticed.

As a matter of fact, artists and philosophers have been always fascinated by the rebellion of collections against categorical order [26], [14]. Let us mention for example Gérard Wajcman's analysis on the status of excess in collections: "Excess in a collection does not mean disorganised accumulation. There is a founding principle: for a collection to be so – even in the eyes of the collector – the number of works needs to exceed the material capacities of displaying and stocking the entire collection at home. Someone living in a studio apartment may very well have a collection: he will only need to not be able to display at least one work in his apartment. It is for this reason that the reserve is one full part of collections. Excess can also apply to memorizing abilities: for a collection to be so, the collector should be incapable of remembering all the pieces he possesses (…). In fact, he either needs to have enough pieces to reach the 'too many' and to 'forget' he had this or that one, or needs to be compelled to leave some outside his place. To put it in a nutshell, what makes a collection is that the collector should not have total power over his collection".

The process of extending a collection is potentially infinite, even if the collection is necessarily undetermined, *temporarily* finished. Practically speaking, a collection ceases to exist as something other than a commonplace correlate whenever the collector loses interest in its extension: he then stops reiterating the acquiring gesture and/or the reconstitution of the collection in an intimate dwelling comes to an end. Both acts have the same essence: in order to keep the collection in an intimate sphere, the collector re-generates the collection, working on his very logic of growth, yet unaware of it. Re-production balances the collection's heavy trends and facilitates new links among the pieces, hence setting up new similarities that will eventually influence the acquiring logic. Strangely enough, desire becomes knotted to difference. Objects enter the collection via the *being different* predicate; they only become similar later on, as being different is what they have in common, hence setting up what Jean-Claude Milner calls a *paradoxical* class.

"A private collector's scene is not his apartment but the whole world. It's important to stress that the major part of his collection in not to be found at his place, his collection is yet to come, still scattered all over the world. Any gallery or fair represents the possibility of chancing on his collection yet to come." ([26]).

Undoubtedly sensitized by those who have long considered the strange condition of collections, object-oriented software designers understood that computer modelling of collections needed the support of heterogeneous computer objects, combining private characteristics—which the objects collected are usually referred to—with characteristics that come from the activities in which these objects are collectively committed.

Curiously, the affinities between classes, collections, singularities and disorders like stack, mass, troop, jumble and other hodgepodges (the last disorders, like collections, cannot exist without a common significant space) have now changed their polarities: classes are definitely different from organizational spatial-based regimes like collections and other "disorders", which now appear to only differ from some degree.

More accurately Jean Piaget and Bärbel Inhelder [13] propose to distinguish *figural* collections from *non-figural* ones. They begin by recalling that a class requires only two categories of relations to be constituted:

- Common qualities to its members and to those of its class, and specific differences that distinguish its own members from other classes ones (comprehension);
- Relations part-whole (belongings and inclusions) determined by "all", "some" and "no one" quantifiers, applied to members of the considered class and to members of classes whose it belongs, qualified as extensions of the class.

For example, cats share in common several qualities owned by all the cats, some of them being specific and some others belonging

also to other animals. But no consideration about space never enter into such a definition: cats may be grouped or not in the space without any change concerning their class definition and properties.

Piaget then defines *figural collections* through the introduction of meaning linked to spatial or/and temporal disposal: a figural collection is a figure because of the spatial links between its elements, when non-figural collections and classes are figure-independent. Organizing knowledge has then to do with the setting of an exhibition, moving to the *paidia* side because forgetting formal, non-figural criteria.

4.2 Similarity *vs.* contiguity parsimony

The current models for information search too often assume that the function and variables defining the categorization are known in advance. In practice, however, when searching for information, experimentation plays a good part in the activity, not due to technological limits, but because the searcher does not know all the parameters of the class he wants to create. He has got special hints, but these evolve as he sees the results of his search. The procedure is dynamic, but not totally random, and this is where the collection metaphor is interesting.

Placing objects in metastable space/time always carries out the collector's experimentation. Here, the intension of the future category has an extensive figure in space/time. And this system of extension (the figure) gives as many ideas as it produces constraints. What is remarkable is that when we collect something, we always have the choice between two systems of constraints, irreducible one to the other. This artificial tension for similarity/contiguity is the only possible kind of freedom allowing us to categorize by experimentation.

This consideration shows the necessity in the design of intelligent applications to take spatial, temporal and spontaneous organization into account, having in mind the ideas brought by collections and exhibitions. As the 'natural' tendency, according to Caillois, consists in moving to formal approaches, we should insist on spatiotemporal approaches at the very beginning of application design.

5 LIFESTREAMING TENDENCIES

The collector attitude is made of *kairos [29],* in the ancient Greek meaning of opportunity, conciliating both available concurrent but irreducible approaches, similarity *vs.* contiguity, meta-playing both with *ludus* and *paidia*. This could be part of the abstract truth of games, as explored by A. Turing within his famous *Imitation game*.

At a crucial moment where service providers tend to offer us social networks timelines/aggregators and general lifestreaming tools for recollecting our whole social and personal lives[2], it is important to renew our frameworks for better innovative capacities.

[2] See for example:
- http://www.youtube.com/watch?v=mg_QZosJMGA, http://www.faveous.com/,
- http://lifestream.glifestream.aim.com/,
- http://itunes.apple.com/fr/app/life-stream-hub-reseaux-sociaux/id432768222?mt=12,
- http://www.youtube.com/watch?v=rA6czHYejWM,
- http://www.youtube.com/watch?v=px9k4hX0oLY,
- http://www.youtube.com/watch?v=oCvB3blWn1E

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