

GENERAL KNOWLEDGE MACHINE PROJECT

INTELLECT MODELING KIT

AUTHOR'S GUIDE

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It is strongly recommended to take a look at General Knowledge Machine Research Group Web site <http://gkm-ekp.sf.net>.

INTELLECT MODELING KIT

IMK is a system for assisting intellectual activity during the following steps:

1. Observation - getting data and information

The component **gkmforms.exe** creates specialized site accessible with Web browser for interaction with user

2. Producing propositions, based on the knowledge

The component **gkm2017b.exe** produces propositions based on user input and internal e-knowledge

3. Selection and verification of the most appropriate propositions

The specialized site for interaction with user created by component **gkmforms.exe** produces ranged propositions list with detailed explanations

4. Memorizing - converting data to information and new knowledge item creation

The component **soz2017b.exe** creates e-knowledge database containing human knowledge that could be used on step 1

5. Abstraction finding – building artificial objects representing group of real objects, featuring typical signs of group

The component **abs2017b.exe** performs tasks as **Data Mining, Big Data** and **Natural Cluster Analysis** to find groups of similar objects and regularities they are based on

IMK was developed as an alternative to traditional Artificial Intelligence. The goal is to assist human intellect on every step of its activity, accept human knowledge and develop new knowledge together with people. The activity of IMK could be verified by human expert on every stage.

IMK includes the following objects:

- **v2017b.zip** – sources of components **soz2017b.f, gkm2017b.f, abs2017b.f, gkmforms.bas, gkminter.php**, settings, **ini** and **dat** files, binaries for Windows and Linux, pictures and icons.
- **renais.zip** – sources for **ELECTRONIC KNOWLEDGE SYSTEM ON RENAISSANCE PAINTING**
- **gestures.zip** – sources for **ELECTRONIC KNOWLEDGE SYSTEM ON LANGUAGE OF GESTURES**
- **avitamin.zip** – sources for **ELECTRONIC KNOWLEDGE SYSTEM ON AVITAMINOSIS**
- **gfortran4.zip** – portable compiler of GNU Fortran v4.7 for Windows with IMK sources in **bin** directory
- **freebas.zip** – portable compiler of Free Basic v1.04 for Windows with IMK sources
- **geany.zip** – portable IDE for Windows for Fortran, Basic and PHP
- **kmeleon.zip** – portable browser for Windows K-Meleon
- **xampp.zip** – portable environment for Windows supporting Apache Web Server and PHP, including ready-to-use **ELECTRONIC KNOWLEDGE SYSTEM ON TOXICOLOGY, ELECTRONIC KNOWLEDGE SYSTEM ON RENAISSANCE PAINTING, ELECTRONIC KNOWLEDGE SYSTEM ON LANGUAGE OF GESTURES, ELECTRONIC KNOWLEDGE SYSTEM ON AVITAMINOSIS**

The realization of IMK is based on idea of member of USSR Academy of Science M. N. Livanov that the essence of memory associations is a spatial-temporal coherence of narrow-band periodical oscillations of central neurons sets activity.

Upon information input the list of propositions based on etalons supplied ranged by value.

Proposition Value Index PVI for etalon = ((etalon refs signs weights sum)/(object signs number)+ (etalon refs signs number)/(etalon signs number))/2. Element of etalon description weight = 1/(number of etalons with this element/sign).

The system assisting human expert's activity should comply with the following requirements described by Arthur Conan Doyle in Sherlock Holmes stories.

We would call it a knowledge machine.

Step 1 - Observation

1. A knowledge machine should have maximum possible information about a case before a judgment.

Step 2 - Producing propositions, based on knowledge

2. A knowledge machine should possess maximum possible knowledge in a sphere of implementation.
3. A knowledge machine should possess no excessive knowledge, should have nothing but the tools which may help in doing work.
4. Getting indication of the course of events, a knowledge machine should be able to guide itself by other similar cases which occur to its memory.
5. A knowledge machine should have an ability to take into account not only descriptions of situations in its memory but results as well, providing a possibility to reconstruct a description from a result, i.e. if you told it a result, it would be able to evolve what the steps were which led up to that result.
6. Possessing information about the great number of cases, a knowledge machine should have an ability to find a strong family resemblance about them, i.e. to find templates of typical cases.
7. A knowledge machine should have an ability to explain the grounds of its conclusion.
8. A knowledge machine should arrive at the conclusion for a few seconds after getting a description of case.
9. A knowledge machine should focus on the most unusual in descriptions of situations.

Step 3 - Elimination of impossible propositions

10. A knowledge machine should have an ability to point out all impossible propositions.

Step 4 - Selection and verification of the most appropriate propositions

11. A knowledge machine should estimate a level of a confidence of its propositions.

The technologies of AI as expert systems and neural networks don't comply with these requirements. And it is a reason why human-AI interaction is complicated at the time. People hardly can trust AI propositions.

Expert system is based on the idea of decision tree, when, with every answer to a program's question, a direction of moving through a tree changes until a final leaf (decision) will be reached.

- So not all possible questions will be asked, and not maximum information will be received.
- The key elements are decision rules, but no knowledge itself. Not a word about the thousands of other similar cases, about typical cases.
- As we see, expert systems originally were designed to be deduction machines. But it is not very reliable to entrust to machine deciding what is absolutely impossible. We think that more fruitful approach is to show what reasons to consider some hypotheses as impossible. And only man should make the final decision.

Neural network is based, as we know, on the idea of teaching of set of elements (neurons), controlling conductivity between them.

- A neural network cannot explain reasons of own conclusion in terms that people can understand. So it is very hard to verify its activity and, therefore, to believe.

An expert system is an example of a 'top-down' approach when particular instances of intelligent behavior selected and an attempt to design machines that can replicate that behavior was made. A neural network is an example of 'bottom-up' approach when there is an attempt to study the

biological mechanisms that underlie human intelligence and to build machines, which work on similar principles.

IMK technology complies with all 11 requirements and unites 'top-down' and 'bottom-up' approaches. Any human knowledge written and spoken can be uploaded to IMK in a straight way by any expert not familiar with software coding. The IMK components are designed to create ready-to-use software application using simple text files edited by people. IMK assists intellectual activity, but does not replace people.

Building IMK application

It is needed to prepare knowledge to be processed in a special human-like way.

Step I

You should name the project usually using up to 8 symbols suitable for file name (for example, Renaissance Painting System may be named **renais**). Create a directory where system will reside, for example, **d:\renais**. Copy there the development software **soz2017b.exe**.

Preliminarily, it is needed to remove from initial text all excessive information, keeping titles, exact descriptions of situations and recommendations. Please try to concentrate on ideas rather than on words. We propose to define 'idea' as a standard text directly defining a specific side of a situation. You should control appearance of synonymous ideas, carefully removing duplications. Resulting text, which may be used as example, in a case of painting information, is the following.

1. Hieronimus Bosch (Van Aken), 1450-1516, Netherlands

```
-----
Artist is pessimist
Artist saw not enough God presence in man
Picture is in tradition of illuminators
Painter is wholly medieval
Fish, pigs, all kind of animals assume human-like forms
Great number of small figures
Allegories with a moral purpose
Savage irony, which gives a piquancy
Scene look like a puppet play
Facial expressions are childishly naive
Artist was incapable of dramatic effects
Stressing everywhere the conflict between good and evil
A picture presents itself as a sequence in time
Lightness of touch
Airy freedom
Exquisitely lovely figures dad in the most delicate of colors
Color-light synthesis
Tonal unity of the composition as a whole
Deep religious sensibility
Exceptionally fertile imagination
```

...

and so on.

Every idea in a description of situation we call a sign. In principle, any sign can have a grade, for example, if a sign is '**Weight**' it may have grades '**1-Very low, 2-Low, 3-Mean, 4-High, 5-Very high**'. But in existing human texts all signs have as a rule only one grade. It is very rare need to use sign with several grades.

Step II

You should gather all signs from all descriptions of situations, eliminate duplicates, and number them pointing number of possible grades. You should make a file called, for example, **renais.sgn** of the following type.

```
1. Artist is pessimist (Sign's title up to 64 symbols )
1, (Number of sign's grades)
...
4. Painter is wholly medieval
1,
...
```

and so on.

Step III

You should make a file called, for example, **renais.stn**, containing numbered titles of possible situations with numbers of corresponding signs and grades, where zero means end of list. If sign's grade is 1 than you may just place one more comma. It should look like the following.

```
1. Hieronimus Bosch (Van Aken), 1450-1516, Netherlands
1,,2,,3,,4,,5,,6,,7,,8,,9,,10,,11,,12,,13,,14,,15,,16,,17,,18,,19,,115,,
0,,
2. Hieronimus Bosch, after 1500, Netherlands
20,,21,,22,,23,,24,,25,,26,,
0,,
3. Drawing by Hieronimus Bosch, 1450-1516, Netherlands
27,,28,,29,,30,,31,,
0,,
...
```

and so on.

Step IV

You should make a file containing a questionnaire for a convenient description of a problem. In this questionnaire you should group questions regardless of its numbers. It is allowed to include additional explanations, if needed. Format of chapter's title is '**== Title**', format of sign's number is '**NNNN~**' (for example ' **11~** ') and format of sign's grade is '**NN~**'. You should make a file called, for this example, **renais.que** of the following type.

```
== INDEPENDENT VERIFICATION PROJECT - CONSULTING POINT ON PAINTING
General Knowledge Machine Research Group
(c) Copyright Konstantin M. Golubev 2017. All rights reserved.
Web site: http://gkm-ekp.sf.net, email: gkm-ekp@users.sf.net
<em>Ideas source: Renaissance painting from Breughel to El Greco,
Text by Lionello Venturi, Translated by Stuart Gilbert,
(c) 1979 by Editions d'Art Albert Skira S.A., Geneva, ISBN 0 333 26644 7
</em>
<hr>
DISCLAIMER WARNING!
This kind of system is intended to assist in paintings evaluation.
It shouldn't in no way replace qualified expert!
== PICTURE'S GENRE =====
3~Picture is in tradition of illuminators
7~Allegories with a moral purpose
55~Painting nature and daily life without celestial or diabolic
interventions
```

230~Landscape, ingeniously diversified with genre scenes
...

and so on.

Step V

You should make a file containing all propositions regarding identified situations. You should call it **renais.prp** and it should look like the following.

The first line of proposition is a title of situation from file **renais.stn** preceding by '~' sign. After this proposition text goes. Please note that for Internet version of e-knowledge system you may include any HTML tags into proposition text (references to pictures, multimedia, URL and so on).

```
~ 1. Hieronimus Bosch (Van Aken), 1450-1516, Netherlands
-----
Artist is pessimist
Artist saw not enough God presence in man
Picture is in tradition of illuminators
Painter is wholly medieval
Fish, pigs, all kind of animals assume human-like forms
Great number of small figures
Allegories with a moral purpose
Savage irony, which gives a piquancy
Scene look like a puppet play
Facial expressions are childishly naive
Artist was incapable of dramatic effects
Stressing everywhere the conflict between good and evil
A picture presents itself as a sequence in time
Lightness of touch
Airy freedom
Exquisitely lovely figures dad in the most delicate of colors
Color-light synthesis
Tonal unity of the composition as a whole
Deep religious sensibility
Exceptionally fertile imagination
THE FOLLOWING IS DETAIL OF PICTURE "THE HAY WAGON", PRADO, MADRID
<IMG src="bosch.jpg">
...
and so on.
```

Step VI

You should make a file called **soz2017b.ini** of the following format:

```
Title of e-knowledge system
Signs descriptions file name (.sgn)
Situations descriptions file name (.stn)
Propositions file name (.prp)
```

For example, in our system:

```
Elect Electronic Knowledge System on Renaissance Painting
renais.sgn
renais.stn
renais.prp
```

Please run command interpreter. Change directory to that appointed for development. All previously created files must be placed in this directory. After that run the program

soz2017b.exe. On completion view the file **proto.soz**. If it does not contain errors messages than initial e-knowledge base creation (files ***.gkm**) was successful. If there are errors please edit your files.

Initial sources have limitations: up to 2,000 possible signs, up to 8,000 possible situations (etalons), up to 100 signs in problem description, up to 100 signs in situation (etalon) description, up to 1,000 size of e-knowledge base element. It is sufficient to build very large e-knowledge system. But if it is necessary to build greater system, you should edit file **all2017b.set** and recompile sources.

Ready-to-use application development by component gkmforms.exe

Please run command interpreter. Change directory to that appointed for development. All previously created files must be placed in this directory. After that run the program **gkmforms.exe**.

Answer the name of project to question **Title**, for example, **renais**.

On completion view the file **index.php** that's a homepage for application like the following.

```
<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 4 //EN">
<html>
<head>
<META NAME = "description" CONTENT = "INDEPENDENT VERIFICATION PROJECT - CONSULTING
POINT ON PAINTING">
<META NAME = "author" CONTENT = "Member of the GKM Research Group, http://gkm-
ekp.sf.net">
<META NAME = "keywords" CONTENT = "General Knowledge Machine, Online, Electronic
Knowledge Publishing, Intelligent Web Site, Intellect Modeling Kit, GKM Research
Group, Electronic Knowledge System">
<META HTTP-EQUIV="content-type" CONTENT="text/html; charset=windows-1252">
<title>INDEPENDENT VERIFICATION PROJECT - CONSULTING POINT ON PAINTING</title>
</head>
<body bgcolor="#383853" link="#0000FF" VLINK="#0000ff" ALINK="#0000ff">
<a Name=YK><FORM ACTION="gkminter.php" METHOD=POST target='gkminterhtml' NAME=gkmzf
onSubmit='return ANSWER();'>
<table bgcolor="#FFFFFF" border=3 bordercolordark="#000001" cellpadding=1
cellspacing=0>
<TR><TD align=left></a><STRONG>E-KNOWLEDGE SYSTEM</STRONG></TD><TD align=right>Powered
by General Knowledge Machine<A HREF=http://gkm-ekp.sf.net><IMG SRC=gkmllogo.gif
ALT='GKM Research Group Home' HSPACE=11 WIDTH=100 HEIGHT=53 ALIGN=TOP
BORDER=0></A><IMG SRC=wgbhuser.gif ALT='Web Access Symbol (for people with
disabilities)' ALIGN=TOP BORDER=0></TD>
</TR><TR><TD><IMG SRC=Holmes.jpg alt='Mr Sherlock Holmes' align=left
border=1></TD><TD>
<EM><b>Disclaimer warning! This system is not a replacement of qualified
expert.<br>Authors should not be liable for any results of its implementation.<br>In
every specific case only authorized person should make decisions.</b></em><hr><br>
<B>INDEPENDENT VERIFICATION PROJECT - CONSULTING POINT ON PAINTING</B><br>
<br><INPUT NAME=Y1 TYPE=TEXT VALUE='Input here non-standard info like name, title ...'
SIZE=54><br><br>
<b>Please check all signs describing problem among listed below and press
(Advise).<br>Don't block pop-up window containing advice!&nbsp;Press (Clear) to reset
before next try.&nbsp;</b><br>
<br>Set higher Max. Prop. Num. if you need more results. &nbsp;</b><br>
<BR><SELECT NAME="SPISOK" SIZE="1" OnChange="SPISOKY()" LANGUAGE="JAVASCRIPT">
<OPTION VALUE=1> INDEX OF CONTENTS
<OPTION VALUE=2>INDEPENDENT VERIFICATION PROJECT - CONSULTING POINT ON PAINTING
```

```
<OPTION VALUE=3>PICTURE'S GENRE
<OPTION VALUE=4>PORTRAITS
<OPTION VALUE=5>HUMAN FIGURES
<OPTION VALUE=6>FIGURES
<OPTION VALUE=7>COLORS
<OPTION VALUE=8>LIGHT
...
```

On completion the files **renaisnnn.html** and **index.php** appear containing knowledge texts. For example:

```
renais.html renais1.html ... renais31.html gkminter.php index.php
```

You should create directory for application in **htdocs** directory of Apache Web server like **d:\xampp\htdocs\renais**. After that copy to it files *.gkm, *.html, *.php, *.pdf, **gkm2017b.exe**, **gkm2017b.ini**, and files from **images** directory. The address is <http://localhost:8000/renais>. The following is files list of **ELECTRONIC KNOWLEDGE SYSTEM ON RENAISSANCE PAINTING (renais)**.

```
d:\xampp\htdocs\renais
```

```
boe.gkm db.gkm db2.gkm renais.html renais1.html... renais31.html gkm-n gkm2017b.exe
gkm2017b.ini gkmhelp.pdf gkminter.php gkmlogo.gif Holmes.jpg ie.gkm index.php ip.gkm
oe.gkm seboe.gkm sip.gkm soe.gkm we.gkm wgbhuser.gif
```

Ready-to-use applications provided

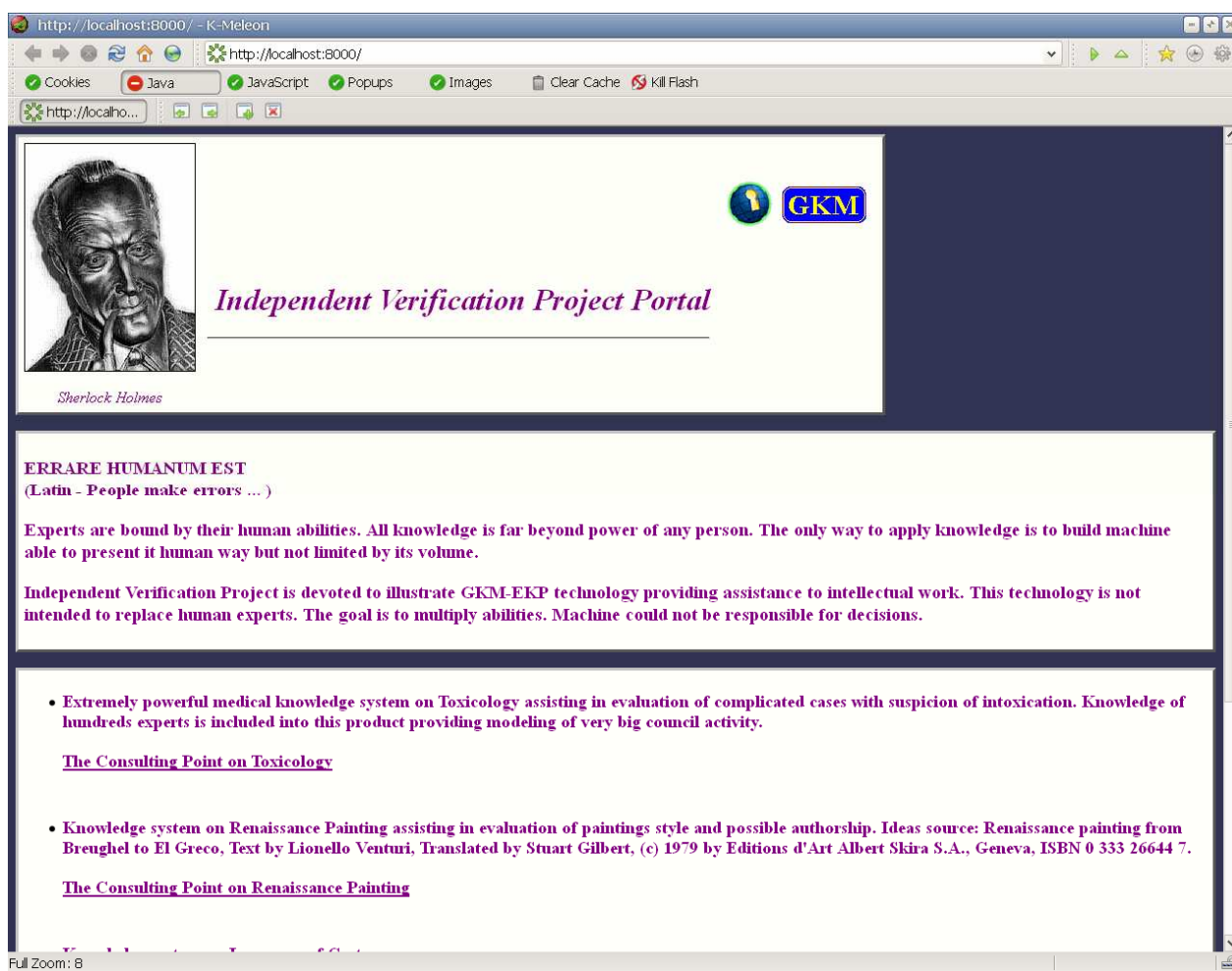
IMK includes the following application ready-to-use.




- **ELECTRONIC KNOWLEDGE SYSTEM ON TOXICOLOGY (emergmed)**
- **ELECTRONIC KNOWLEDGE SYSTEM ON RENAISSANCE PAINTING (renais)**
- **ELECTRONIC KNOWLEDGE SYSTEM ON LANGUAGE OF GESTURES (gestures)**
- **ELECTRONIC KNOWLEDGE SYSTEM ON AVITAMINOSIS (avitamin)**

They are located in the **htdocs** directory of **xampp** – portable environment for Windows supporting Apache Web server and PHP.

To install applications file **xampp.zip** should be unzipped into the root directory of partition, for example **d:\xampp**. The applications should be located in the following subdirectories of **d:\xampp\htdocs** - **d:\xampp\htdocs\emergmed**, **d:\xampp\htdocs\renais**, **d:\xampp\htdocs\gestures** and **d:\xampp\htdocs\avitamin**. Start Apache Web Server with command **d:\xampp\apache_start.bat**. A text window appears notifying about server start. Server shutdown is by closing a window.

The browser **K-Meleon** could be used for accessing applications. To install browser file **kmeleon.zip** should be unzipped into suitable directory, for example, **d:\K-MeleonPortable**. Start browser with command **d:\K-MeleonPortable\K-MeleonPortable.exe**. The initial page pointing to presented applications appears, for example, **http://localhost:8000**.



E-KNOWLEDGE SYSTEM	Powered by General Knowledge Machine  
	<p><i>Disclaimer warning! This system is not a replacement of qualified expert. Authors should not be liable for any results of its implementation. In every specific case only authorized person should make decisions.</i></p> <p>INDEPENDENT VERIFICATION PROJECT - CONSULTING POINT ON PAINTING</p> <p>Input here non-standard info like name, title ... <input type="text"/></p> <p>Please check all signs describing problem among listed below and press (Advise). Don't block pop-up window containing advice! Press (Clear) to reset before next try.</p> <p>Set higher Max. Prop. Num. if you need more results.</p> <p>INDEX OF CONTENTS <input type="text" value="v"/></p> <p><input type="button" value="Advise"/> <input type="button" value="Clear"/> Sources Help</p> <p>Hints: Press Ctrl/F to search. Alt/S (IE) to submit. Values: Max. Prop. Num.: <input type="text" value="5"/> Max. Deviation: <input type="text" value="0"/></p>
	<p><u>INDEPENDENT VERIFICATION PROJECT - CONSULTING POINT ON PAINTING</u></p> <p>General Knowledge Machine Research Group (c) Copyright Konstantin M. Golubev 2017. All rights reserved. Web site: http://gkm-ekp.sf.net, email: gkm-ekp@users.sf.net Ideas source: Renaissance painting from Breughel to El Greco, Text by Lionello Venturi, Translated by Stuart Gilbert, (c) 1979 by Editions d'Art Albert Skira S.A., Geneva, ISBN 0 333 26644 7</p> <p>DISCLAIMER WARNING! This kind of system is intended to assist in paintings evaluation. It shouldn't in no way replace qualified expert!</p> <p>Index</p>
	<p><u>PICTURE'S GENRE</u></p> <p><input type="checkbox"/> 3. Picture is in tradition of illuminators</p> <p><input type="checkbox"/> 7. Allegories with a moral purpose</p> <p><input type="checkbox"/> 55. Painting nature and daily life without celestial or diabolic</p>

GKM Electronic Knowledge System on Renaissance Painting v

Description of the problem
 Input here non-standard info like name, title ...
 106. Figures are not isolated, participated in world around them
 152. The figures seeming like so many flashes of light
 268. Figures aspiring spirits freed from bodies

THE BEST PROPOSITIONS
 Parameters : grades deviation = 0%, min. index. = 1%, max. prop. num. = 5

Index	Proposition	(Total 3 of 31 (10. %))
19 %	30. El Greco (Domenikos Theotokopoulos), 1541-1614, Italy, Spain	
19 %	10. Titian, 1477/87-1576, Venetia	
18 %	15. Tintoretto (Jacopo Robusti), 1518-1594, Venetia	

30 =

According to presence of the signs:
 268. Figures aspiring spirits freed from bodies
Proposition 1
 30. El Greco (Domenikos Theotokopoulos), 1541-1614, Italy, Spain

 Mannerist
 Elongation of proportions
 Anti-classical composition
 Action is ruled out and stress laid on the psychological
 content of the scene
 Colors play a leading part, clashing or harmonizing
 Colors stepped up to such intensity as to replace light
 Forms derived from abstract prototype
 Composition within a frame of reference
 Innate mysticism
 Spiritual aspiration
 Figures are sublimated into wraiths of light
 Rendering of space is reduced to symbolic indications of its
 existence
 A gust of emotions sweeps through figures, restlessness
 A gust of emotions is not co-ordinated in movement, still
 less in action
 Volumes of bodies are not suppressed
 Physical aspects are wholly subordinated to the spiritual
 content

Natural Cluster Analysis by component abs2017b.exe

Have you ever tried to understand is there any sense in a significant amount of data? Did you use heavy mathematics to classify objects? Was it easy and convenient? Have you been satisfied with results?

Amazingly, but human experts can do such a job without any mathematics. We call such persons experienced. They know not only facts but can explain relations between facts, set general cases and rules for their treatment.

Can we develop mathematics to simulate this?

Let us try to solve the following problem with theoretical mathematics. We have 1000 cases with every case described by subset of parameters from a whole set of parameters with total number 1000. We want to find typical cases dividing all number of cases into groups of similar ones.

How we can do this?

We can place all cases into the database and try to query database with all possible subsets of parameters. This way we hope to find typical combinations of parameters and corresponding groups of cases.

What computing power we will need?

The most powerful supercomputer in the world of 2016 Tianhe-2 (54 PFLOPS) has the power of $6 \cdot 10^{16}$ FLOPS (Floating point operations per second). It is equal approximately to 2^{50} FLOPS. Assume that we can do one query per one FLOP. In reality it takes much more. Total number of queries should be 2^{1000} . The time needed is $(2^{1000})/(2^{50}) = 2^{950}$, i.e. 10^{300} seconds. This number is really greater than number of seconds in universe existence, i.e. $4.32 \cdot 10^{17}$.

But could we simulate human tactics?

The brain contains near 100 billion neurons, every one of them is a computer. They are working together in an organized way and it is impossible at the moment to build such a complex structure.

Is situation hopeless?

The brain is multi-floor building and what we know about intellect is higher floor expressed by words. Fortunately, number of verbal concepts and ideas used by people are limited and can be replicated by our computers.

How?

If we could model intellectual activity based on verbal ideas, then we would have a chance to simulate human experience.

The central point of this is ability of human brain to find similar objects descriptions inside memory. The brain can do it almost instantly.

The IMK technology may be used to simulate this activity. With this technology it is possible to model expert evaluation of situation based on human knowledge doing grouping/categorization. Every object from set should belong to at least one group. And all objects in group should be similar.

We can start the following procedure. With General Knowledge Machine we try to find for every object sets of similar objects in a chosen range of similarity limits and compute signs typical for thus found groups with a given frequency of occurrence. After that we build groups of objects containing all or almost all found signs. This way we have number of compound iterations equal to a number of initial objects. And the time needed is moderate, usually hours.

It is possible that not all groups can be found this way but many of them could. And we have a possibility to set some signs as obligatory that provides very convenient thing. For example, we can set as obligatory signs treatment and result for a number of patients. And then we could see groups of typical patients having predefined treatment and result.

You should make a file called **abs2017b.ini** of the following format:

```
Title of e-knowledge system
Grades Dispersion Limit (%) [Start, Finish, Step]
(PVI) Similarity Limit [Start, Finish, Step]
(% Of Etalons) Regularity Signs Selection Limit (%) [Start, Finish, Step]
(Att. Ind. % of Signs) Group Selection Limit [Number]
(% of Objects in Group) Typical Signs Limit [Number]
```

Group Objects Number Lower Limit (%) [Number]
 Obligatory Signs. Up to 10 [Number]

For example, in our system:

```
Renaiss
0,0,0,
1,98,1,
1,98,1,
80,
85,
5,
0
```

Please run command interpreter. Change directory to that appointed for development. All previously created files must be placed in this directory. After that run the program **abs2017b.exe**.

Answer the name of project to question **Title**, for example, **renais**. Input values into appropriate fields.

On completion view the file **proto.abs**.

You can look at variant of **proto.abs** in sources for **Painting**.

```
Intellect Modeling Kit v.2017beta regularities finding
Copyright (C) 1987-2017 Konstantin M. Golubev
Web site http://gkm-ekp.sf.net, Email gkm-ekp@users.sf.net
Distributed under Lesser GNU General Public License
Snum: 2000 Enum: 8000 Emax:100 Imax:100 Base: 1000 Sn: 80 En: 80
```

Renaiss

Regularities Finding

```
***** Signs Probabilities *****
Total Number of Etalons          31
3. %      1)1. Artist is pessimist
3. %      2)2. Artist saw not enough God presence in man
3. %      3)3. Picture is in tradition of illuminators
3. %      4)4. Painter is wholly medieval
```

...

```
**** Regularity derived from the object:
18.18. Giacomo Pontormo (Carrucci), 1494-1556/57, Tuscany, Italy
```

```
204 - 1)204. Mannerist
226 - 1)226. Elongation of proportions
231 - 1)231. Anti-classical composition
```

Group members

```
23.23. Niccolo dell'Abbate, 1509-1571, Modena, Italy
30.30. El Greco (Domenikos Theotokopulos), 1541-1614, Italy, Spain
Total      2 of 31 ( 6.45 +- 8.65 % )
```

```
**** Regularity derived from the object:
18.18. Giacomo Pontormo (Carrucci), 1494-1556/57, Tuscany, Italy
```

```
204 - 1)204. Mannerist
226 - 1)226. Elongation of proportions
```

Group members

```
22.22. Francesco Parmigianino (Mazzda), 1503-1540, Parma, Italy
23.23. Niccolo dell'Abbate, 1509-1571, Modena, Italy
```

30.30. El Greco (Domenikos Theotokopulos), 1541-1614, Italy, Spain
 Total 3 of 31 (9.68 +- 10.41 %)

**** Regularity derived from the object:

19.19. Rosso Fiorentino (Giovanni Battista), 1495-1540, Florence

204 - 1)204. Mannerist

Group members

18.18. Jacomo Pontormo (Carrucci), 1494-1556/57, Tuscany, Italy
 19.19. Rosso Fiorentino (Giovanni Battista), 1495-1540, Florence
 20.20. Domenico Beccafumi, 1486-1551, Montaperti, Italy
 21.21. Agnolo Bronzino (di Cosimo), 1503-1572, Florence, Italy
 22.22. Francesco Parmigianino (Mazzda), 1503-1540, Parma, Italy
 23.23. Niccolo dell'Abbate, 1509-1571, Modena, Italy
 28.28. Bartholomeus Spranger, 1546-1611, Netherlands
 29.29. Pieter Aertsen, 1508-1575, Netherlands
 30.30. El Greco (Domenikos Theotokopulos), 1541-1614, Italy, Spain
 Total 9 of 31 (29.03 +- 15.98 %)

**** Regularity derived from the object:

15.15. Tintoretto (Jacopo Robusti), 1518-1594, Venetia

115 - 1)115. Exceptionally fertile imagination

Group members

1. 1. Hieronimus Bosch (Van Aken), 1450-1516, Netherlands
 15.15. Tintoretto (Jacopo Robusti), 1518-1594, Venetia
 19.19. Rosso Fiorentino (Giovanni Battista), 1495-1540, Florence
 Total 3 of 31 (9.68 +- 10.41 %)

**** Regularity derived from the object:

4. 4. Quentin Massys, 1466-1530, Netherlands

39 - 1)39. Total serenity

40 - 1)40. Depicting man and nature with loving care in details

41 - 1)41. Color are conditioned by the images, not autonomous

Group members

4. 4. Quentin Massys, 1466-1530, Netherlands
 5. 5. Eyckian tradition, Netherlands
 Total 2 of 31 (6.45 +- 8.65 %)

**** Regularity derived from the object:

7. 7. Pieter Brueghel, 1525/30-1569, Netherlands

13 - 1)13. A picture presents itself as a sequence in time

Group members

1. 1. Hieronimus Bosch (Van Aken), 1450-1516, Netherlands
 7. 7. Pieter Brueghel, 1525/30-1569, Netherlands
 Total 2 of 31 (6.45 +- 8.65 %)

**** Regularity derived from the object:

24.24. Francois Clouet, before 1522-1572, France

233 - 1)233. Attention to details

Group members

24.24. Francois Clouet, before 1522-1572, France
 27.27. Antonio Moro, 1519-1576, Netherlands
 Total 2 of 31 (6.45 +- 8.65 %)

***** GROUPS FOUND *****

Software compilation

IMK supplied with sources and binaries for Windows and Linux. Portable Windows GNU

Fortran **gfortran4.zip** and Free Basic compilers **freebas.zip** are included. Universal Windows IDE **GEANY** is included in **geany.zip**.

In order to compile for your system e-knowledge base engine provide that GNU compiler is on your system (visit <http://www.gnu.org>). Unzip, for example, GNU Fortran compiler to directory **d:\gfortran4**, Free Basic compiler to directory **d:\FreeBASIC-1.04.0-win32**.

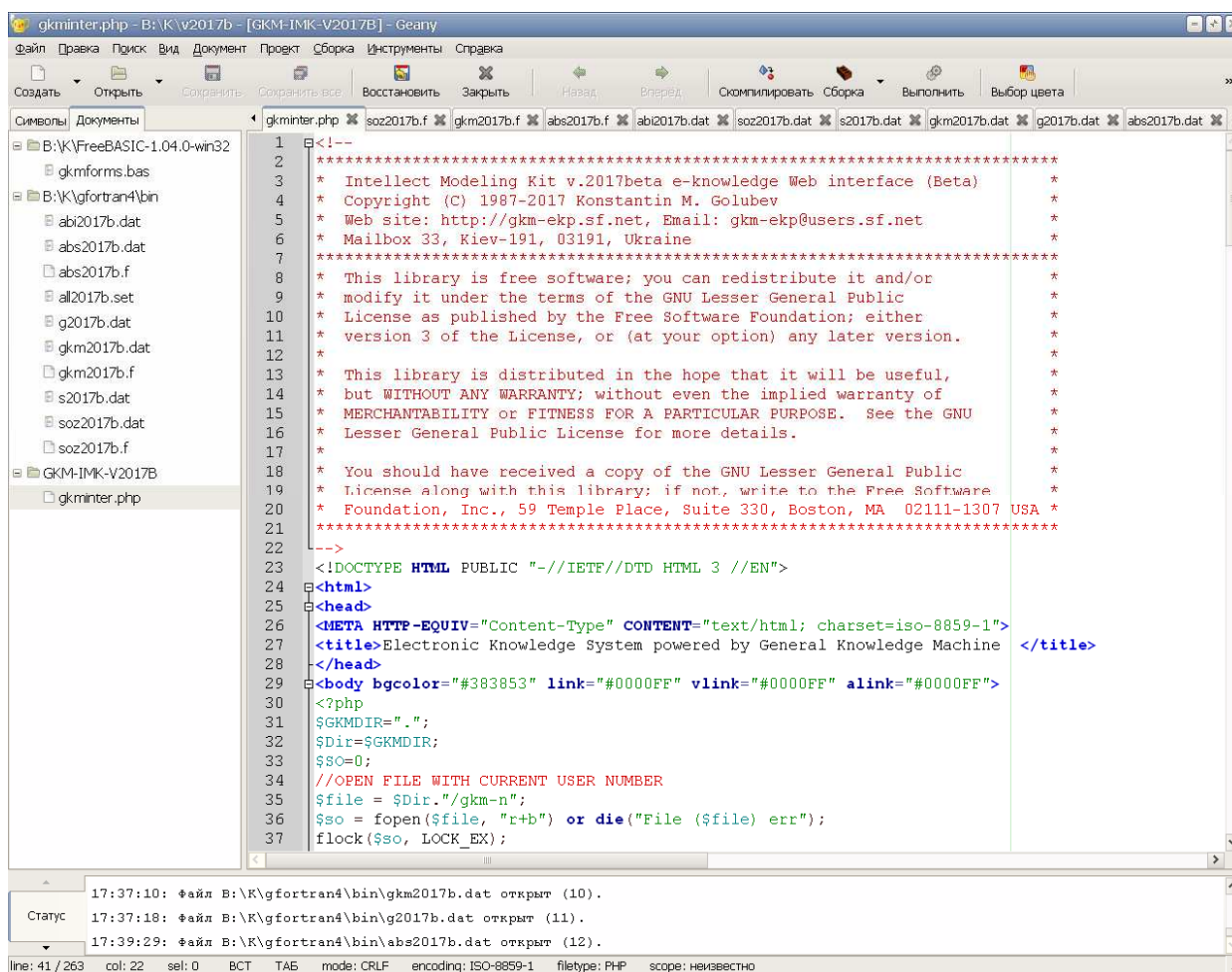
Unzip Fortran sources ***.f**, ***.dat**, ***.set** to selected directory with compiler binary like **d:\gfortran4\bin**. Change directory to chosen one. Issue commands:

```
gfortran soz2017b.f -o soz2017b.exe
gfortran gkm2017b.f -o gkm2017b.exe
gfortran abs2017b.f -o abs2017b.exe
```

Unzip Free Basic sources ***.bas** to selected directory with compiler binary like **d:\FreeBASIC-1.04.0-win32**. Change directory to chosen one. Issue command:

```
fbc -w all gkmforms.bas
```

The following is example of **GEANY** settings.



Свойства проекта

Проект Отступы Редактор Файлы Сборка

#	Метка	Команда	Рабочий каталог	Сбросить
Команды для языка: F77				
1.	Скомпилировать	B:\K\gfortran4\bin\gfortran --static -Wall -c "%f"	B:\K\gfortran4\bin\	
2.	Сборка	B:\K\gfortran4\bin\gfortran --static -Wall -o "%e" "%f"	B:\K\gfortran4\bin\	
3.				
Регулярное выражение, являющееся признаком ошибки:				
Независимые команды				
1.	Собрать			
2.	Собрать заданную цель...			
3.	Собрать объектный файл			
4.				
Регулярное выражение, являющееся признаком ошибки:				
<i>Примечание: для команды 2 будет открыт диалог, позволяющий ввести дополнительные параметры.</i>				
Выполнить команды				
1.	Выполнить	"./%e"		
2.				
<i>Шаблоны для подстановки в команду и рабочий каталог: %d, %e, %f, %p и %i, смотрите руководство для более детальной информации.</i>				
				Отменить ОК

Свойства проекта

Проект Отступы Редактор Файлы Сборка

#	Метка	Команда	Рабочий каталог	Сбросить
Команды для языка: FreeBasic				
1.	Скомпилировать	b:\K\FreeBASIC-1.04.0-win32\fbcc -w all "%f"	b:\K\FreeBASIC-1.04.0-win	
2.				
3.				
Регулярное выражение, являющееся признаком ошибки:				
Независимые команды				
1.	Собрать			
2.	Собрать заданную цель...			
3.	Собрать объектный файл			
4.				
Регулярное выражение, являющееся признаком ошибки:				
<i>Примечание: для команды 2 будет открыт диалог, позволяющий ввести дополнительные параметры.</i>				
Выполнить команды				
1.	Выполнить	"./%e"		
2.				
<i>Шаблоны для подстановки в команду и рабочий каталог: %d, %e, %f, %p и %i, смотрите руководство для более детальной информации.</i>				
				Отменить ОК