

# Psychophysiological profiling system

Software

## Manual

Version VibraMI\_10

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Saint-Petersburg

2018

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# 1 Introduction

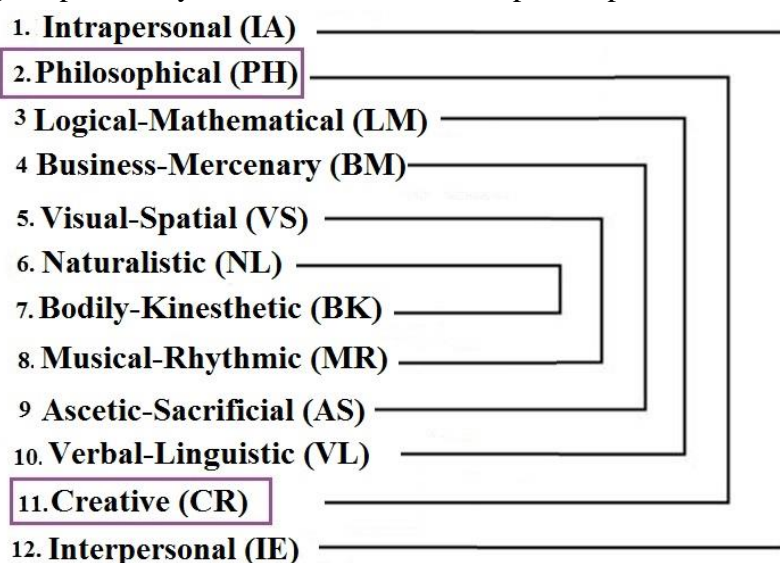
Welcome to the **VibraImage** World! Thank you for your purchase of **VibraMI** system. This Manual is written to help you enjoy **vibraimaging** and open new features in your abilities!

**VibraImage** technology measures micromovement (micro motion, vibration) of person by standard digital, web, IP or television cameras and image processing. Human head microvibration is linked with the vestibular-emotional reflex (VER) of a person and indicates emotion status and personality traits. **VibraMI** system detects human emotions by the control of three dimensional (3D) head-neck movements and fluctuations, accumulated as frame difference in several video frames.

**VibraMI** is based on [multiple intelligences theory](#) of [Howard Gardner](#). Author of multiple intelligences (MI) concept offers an alternative approach to the general intelligence as measured by classical IQ-tests. Gardner's multiple intelligences are equal and independent of each other. Each of the basic intelligences is a special way of interacting with the environment, it is a person's ability to solve problems or to put new problems valuable under this or several cultures. In recent decades, the credibility of intelligence tests that measure total IQ has been steadily falling. Researches in different areas show, that IQ in points reflects only «actual development zone» - that is what a person knows at present time, instead of «zone of proximal development» ([according L.S. Vygotsky, 1982](#)) – ability to learn, acquire knowledge in a specific field.

Many researches were against the use of the term «intelligence» to describe some of the skills. They prefer to define «Musical-rhythmic and harmonic» and «Bodily-kinesthetic» intelligences as «talent». However, such a narrow definition according to Gardner devalue these skills in the sense that the conductors and dancers are talented, but not smart. The advantage of Gardner's theory of multiple intelligences is its flexibility and limitlessness of available human possibilities for self-realization in a professional field. In this regard, Gardner speaks of «infinity» intelligences, their integrality and the ability to develop.

**VibraMI** program used updated [line-opposite MI classification](#) extended to 12 types, indicating the possibility for self-realization in a specific professional field:



## 1.1 Basic applications

**VibraMI** is psychometric program for detection of intelligence profile, aptitude and abilities. Psychophysiological profiling system **VibraMI** program targets the following:

- detection of talent profile, aptitude and human abilities area;
- assistance in recruiting;
- profiling and disclosure of the personal characteristics;
- research and measurement of psychophysiological and emotional states of a person;
- research and ranking of psychophysiological responses to presented stimulus;
- analysis of ratio between conscious and unconscious responses of a person.

The software and a hardware form a **VibraMI** system.

Program **VibraMI** offers several questionnaires for detection of the human abilities, aptitude and talent profile according to multiple intelligences model.

**Gardner\_12\_En** questionnaire intends to identify leading abilities and dominant intelligences for adults human in a stressful situation. Using this questionnaire system detects human abilities and optimum fields for education, training and skills.

**Gardner\_12S\_En** questionnaire intends to identify leading human abilities in a pleasant situation. Using this questionnaire system detects human abilities in hobby.

**Gardner\_12S5\_En** questionnaire intends for 5-10 years old kids testing.

**Gardner\_12T\_En** questionnaire intends for 10-15 years teenagers testing.

## 1.2 Specifications

User must have the hardware with the following parameters:

### 1.2.1 Basic parameters

- |   |     |
|---|-----|
| • Resolution, TVL, more than                | 400 |
| • Noise level of vibraimage, bit, less than | 0,1 |
| • Frame speed, FPS, not less than           | 30  |

### 1.2.2 Digital (web) camera requirements

- |                                |                         |
|--------------------------------|-------------------------|
| • Resolution, pixel, more than | 640 x 480               |
| • USB compatible               | USB 3.0, USB 2.0.       |
| • Frame speed, FPS, more than  | 30                      |
| • Exposition control           | automatic and manual    |
| • Color mode                   | color and B/W switch    |
| • Flicker mode                 | Flicker 50 Hz and 60 Hz |

### 1.2.3 System requirements for local module computer

• Operation System	Windows 7/8/10 or later <b>64-bit only</b>
• Processor	Intel I3 or higher
• RAM	more than 4 Gb
• HDD	Recommended SSD type more than 500 Gb
• USB port	1 free USB ports version USB 2.0
• Installed software	Microsoft Office Excel 2010 ( <b>64-bit only</b> ) and higher
• Video capture	WDM-compatible video device

### 1.3 Package contents

1. <b>VibraMI</b> software	- 1
2. Activation code	- 1
3. User's manual	- 1
4. Digital USB camera (hardware)	- 1 (option)
5. Personal computer (hardware)	- 1 (option)

#### Attention!

Hardware with the specified parameters isn't included in the delivery. User gets the hardware for the **VibraMI** system themselves.

It is recommended to use Microsoft LifeCam Cinema webcam or similar with parameters not worse than this webcam.

## 2 **VibraMI** software installation

It is necessary to execute the following actions for installation of **VibraMI** program on your computer:

1. Go to Web page <http://www.psymaker.com/ru/support/downloads/>
2. Download file [www.psymaker.com/downloads/ setupVibraMi10.exe](http://www.psymaker.com/downloads/setupVibraMi10.exe)
3. Run file VibraimageMI10.exe from archive file.
4. Select language for installation procedure.
5. Press button «Next» in the appeared window of the beginning installation.
6. Accept the license agreement and to press button «Next» in the appeared window.

7. In the appeared window, specify a way to the catalogue where files of the program will be written down, then to press button «Next».
8. Press button «Next» in the appeared window, allows installation of software files on your computer.
9. Press button «Install» at the start of installation.
10. Press button «Finish» at the end of installation.
11. **VibraMI** program icon appears after the end of installation in system menu on desktop of your computer.
12. To reboot a computer.

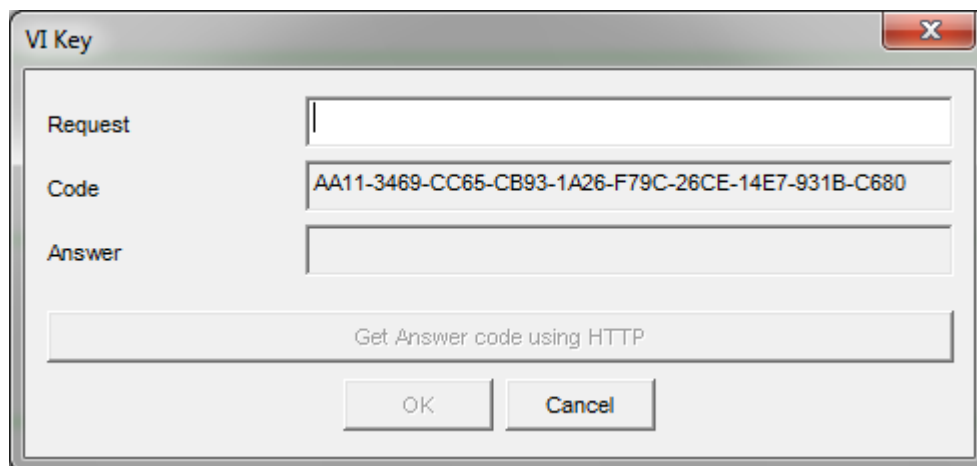
## 2.1 **VibraMI** software activation

1. Procedure of activation is done once at the first start of the program.
2. Before the program activation it is need to buy this version of the program in the online store Psymaker  
<http://www.psymaker.com/store/>
  - Activation procedure requests access to the Internet for receiving answer code from server.
  - Activation code has the structure shown in the table.

Key type	Software modification
VIXX_XXXXXXXX_MI	<b>VibraMI</b> is psychometric program for detection of talent profile, aptitude and abilities.

### 2.1.1 Standard activation

1. For the activation beginning it is necessary to run the **VibraMI** program.
2. At the first start of the program the activation window will be displayed (Fig. 2.1).



*Fig. 2.1. Activation window.*

3. In the field «Request» it is necessary to enter the activation code received by e-mail or specified by the seller (Fig.2.2).

*Fig. 2.2. Putting activation code.*

4. After input of activation code to press the button «Get Answer code using HTTP».

**Attention!**

**Please, be careful and paste code without additional gaps!**

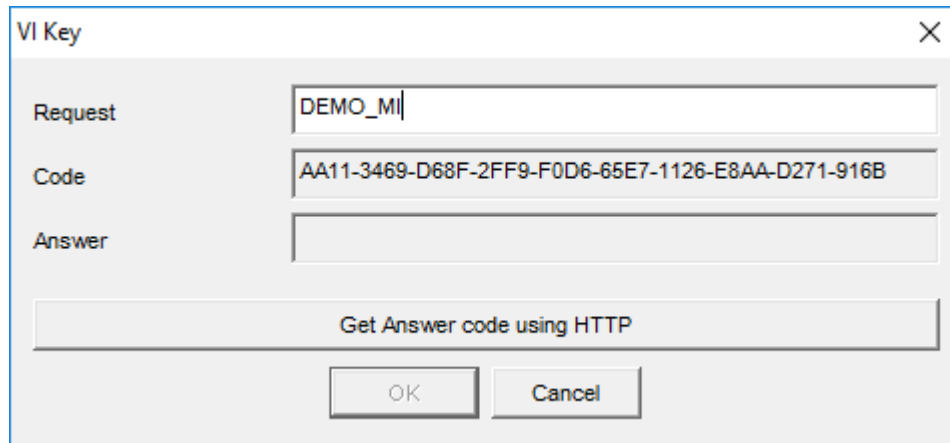
5. The activation code will be checked up through the Internet and, in case of successful end of activation procedure, the answer code will be sent (Fig. 2.3).

*Fig. 2.3. Successful activation.*

6. Press button «OK». **VibraMI** automatically started.

## 2.1.2 DEMO activation

1. For the activation beginning it is necessary to run the **VibraMI** program.
2. At the first start of the program the activation window will be displayed (Fig. 2.1).
3. In the field «Request» it is necessary to enter «DEMO\_MI» (Fig.2.4). After input of activation code to press the button «Get Answer code using HTTP».

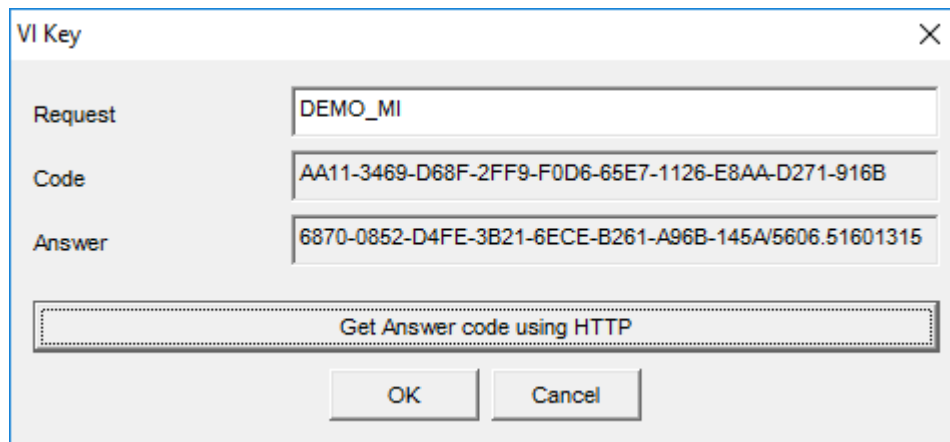


*Fig. 2.4. Putting DEMO activation code.*

### **Attention!**

**Please, be careful and paste code without additional gaps!**

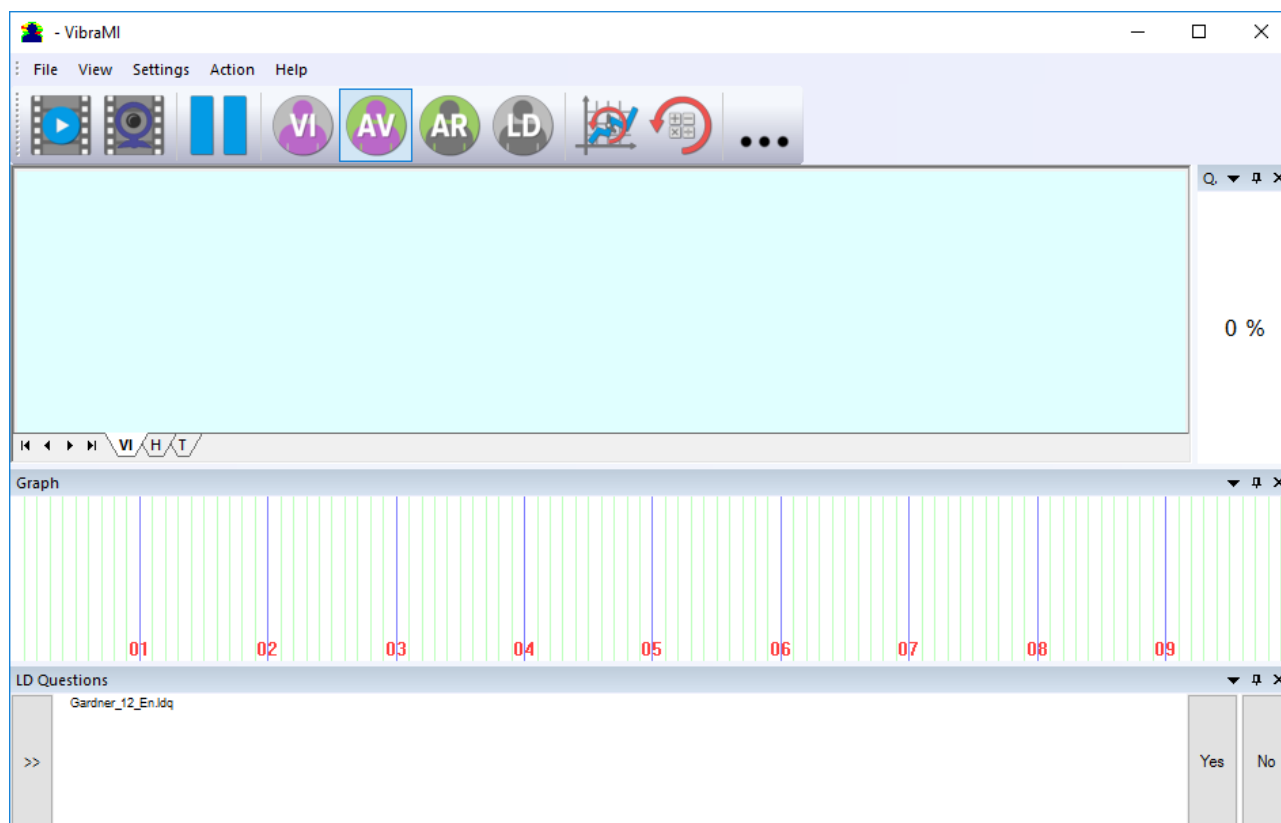
4. The activation code will be checked up through the Internet and, in case of successful end of activation procedure, the answer code will be sent (Fig. 2.5).



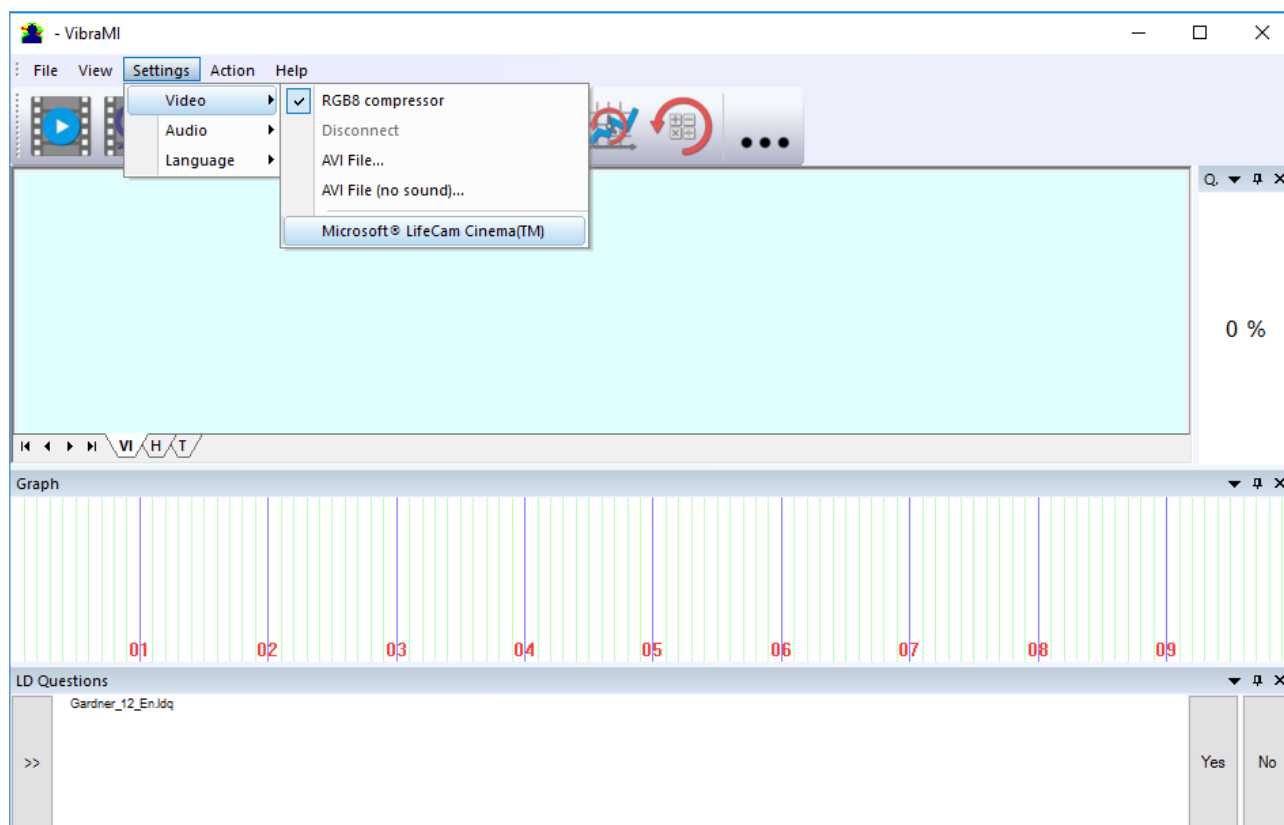
*Fig. 2.5. Successful DEMO activation.*

5. Press button «**OK**». **VibraMI** will be automatically started in selected version.

After starting program you will see white screen (Fig. 2.6). For camera selection in program it is necessary to click the right mouse button and to select the camera from the appeared submenu «Video» in menu «Settings» (Fig. 2.7).



*Fig. 2.6. The first start of the program. The camera isn't connected.*



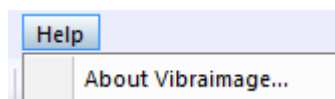
*Fig. 2.7. Connection of the camera.*

## 2.2 Reinstallation of **VibraMI**

**Note**, it is recommended to uninstall the **VibraMI** program before any upgrade software or hardware on PC and to reinstall after this upgrade.

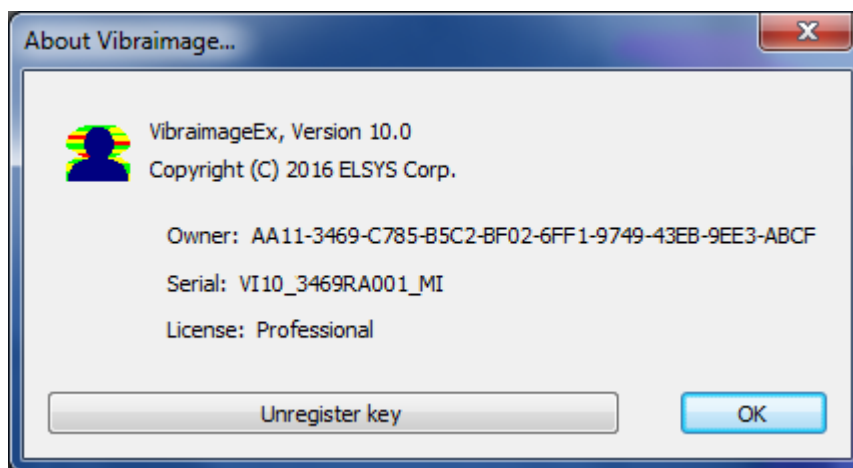
For this purpose, it is necessary to execute the following actions:

1. Connect to the Internet a computer on which one of **VibraMI** has been installed.
2. Start **VibraMI** program for reinstallation on a new computer.
3. In the menu «**Help**» (Fig. 2.8) choose item «**About Vibraimage...**» (Fig. 2.8).



*Fig. 2.8. Menu «Help»*

4. In the opened window press the button «**Unregister key**» (Fig. 2.9).
5. Close the program.
6. Connect a new computer to Internet.



*Fig. 2.9. Information about the program.*

7. On the new computer install the program and make registration of an «old» modification activation code through the Internet, according to recommendations of section 2.1.

8. After successful program registration the given activation code will be fixed to the given computer.

## 2.3 Camera's setting

Standing correct camera settings is very important operation for the next vibraimage processing, because mistakes in image quality have great influence to the vibraimage processing results.

### 2.3.1 Video camera choice

It is necessary to select in the main menu «**Settings**» => «**Video**» => «**.../name used camera/...**». In figure 2.7 the process of selecting camera «Microsoft LifeCam Cinema» is shown. If the camera is connected, selected and works, then on the left of the name there will be an icon «**✓**» (Fig. 2.10), and the menu will be extended with the «**Video capture filter...**» and «**Video capture format...**».

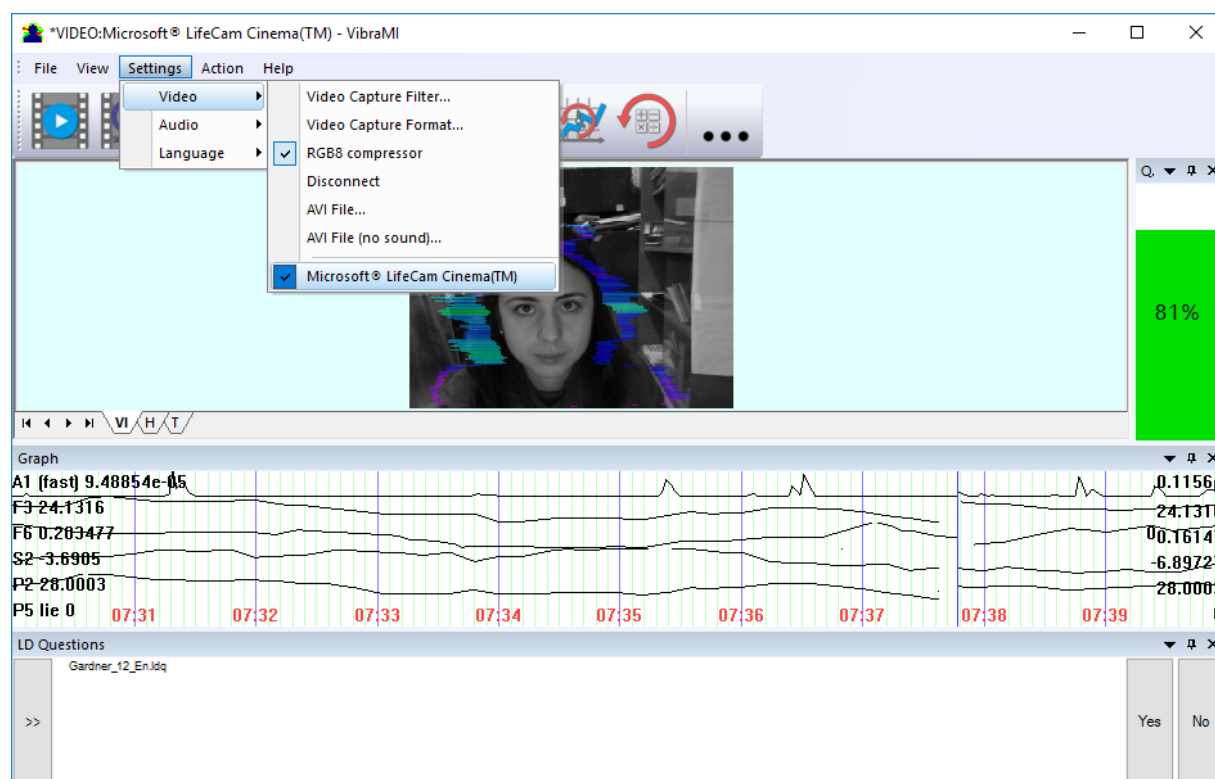


Fig. 2.10. Example of camera choice.

**VibraMI** system allows to processing as the «alive» video signal acting from a video camera, and the video data, before written down and saved as an AVI-file. On default the system works with a signal from a video camera. Subitems «AVI File ... F3» and «AVI File (no sound)... Ctrl+F3 » are intended for a choice for the analysis of an external video file.

### 2.3.2 Video capture filter

Select «**Video capture filter.....**» in the submenu «**Video**» (Fig. 2.11) for open menu of the camera settings. Item «**Video capture filter...**» appears in the menu only in case of the correct installation of camera drivers and correct choice of operating camera.

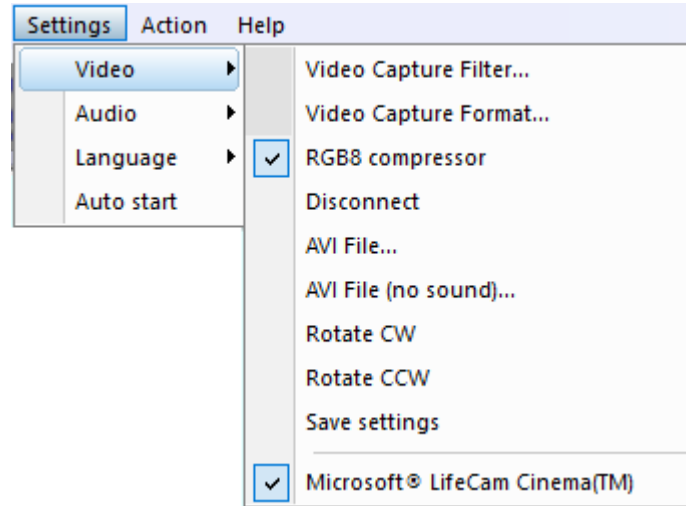


Fig. 2.11. Opening of the camera's settings menu («Video capture filter...»).

After a choice of the «**Video capture filter...**» the window «**Settings**» will open. Settings window differs depends on camera type. The first tab of this window is usually devoted to the image setup (Brightness, Contrast, etc.). In a figure 2.12 the window «**Settings**» for the camera «**Microsoft LifeCam Cinema**», and in a figure 2.13 for the camera «**Look 1320 V2**» is shown. Camera Microsoft LifeCam Cinema has low noise level and is preferable for vibraimage applications among webcams.

When adjusting the camera settings, you must fulfill the following general requirements:

- The «**Brightness**», «**Contrast**» and others parameters should be configured so that the image of the object was the maximum contrast.
- Switch on «**Flicker**» mode for setting lighting power line frequency (repayment flicker), in most countries it is 50 Hz.
- If your camera supports, then switch on the black-and-white image «**B/W mode**». If the camera works only in color mode, it is recommended to set «**Saturation**» parameter to minimum value.
- Depending on the experimental conditions and light to use automatic or manual setting «**Exposure**» parameter. If constant lighting, it is recommended to use the manual adjustment. If changes (for example, an object depends on the lighting street lighting), it is better to use the automatic adjustment mode setting.
- Parameters «**Zoom**» and «**Focus**» is recommended to use in the manual mode and change their values not due to electronic image processing, but by approaching/removing the camera from the object.

Depending on the experimental conditions and light it is necessary to select auto or manual settings «**Focus**», «**Exposure**». If the illumination is constant, then it is recommended to use manual configuration, if illumination is changed (for example, the illumination of an object depends on street lighting), it is better to use automatic configuration. The «**Scale**» (Zoom) is recommended to select based on two factors. Firstly you need to have maximum image size of control object and it is preferably to stand maximum zoom level. From the other side high level of electronic zoom in some cameras could go down the frame rate and it is necessary to control this parameter and fixed frame rate more than 25 fps. So for webcam Microsoft LifeCam Cinema the optimal meaning of zoom for personal control is 4, see fig. 2.14. For other cameras it is possible to adjust other optimal zoom settings.

**Note**, program settings are set by default at each new turn on the camera. If the video conditions don't change it is recommended to save your settings using item «**Save Settings**» from the submenu «**Video**» (Fig. 2.11).

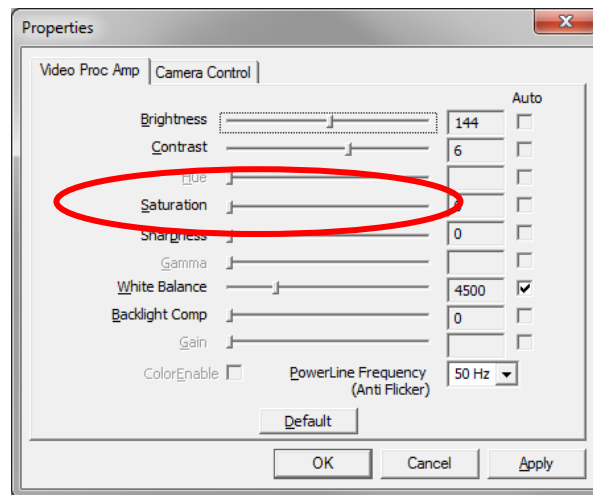


Fig. 2.12. Video setting, camera « Microsoft LifeCam Cinema»

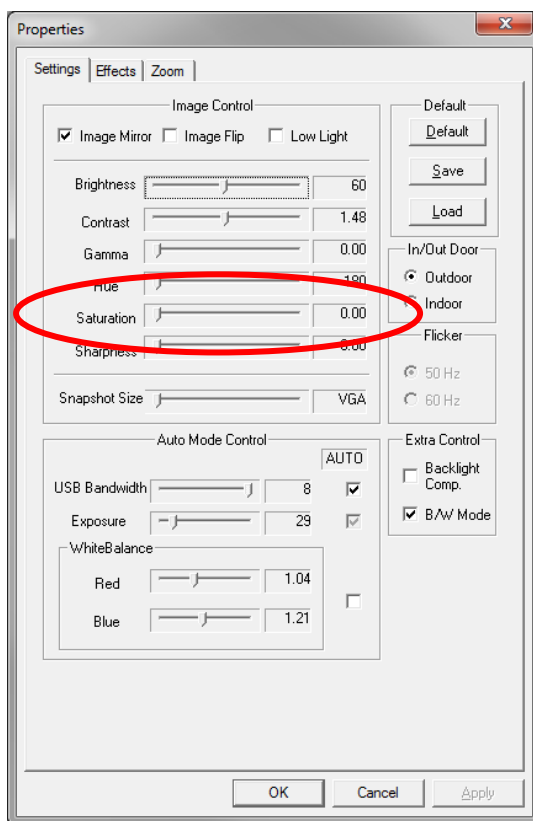


Fig. 2.13. Window «Settings», video setting, camera «Look 1320 V2»

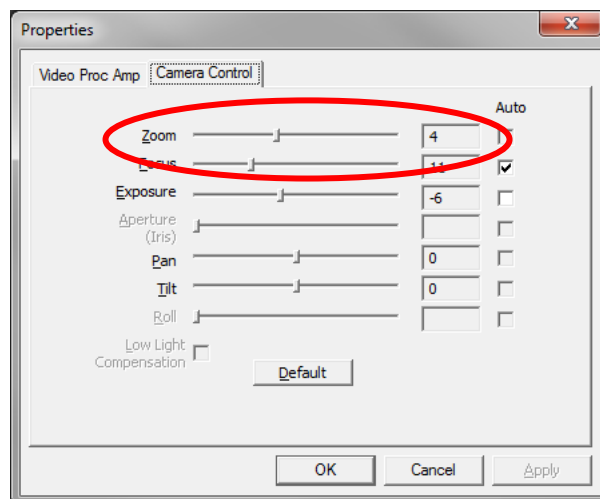


Fig. 2.14. Zoom setting, camera «Microsoft LifeCam Cinema»

### 2.3.3 Video capture format

Select «**Video capture filter...**» in the submenu «**Video**» (Fig. 2.11) for open menu of the camera settings. Item «**Video capture format...**» appears in the menu only in case of the correct installation of drivers of the camera and a choice of the working camera. Frame rate is necessary to set 30 and the frame size to set («Output Size») not less than 640 x 480 px (Fig. 2.15).

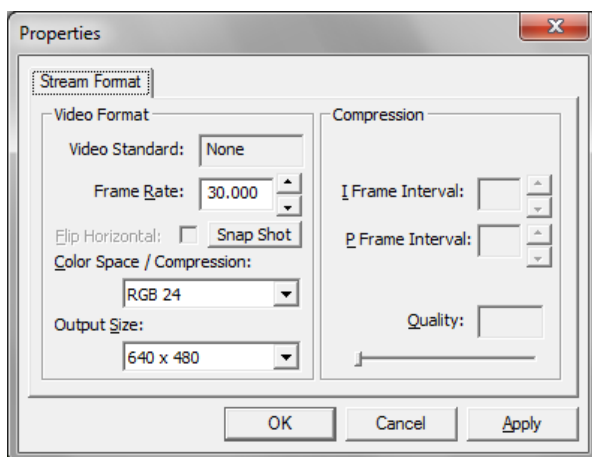


Fig. 2.15. Window «Video capture format»

**Note**, after changing camera settings in the program **VibraMI** frame rate «In» must be in the range of 25 – 30 FPS.

### 2.3.4 Checking the settings on the test table

During the first start of Vibraimage system and periodically it is recommended to test image quality by the test table. It is required to place a test pattern opposite to the camera so that the image of the table occupies the entire space of the frame. To achieve the optimal contrast range of object is need to stand in camera settings auto regulation of illumination in case of unstable illumination (Fig. 2.16) and manual regulation of illumination in case of a constant illumination (Fig. 2.17). The inscription «Warning! Low quality (1)» in the upper left corner of the image is normal, because there is no a person's face on the video.

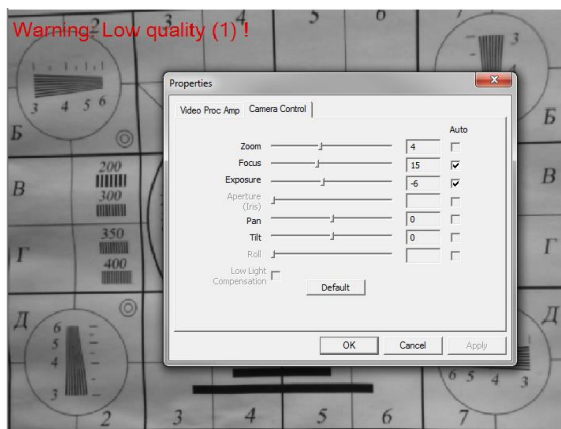
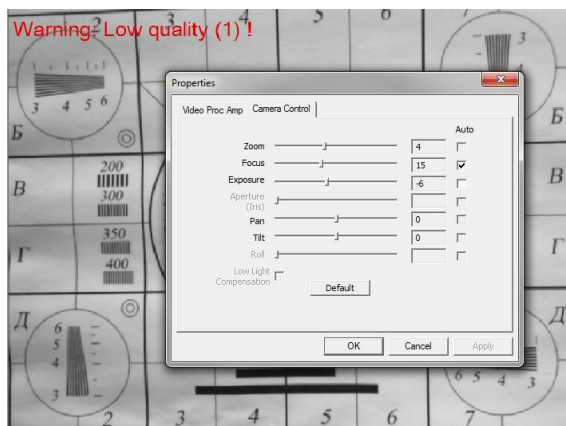


Fig. 2.16. Checking the camera settings on the test table, automatic regulation of the exposure (mode is recommended for unstable object illumination).



*Fig. 2.17. Checking the camera settings on the test table, manual regulation of the exposure (mode is recommended for stable object illumination).*

### 2.3.5 Video quality auto checking function

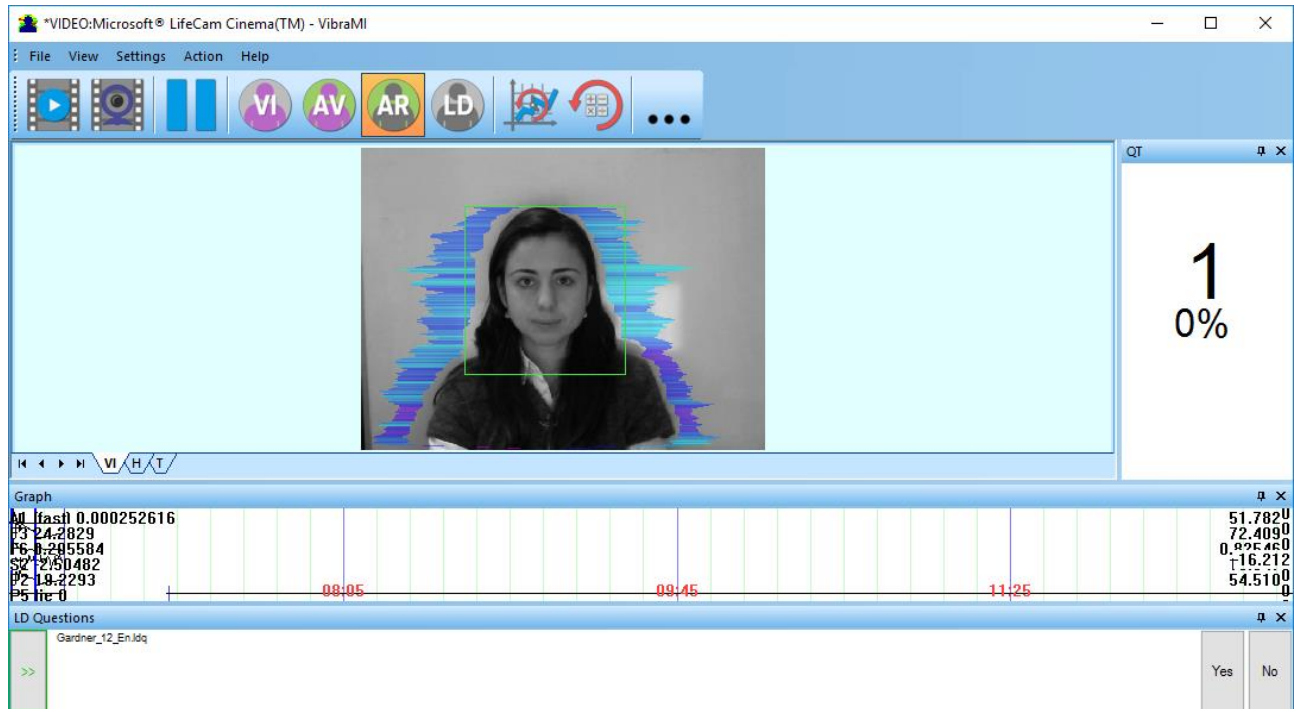
The program **VibraMI** has auto checking function and image quality control during the test. Because the definition of human reaction occurs on the video, the quality control of the processed video is necessary to get the right test result. Program gives error indication in left upper corner (Fig. 2.18) of image area if the image quality is lower than standard vibraimage requests:

Error 1 – indicates when facial image is lower than necessary. For cancel this error is need to move checked person near to camera or start zoom function on camera (Fig. 2.18).

Error 2 – indicates when camera noise level is higher than necessary. The reason of this error could be low illumination, incorrect camera settings or camera vibration (Fig. 2.19).

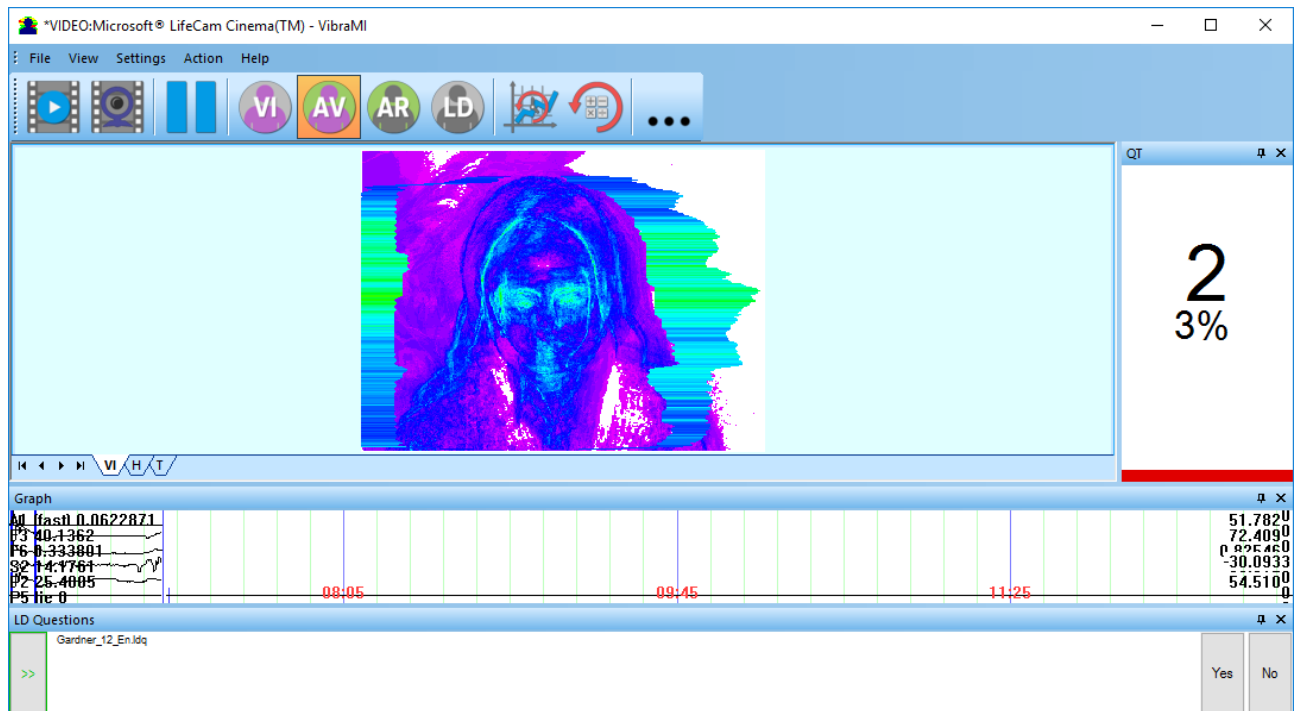
Error 3 – indicates when computer input frequency rate is lower than necessary. Requested norm for processed frame frequency is more than 25 FPS. This errors indication was done for deleting unqualified staff influence during results control (Fig. 2.20). Modern web cameras via USB 2,0 interface provide input at 30 FPS when the input format is 640 x 480 px.

**Note**, before the start of the test should ensure that the program processes image of a person without any errors.



*Fig. 2.18. An example of an error message (1) at a low image quality.  
Head image size is lower than requested.*

Head image size in the elements (pixels) determines the accuracy of recorded vibration and requires permanent control during the test. When tested with a video image analysis there are no strong restrictions on the movement of the test person, as required the contact polygraph. Thus, the person feels natural, which increases the accuracy of test results. However, the natural behavior can lead to the fact that the person during the response will deviate from the camera and the head image size becomes less than required. To resolve this problem vibraimage system continuously monitors a person's head size of the image and displays an error message (1) in the case of reducing the size below the limit. In addition, vibraimage program includes a permanent face detection algorithm, which ensures elimination of errors from a lack of a real image of the person in the frame during testing.

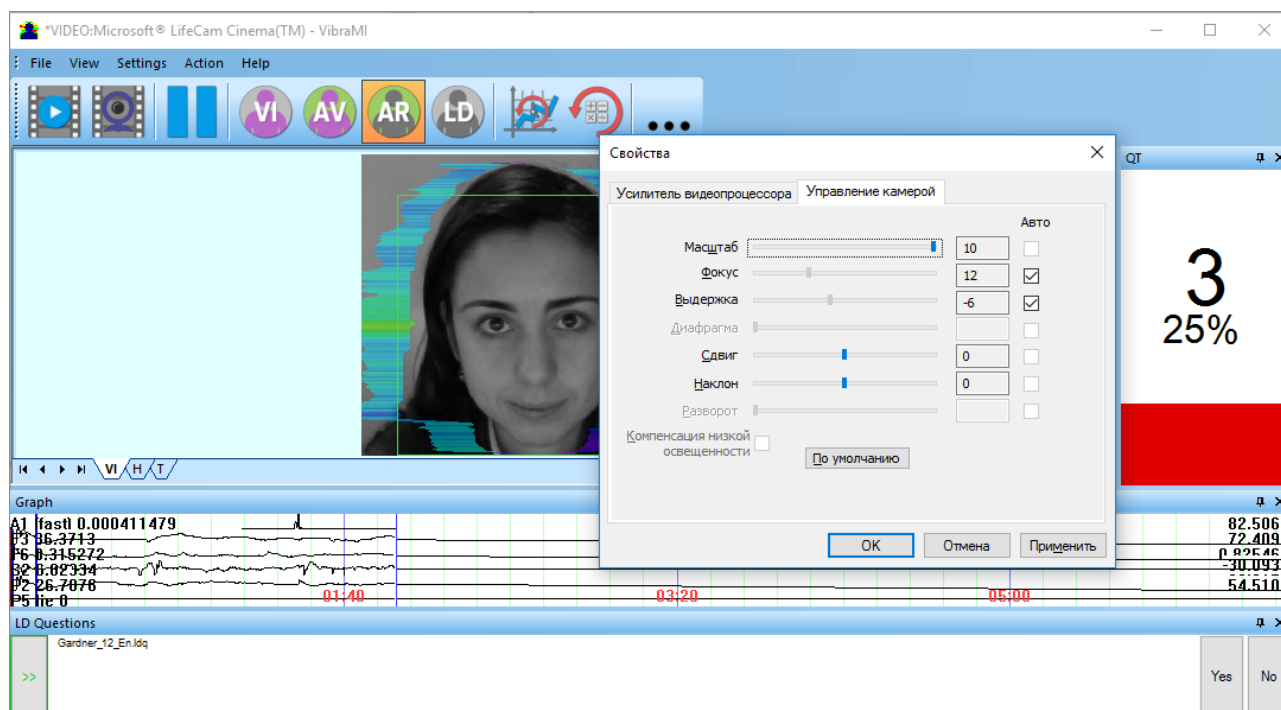


*Fig. 2.19. An example of an error message (2) at a low image quality.  
Camera vibrations is strong and on the image there is a noise.*

The figure 2.19 shows an example of strong camera vibrations. For good vibraimage you should mount the camera on a fixed support so that the vibration of the support was minimal. If the camera is mounted on a table, while working with the program you should not lean on the table.

The noise of the signal from the web-camera includes a video camera noise and illumination instability and it can significantly affect the test results. Continuous calculation of the noise level should be carried out by methods similar to the measurement of the noise from the photodetector of the television camera. In this case, when you exceed the noise threshold, the system automatically displays an error message (2) (Fig. 2.19).

This error also appear when illumination is instability.



*Fig. 2.20. An example of an error message (3) at a low image quality.  
Camera vibration*

Despite the fact that the television camera may transmit 30 FPS with the given resolution, it does not guarantee that the computer receives and processes the incoming video data in real time. However, any deviation from the information processing in real time results to loss of information and to reducing the reliability of the test. By reducing the input and processing actual frequencies frames below the set limit, the system automatically displays an error message (3) (Fig. 2.20).

In this situation, it is necessary to reconfigure parameters of the camera («**Brightness**», «**Contrast**», et al.) to increase the frame rate. For web-camera Microsoft LifeCam Cinema that happens in the case of zoom in the maximum, as shown in figure 2.21. In the case of reducing zoom should control the frame rate in the menu «**Video Capture Format ...**» (Fig. 2.15).



*Puc. 2.21. An example of a quality column operation. Head image size and other parameters are correct.*

Quality column shows time % during the testing when image quality is equal 100 %. When we have quality indication 88 % (fig 2.22), that means 88 % of testing time image quality hasn't errors and 12 % of testing time image quality includes errors with the number 1 or 2 or 3.



*Puc. 2.22. Quality test shows 88 %*

Pressing button R reset image quality to the beginning 100 %. In lie detection mode and M mode image quality is very important and testing with image quality lower 80 % could not be acceptable for processing.

## 3 VibraMI. User's manual

Psychophysiological profiling system **VibraMI** software solves the following tasks:

- determination of the maximum human abilities area for its professional activities;
- professional orientation test;
- profiling and disclosure of the personal characteristics;
- research and measurement of psychophysiological and emotional states of a person;
- research and ranking of psychophysiological responses to presented stimuli.

After start of **VibraMI** and connection of the video device (Fig. 3.1) in the main window there is an image from connected video device.

### 3.1 Main window

Main window (Fig. 3.1) consists of the following parts:

1. main menu;
2. image area;
3. questionnaire panel;
4. tools panel;
5. name of running VibraImage module, model of video source (Video camera model or AVI file name) & type of video source (Video camera or AVI file);
6. quality test column;
7. image menu

**Note**, double click by the left button of a mouse in the image field of makes **RESET** of all saved up information and statistics about frames and start new cycle collection of information.

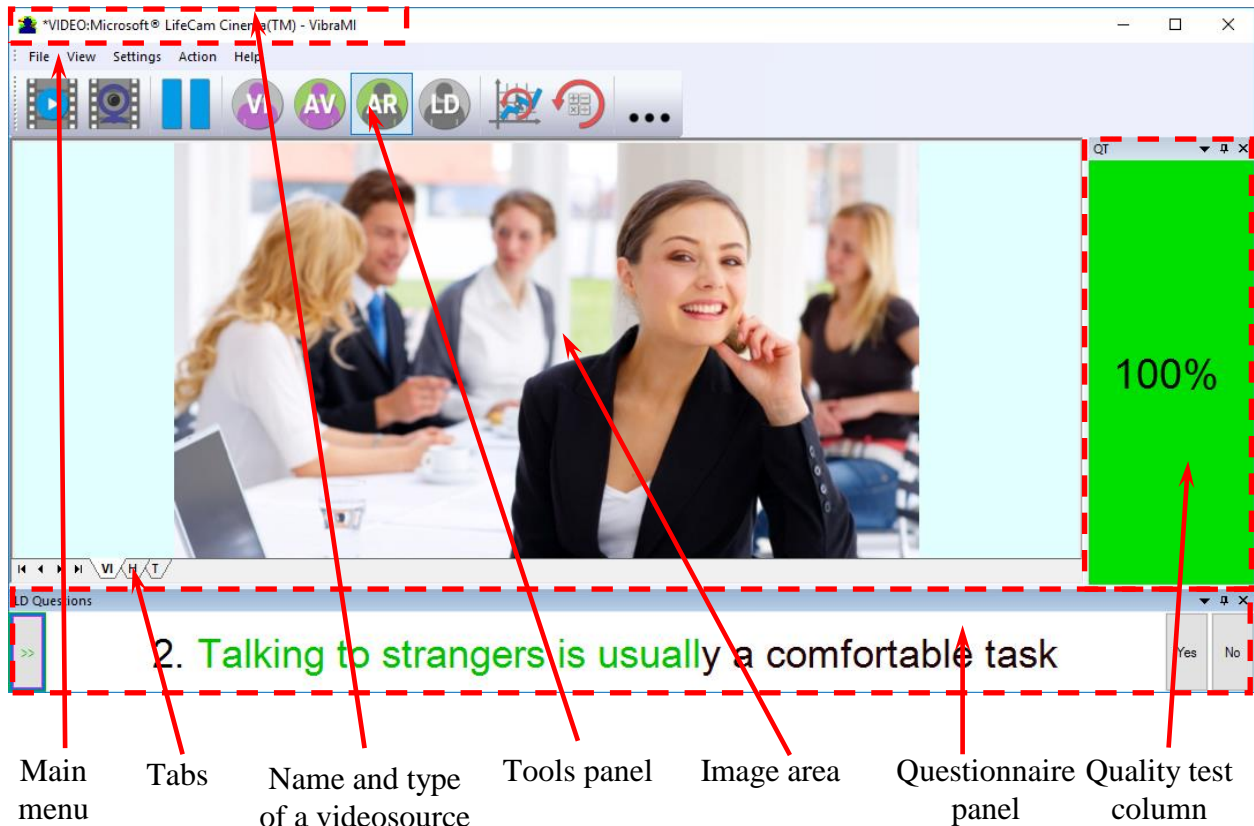


Fig. 3.1. Main window *VibraMI*.

The user can add or remove the window on the screen using the submenu «**View**» - «**Toolbar**».

The user also can control the placement of additional windows on the screen and the size using the controls elements on the left side of each window title.

Each window can be temporarily minimized and moved to the border of the main program window (Fig. 3.2). Figure 3.3 shows additional windows hidden and moved to the border of the main window and they icons are highlighted in orange color.

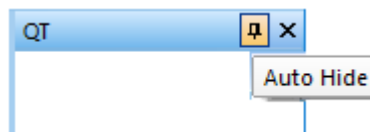
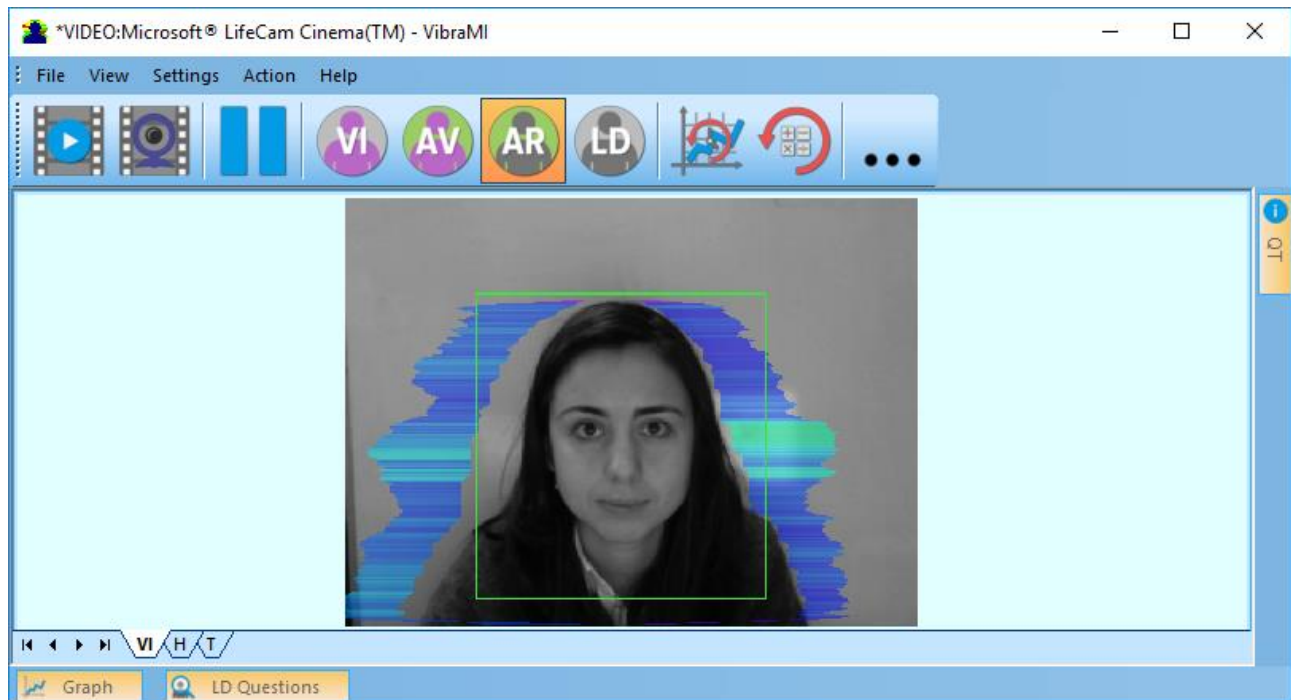


Fig. 3.2. Control element «hide window»



*Fig. 3.3. All additional windows are hide.*

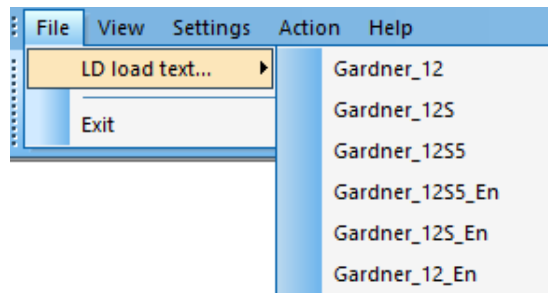
## 3.2 Main menu

The main menu contains the following items:

- «File»
- «View»
- «Settings»
- «Action»
- «Help»

### 3.2.1 Menu File

Menu «**F**ile» (Fig. 3.4) contains following items:



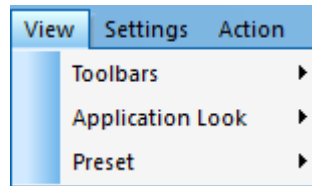
*Fig. 3.4. Menu «File»*

Item «**LD load text...**» – load questionnaire file.

Item «**Exit**» – allows quitting the program.

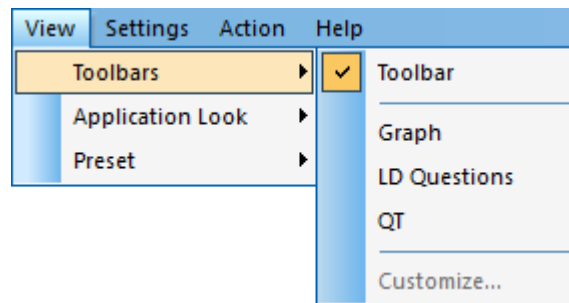
### 3.2.2 Menu View

Menu «**View**» (Fig. 3.5) contains following items:



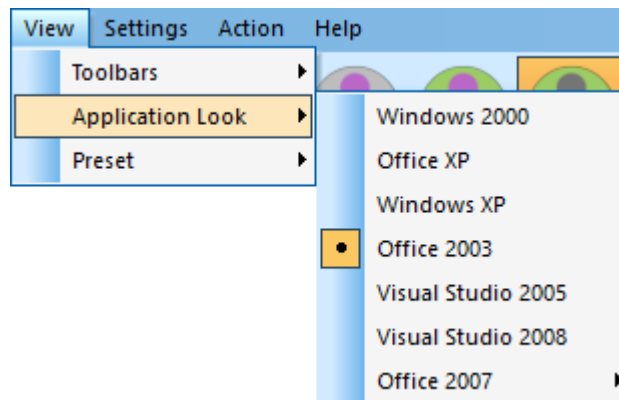
*Fig. 3.5. Menu «View»*

Submenu «**Toolbars**» (Fig. 3.6) - switch on/off the toolbars and additional functional windows.



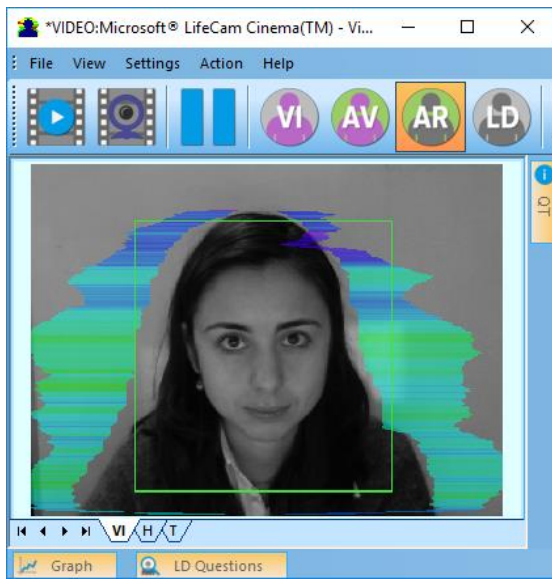
*Fig. 3.6. Submenu «Toolbars»*

Submenu «**Application Look**» (Fig. 3.7) contains following items:

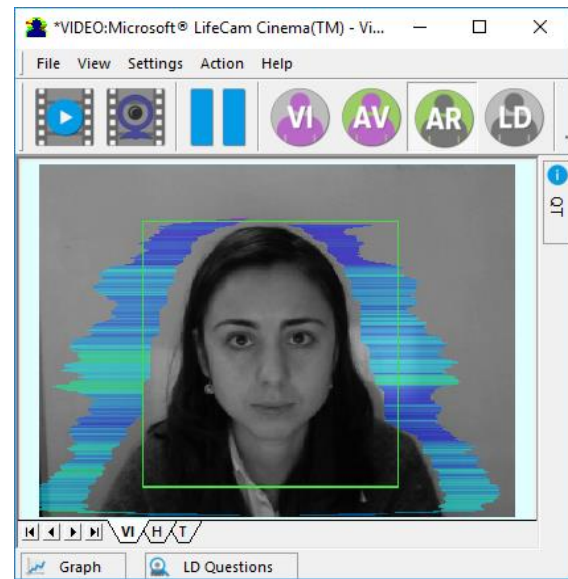


*Fig. 3.7. Submenu «Application Look»*

The program for the user's convenience have the ability to change the style of the main elements of the working window (Fig. 3.7). To change the style, use the submenu «**View**» - «**Application Look**» (Fig. 3.6).



a) Style "Office 2003"



b) Style "Windows 2000"

3.7 Main window with different styles.

Submenu «**Preset**» – choice of visualization mode:

**LD** - real video image,

**AR** - external vibraimage (vibra-aura) around real video image,

**AV** - vibra-aura around internal vibraimage,

**VI** - internal vibraimage.

### 3.2.3 Menu Settings

Menu «**Settings**» (Fig. 3.8) contains following items:

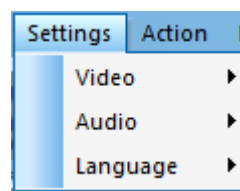


Fig. 3.8. Menu «Settings»

Submenu «**Video**» – video settings:

Submenu «**Video**» contains settings of video modes (see fig. 2.11). It can differ depending on connected devices. For example, this menu contains the following items (Fig. 3.5). You can choose as video source one from many installing in PC video-devices or load external video file.

Subitem «**Video Capture Filter...**», «**Video Capture Format...**», «**Save settings**» - (see 2.3)

Subitem «**RGB8 compressor**» is intended for management of a video file record format. If this item is chosen, that, for economy of a space on a hard disk, the video file saved in a black-and-white format.

**Note**, for connection to system of network IP cameras (for example, in figure 3.5 CamIP RTSP Example) and adjustments of their parameters the additional software CamIP.exe [http://www.psymaker.com/downloads/CamIP\\_installer.msi](http://www.psymaker.com/downloads/CamIP_installer.msi) is used.

Subitem «**Disconnect**» allows disconnecting all video camera or video file.

Subitems «**AVI File...**» and «**AVI File (no sound)...**» are intended for selecting for the analysis of an external video file. The file can be loaded with a sound and without sound.

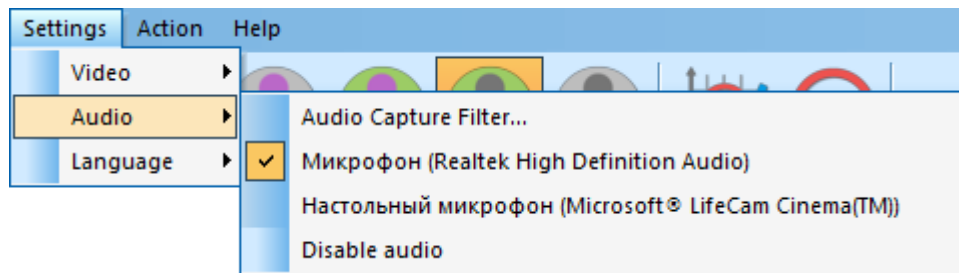


Fig. 3.9. Submenu «Audio»

Submenu «**Audio**» (Fig. 3.9) contains settings of audio modes. It is can differ depending on connected devices.

Item «**Audio Capture Filter...**» allows adjusting the microphone selected for operation (see items below).

Subitem «**Audio Capture Filter...**»

Item «**Disable audio**» cancel audio analysis.

Submenu «**Language**» allows to choose a language.

### 3.2.4 Menu Action

Menu «**Action**» (Fig. 3.10) contains following items:

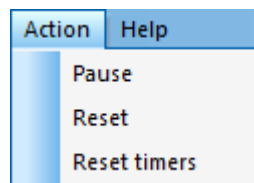


Fig. 3.10. Menu «Action»

Item «**Reset**» – reset all saved up information and statistics about frames and start new cycle collection of information.

Item «**Pause**» – stop last accepted frame of data in image area of windows.

Item «**Reset timers**» – reset to «0» all timers: video file timer, graph timer. The conclusion video and construction of graph begins all over again.

### 3.3 Tools and LD panels of VibraMI program

**VibraMI** toolbar (Fig. 3.11) contains following buttons:



*Fig. 3.11. VibraMI toolbar.*

All toolbar buttons (Fig. 3.11) duplicated the corresponding items in the menu system. When the tool tip determines the assignment of toolbar buttons. Note, the selected toolbar button is highlighted in color or volume, depending on the main window style.



– AVI files download for PDD analysis;



– live video camera connection;



– pause on image and program operations;



– choice of internal vibraimage mode (VI);



– choice of external vibraimage (vibra-aura) around internal video image mode (AV);



– choice of external vibraimage (vibra-aura) around real video image mode (AR);



– choice real video image mode (LD);



– reset timers and restart of testing;

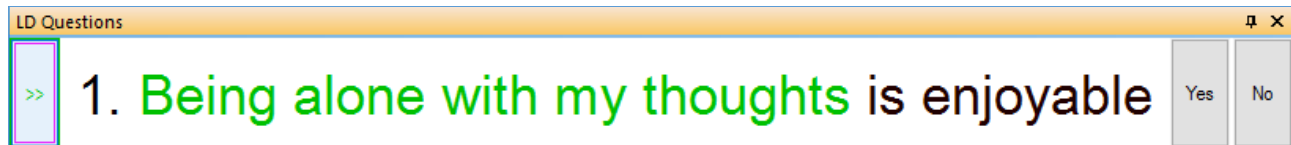


– reset of all saved up information and statistics about frames and start new cycle collection of information;



– open the folder where you saved the images and measurement's data.

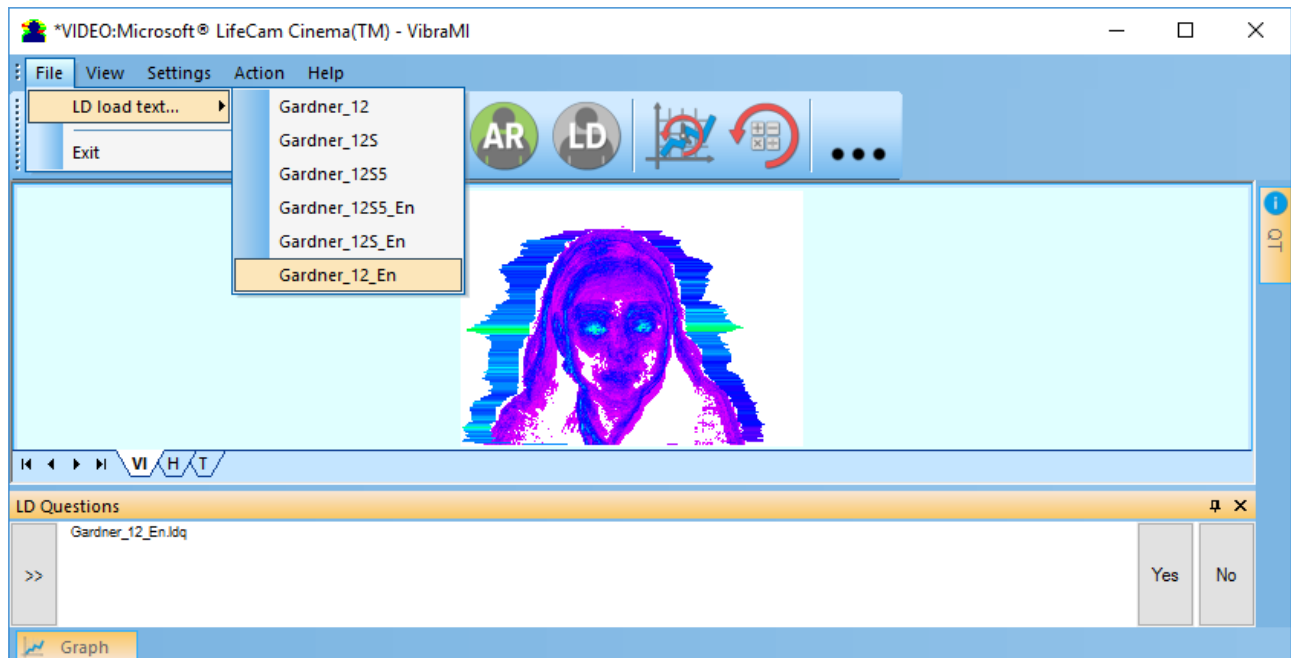
LD panel of **VibraMI** program shown on fig. 3.12.



*Fig. 3.12. LD bar. Starting of a questionnaire.*

One-clicking on the button on the LD bar let start a questionnaire at that moment. Double-clicking returns to the beginning of the questionnaire and the video file. The questionnaire can be selected by putting on the item «**LD load text...**» in the menu «**File**».

After the choice of the file, for example, Gardner\_12\_En (Fig. 3.13), the program passes into the mode of reading and visualization of a questionnaire. The person conducting survey reads the questions which are displayed in the karaoke mode.



*Fig. 3.13. Loading a new questionnaire.*

The user may develop owns questionnaires on topics of interest to him and put them in the installation directory \VibraMI\ in the same file format **ld\_XXXXXX.ldq**.

## 4 **VibraMI** operation principles

**VibraMI** is program for psychophysiological testing (PPT) of a person by the vibraimage technology and questionnaire for detection of intelligence profile, aptitude and abilities.

Calculation of recommended specializations, narrow and broad fields is based on personal conscious response and psychophysiological (subconscious) response (I-E format) to the questionnaire and presenting image stimulus.

Detail field of professional orientation is done based on the International Standard Classification of Education (ISCED) 2013 ([ISCED-F 2013](#))

### 4.1 Multiple intelligences model

The basis of **VibraMI** analysis is a comparison of the conscious response to questions and stimuli (the Yes / No answers of tested person) with the unconscious psychophysiological response determined by vibraimage technology. Presented questions and stimuli are consistently grouped according to the types of personality, according to the multiple intelligence (MI) model:

#### 1 Intrapersonal (IA)

Internal resources are fundamental in the process of professional self-realization for this MI type. Inference depth and accurate calculation displays self-discipline and internal control. Representative features of this MI type are restraint, self-sufficiency, persistence of convictions.

#### 2 Existential-Theoretical (ET)

Representative features of this MI type are ability to global conclusions, the ability to formulate questions about life and death, the analysis of existential problems. The sphere of interests of such person is outside ordinary and routine affairs in the field of the deep aspects of the universe and fundamental theories.

#### 3 Logical-Mathematical (LM)

Developed ability to operate with numbers, to make accurate predictions, to vary by abstract concepts, to solve puzzles, to subtly differentiate cause-effect relationships evidence about the prevalence of logical-mathematical MI type. Love for experiments and complex calculations has a profound psychological meaning, regardless of the chosen sphere of professional self-realization.

#### 4 Business-Mercenary (BM)

Representatives of this MI type maximally effectively self-realize in the field of sales, forecasts and calculations associated with its. Analytic and mathematical abilities in combination with developed communicative skills are combined with excitement, that makes differ this MI type from the interpersonal or the logical-mathematical.

## 5 Visual-Spatial (VS)

This type of intelligence is characterized by the ability to perceive surrounding objects and phenomena in three-dimensional space, regardless of their initial position and dynamics. The visual type of perception is the leading and it carries the main information-psychological load. In addition, this MI type is manifested in the acute perception of shades and forms, characterized by an excellent getting around.

## 6 Naturalistic (NL)

A person with natural intelligence closely connects himself with the surrounding world, subtly differentiates the smallest aspects of its transformation. Merging with nature for such people is a synthesis of naturalness and spirituality, in which a person is viewed not as a "corona of creation", but as a part of it.

## 7 Bodily-Kinesthetic (BK)

Different types of movements are the main source of expression for people with leading bodily-kinesthetic MI type. Large motor skill (coordination of movements, balance, dexterity, strength, flexibility, etc.) or/and fine motor skill (dexterous sensitive fingers) can be well developed. Expressed BK MI type can be equated with the potentialities of professional athletes.

## 8 Musical-Rhythmic (MR)

Type of intelligence, characterized by increased sensitivity to sounds and phonemes. It can be manifested as the presence of a musical ear (but not necessarily) or the presence of persistent musical interests. Music carries a deep psychological load in the life of such a person, being a vocation or a serious hobby.

## 9 Ascetic-Sacrificial (AS)

This type of intelligence is inherent in people with high readiness for self-giving, sometimes reaching a level of self-sacrifice in the name of saving human or other life. The active life position of such people is based on ideas of humanity and pacifism.

## 10 Verbal-Linguistic (VL)

Skillful mastery of all kinds of speech, both oral and written can be attributed to manifestations of this type of intelligence. It is not rare to find the ability to speak foreign languages or master of native language, the ability of the speaker. Oral speech of such people is easy, graceful, and written - has "innate grammatical correctness" and literary style.

## 11 Arts-Bohemian (AB)

Representatives of the bohemian artistic intellect personify themselves with the sphere of art in various spheres of its refraction. Public recognition of their exclusivity and belonging to the sphere of arts is the dominant in the sphere of professional self-realization.

## 12 Interpersonal (IE)

The manifestations of this intelligence include a high need for various types of communication, with the ability to different types of interaction, as such. The ability to subtly feel the mood of other people for their verbal (direct speech, clauses) and non-verbal (facial expressions, gestures) manifestations is distinguished by interpersonal intelligence. Ease of communication, the ability to resolve conflicts - natural companions of interpersonal intelligence.

## 4.2 Conscious response to the questions (Yes/No)

Let's consider conscious response YN of the test person at an answer to a pair of consecutive questions relating to a one type of intelligence for Gardner12 questionnaire. Questions in this questionnaire presented so that the person with the developed type of this multiple intelligence answered to a first question «Yes», and to the second question - «No». At the answer to the corresponding couple of questions of the second questionnaire of Gardner12S, people with the developed this type of intelligence have to answer Yes and Yes. For example, the questions of a questionnaire Gardner12 concerning Visual-Spatial intelligence type:

1 I understand information better in the form of a chart

2 It's easier and more comfortable to understand information when I hear it

In the given example the test person answers to a first question «Yes», and to a second question «No» (Yes/No), then value of 100 % is conditionally appropriated to the parameter YN for the 5 VS group (Fig. 4.1, columns 3 - 8, 10). If answers are «Yes/Yes» or «No/No», then YN is 50 % (Fig. 4.1, columns 1, 12). If a person responds negatively to the first question and to the second - positively (No/Yes), then YN = 0 % (Fig. 4.1, column 2, 9, 11.).

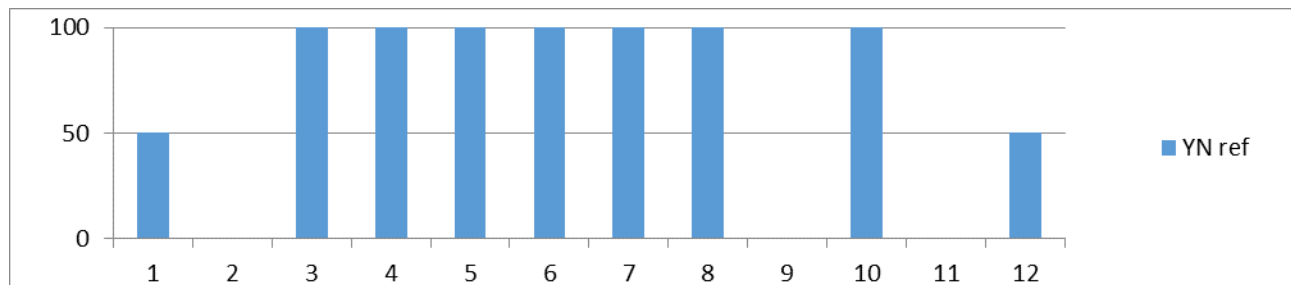


Fig. 4.1. The resulting graph of the parameter K for the types of intelligences

The MI profile represented in figure 4.1 illustrates *conscious* perception of the examinees about their intellectual capacities and needs, i.e. a desirable or idealized MI profile, from the view point of self-esteem. The results reflect a traditional psychological test approach to diagnostics of any new mental formations on the basis of self-esteem of the examinees.

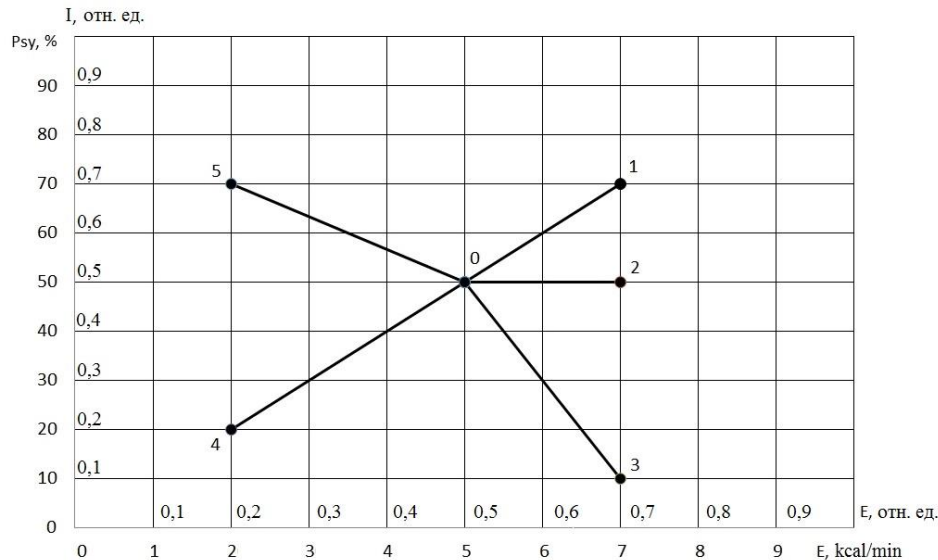
## 4.3 Psychophysiological (subconscious) response (I-E)

The subconscious reaction is measured by analyzing the information state and energy state (IE) as general features of psychophysiological state by vibramage technology. This technology is similar to psychophysiological detection of deception and confirms or rejects conscious response based on positive or negative reaction of the examined person on the indicated stimulus.

As an example, we will consider the change of a psychophysiological status (PPS) of the person given in a scale information - energy in fig. 4.2 Actual PPS is displayed in the form of a

point and change of person's PPS in time is displayed in the form of a straight line or a curve between two points. The example of PPS change from a state 0 in various states 1, 2, 3, 4, 5 is given in figure 4.2.

As shown in fig. 4.2 on the information-energy diagram changing from initial PPS (point 0) to other states is characterized by one change of consumed energy and different states of psychological comfort.



*Fig. 4.2. Information-energy diagram of the PPS.*

Transition 0-1 is characterized by an increase in energy consumption and improvement of psychological state. The reason of this PPS change can be a good or pleasant news (the stimulus), it leads to a more intensive exchange processes (increase in energy consumption), and the psychological condition and mood notably improved (entropy of metabolic processes decreased, and the information content of the exchange increased).

Transition 0-2 is characterized by an increase in energy consumption and an even level of psychological state. The reason can be, for example, an increase in mental and physical activity, which lead to more intensive exchange processes (increase in energy consumption), at the same time, the psychological state and mood are unchanged, as conducted by the impact did not cause emotional changes.

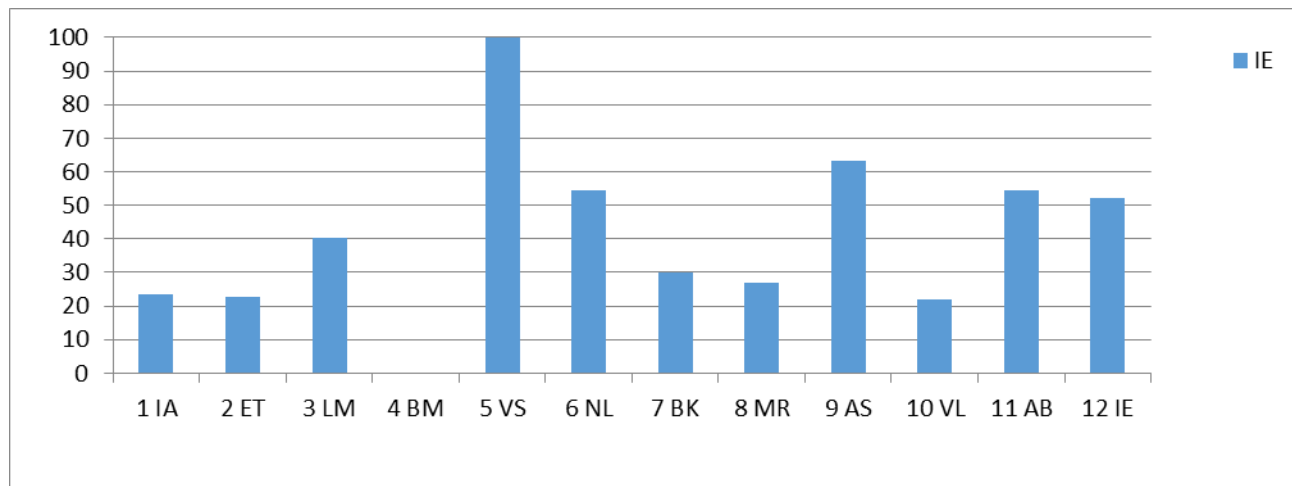
Transition 0-3 is characterized by an increase in energy consumption and impairment of psychological state. The reason can be unpleasant information that leads to a more intensive exchange processes (increase in energy consumption), and the psychological condition and mood became notably worse (entropy of metabolic processes became worse, and the information content of the exchange decreased).

Transition 0-4 is characterized by a decrease in energy consumption and impairment of psychological state. The reason can be unpleasant information that leads to a slowing of metabolic

processes (reducing energy consumption), and the psychological condition and mood became notably worse (entropy of metabolic processes became worse, and the information content of the exchange decreased).

Transition 0-5 is characterized by a decrease in energy consumption and improvement of psychological state. The reason can be pleasant news, which soothes and slows down the metabolic processes (reducing energy consumption), and the psychological condition and mood are notably improved (entropy of metabolic processes decreased, and the information content of the exchange increased).

These explanations describe the physiological processes on a qualitative level, and **VibraMI** program produces a quantitative calculation of information-energy processes occurring in the person upon presentation of stimulus. **VibraMI** shows the calculated human physiological reactions after each question in the form of an information chart (Fig.4.3).



*Fig. 4.3 Measurement of the psychophysiological responses to stimulus*

The resulting MI profile illustrates unconscious attitudes of the examinees concerning their abilities, i.e. minimally reflects the social stereotypes of desirable behavior.

## 5 Saving and analyzing results

Test results can be viewed using standard Windows functions, such as pressing the PrintScreen and download images from the screen to any standard program such as Paint to view graphics.

After completing of the questionnaire program **VibraMI** automatically creates files with the test results in the directory «C:\Users\user\Documents\MI Result».

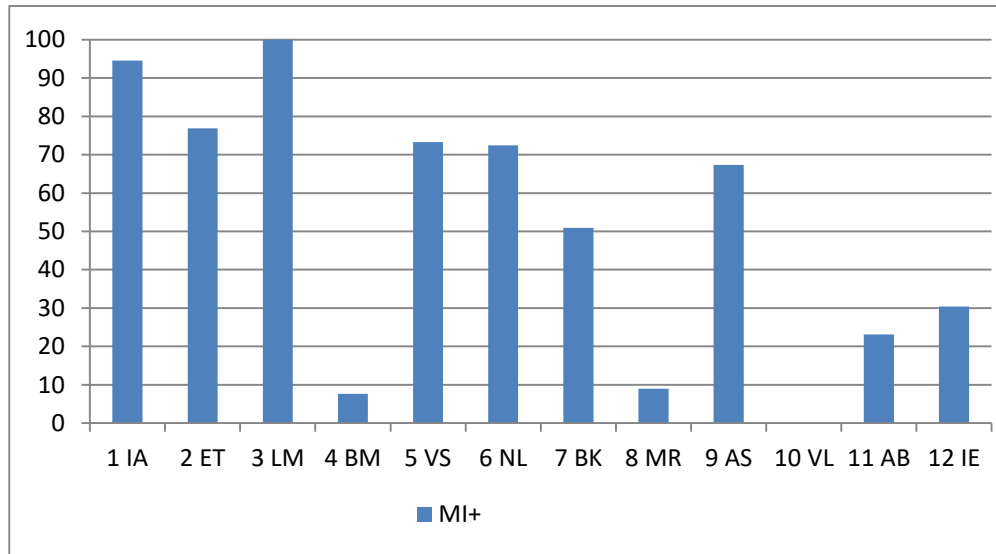
The result of testing recorded in the form of files of the following types:

<b>YYY-MM-DD hh_mm_ss_MI.xlsm</b>	main results of intelligence profile, aptitude and skills abilities. Excel format
<b>YYY-MM-DD hh_mm_ss_M.xlsx</b>	testing result for Mental-Functional state. Excel format
<b>YYY-MM-DD hh_mm_ss_e.txt</b>	text file with a list of questions with the ranking of reaction to them, calculated by different algorithms (A, M, I, S, S1, At, It, IE);
<b>YYY-MM-DD hh_mm_ss_histH.png</b>	graphic file with the histogram of frequency distribution
<b>YYY-MM-DD hh_mm_ss_histH.xml</b>	data file with the histogram of frequency distribution. XML format
<b>YYY-MM-DD hh_mm_ss_histT.png</b>	graphic file with graphs of I-E state of a person changes over the period
<b>YYY-MM-DD hh_mm_ss_LD.txt</b>	measurement results based on LD calculations. Text format
<b>YYY-MM-DD hh_mm_ss_M.xml</b>	Testing result for Mental-Functional state. XML format
<b>YYY-MM-DD hh_mm_ss_MI.xml</b>	main results of PPS changes during the PFT is presented synchronously with graphical and text information. XML format
<b>YYY-MM-DD hh_mm_ss_MI2.xml</b>	alternative results of PPS changes during the PFT is presented synchronously with graphical and text information. XML format
<b>YYY-MM-DD hh_mm_ss_row.txt</b>	text file with the results of the measurement parameters on questions for statistical processing

In all files in names **YYYY-MM-DD** and **HH\_MM\_SS** date and time of measurement.

## 5.1 Final test results

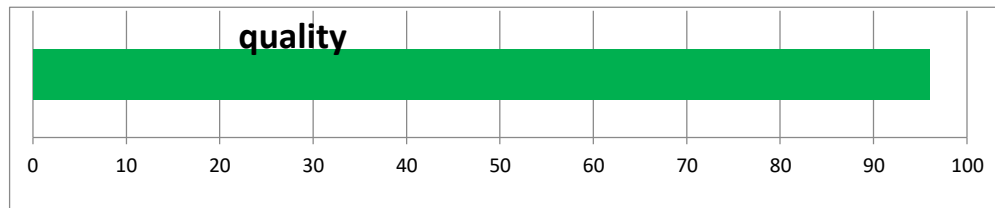
The results of intelligence profile, aptitude and skills abilities during the PPT are shown in graphical and table information indicated in xlsx file (Fig. 5.1.1-5.1.9) in list Final and in text files.



*Fig. 5.1.1 MI profile*

N	%		Intelligence profile
1	100	LM	Logical-mathematical (LM)
2	95	IA	Intrapersonal (IA)
3	77	ET	Existential-Theoretical (ET)
4	73	VS	Visual-spatial (VS)
5	72	NL	Naturalistic (NL)
6	67	AS	Ascetic-Sacrificial(AS)
7	51	BK	Bodily-kinesthetic (BK)
8	30	IE	Interpersonal (IE)
9	23	AB	Arts-Bohemian (AB)
10	9	MR	Musical-rhythmic (MR)
11	8	BM	Business-Mercenary (BM)
12	0	VL	Verbal-linguistic (VL)

*Fig. 5.1.2. Intelligence profile table based on MI rating*



*Fig. 5.1.3. Psychophysiological test quality*

	%	No	Broad field
1	88	06	Information and Communication Technologies (ICTs)
2	86	05	Natural sciences, mathematics and statistics
3	78	08	Agriculture, forestry, fisheries and veterinary
4	66	07	Engineering, manufacturing and construction
5	46	02	Arts and humanities
6	43	10	Services
7	43	03	Social sciences, journalism and information
8	41	04	Business, administration and law
9	39	09	Health and welfare
10	15	01	Education

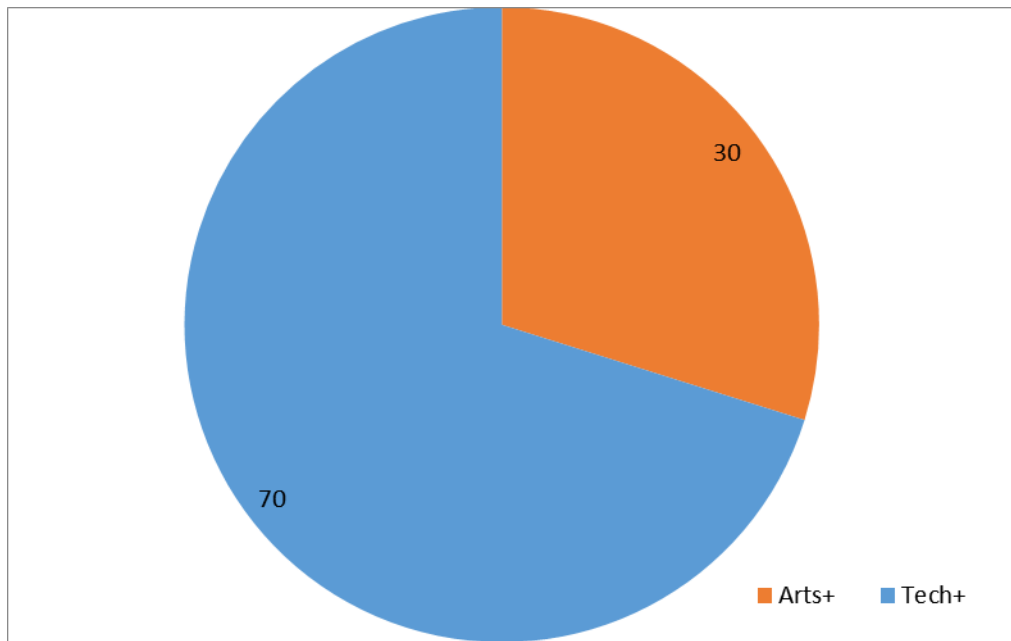
*Fig. 5.1.4. Broad field of recommended personality specialization*

	%	№	Narrow field
1	97	054	Mathematics and statistics
2	88	061	Information and Communication Technologies (ICTs)
3	87	073	Architecture and construction
4	84	081	Agriculture
5	84	082	Forestry
6	84	052	Environment
7	84	083	Fisheries
8	81	051	Biological and related sciences
9	81	053	Physical sciences
10	81	071	Engineering and engineering trades

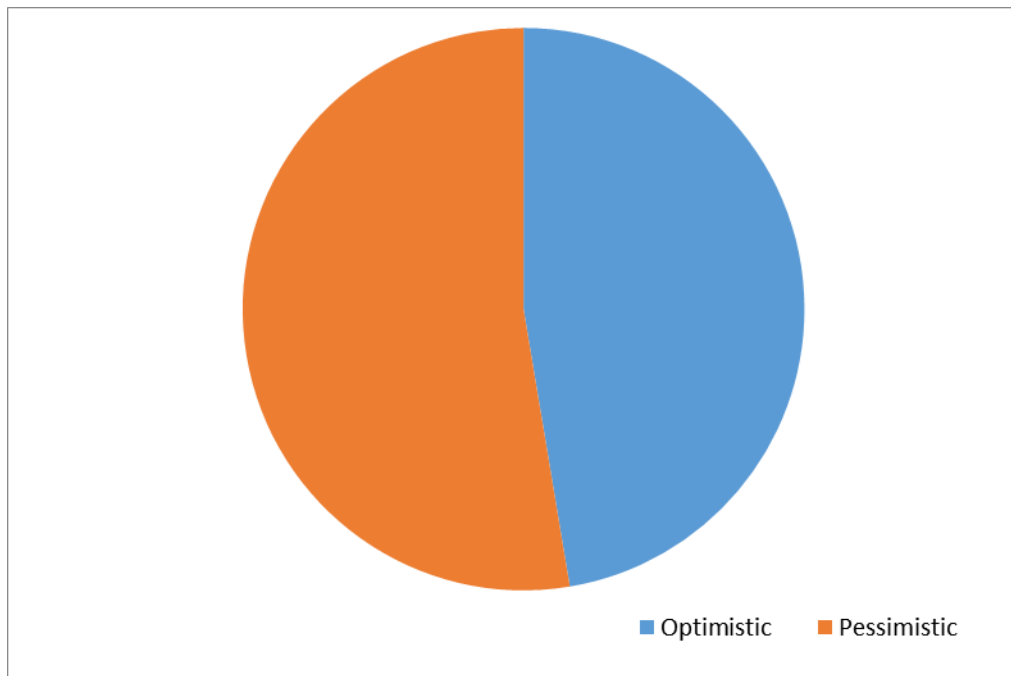
*Fig. 5.1.5. Narrow field of recommended personality specialization*

	%	№	Skills
1	97	0541	Mathematics
2	97	0542	Statistics
3	88	0611	Computer use
4	88	0612	Database and network design and administration
5	88	0613	Software and applications development and analysis
6	88	0713	Electricity and energy
7	88	0714	Electronics and automation
8	88	0715	Mechanics and metal trades
9	87	0731	Architecture and town planning
10	87	0732	Building and civil engineering

*Fig. 5.1.6. Recommended personality specialization*

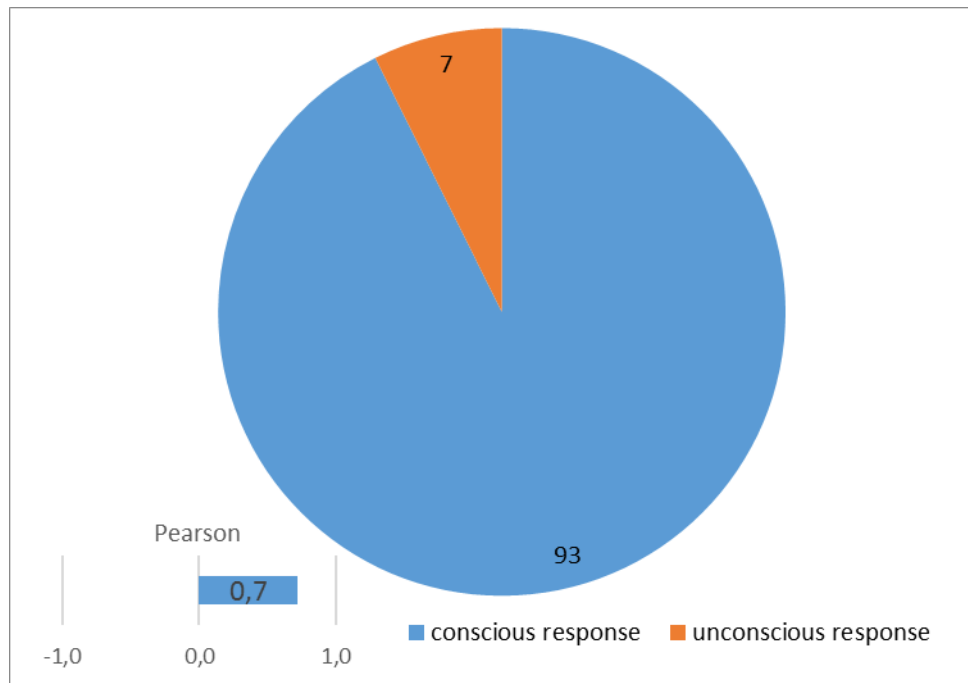


*Fig. 5.1.7. Ratio between Arts and Tech personality abilities*



*Fig. 5.1.8. Ratio between optimistic and pessimistic relation during current PPT*

In the fig. 5.1.9 there is ratio between conscious and conscious response during current PPT. In the left bottom part of the chart there is graph of sum Pearson's correlation coefficient. It's counted on graphs I(t) and E(t) from the file **YYY-MM-DD hh\_mm\_ss\_M.xlsx**.



*Fig. 5.1.9. Ratio between conscious and unconscious response during current PPT*

Given MI profile data are the testing VibraMI results of Viktor Minkin, the author and inventor of this method and VibraMI program.

## 5.2 MI Stat data

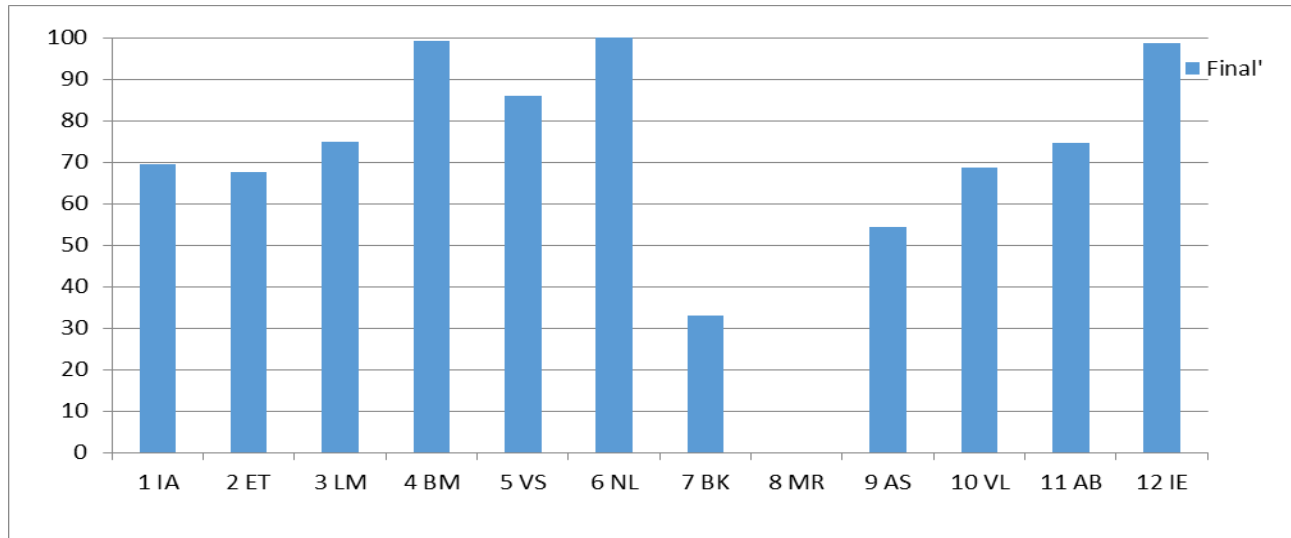
There are graphs Final, Final', YN, IE and YN - IE in xlsx file in MIStat sheet before the Final tab (Fig. 5.1.1, 5.2.1 - 5.2.4).

The Final graph is the same as the MI profile graph (Fig. 5.1.1). It summarizes the conscious response to questions (YN) and the subconscious (IE), but is calculated with averaging over the first 4 and last 4 MI types subconscious response (IA, ET, LM, BM and AS, VL, AB, IE).

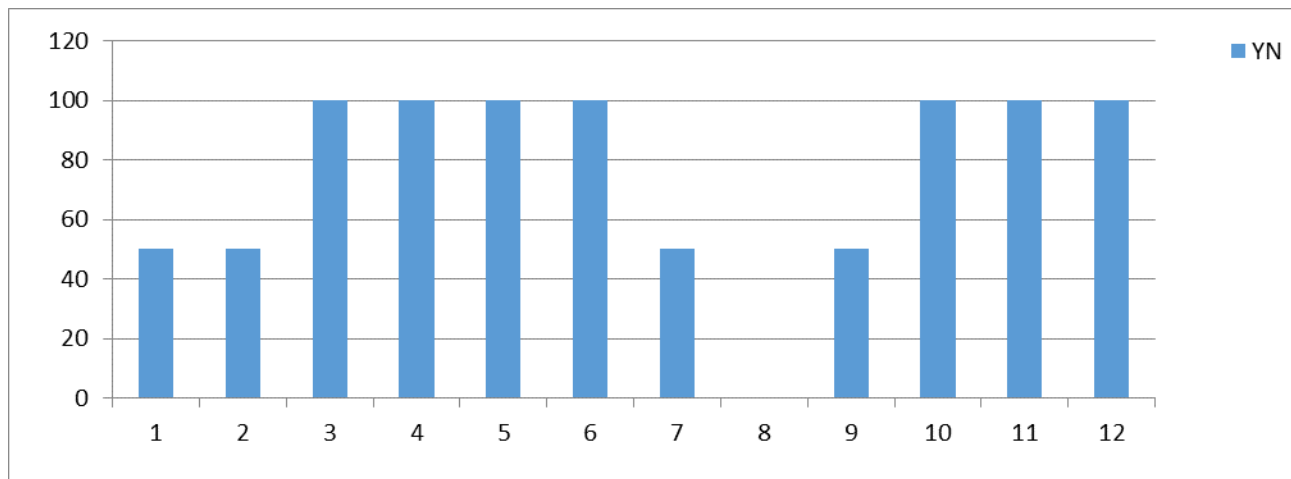
Final' is similar to the Final graph but it is without averaging of opposite MI types (Fig. 5.2.1).

The graph of YN (Yes / No) shows conscious response based on the answers to the questions (Figure 5.2.2). For more details, see section 4.2.

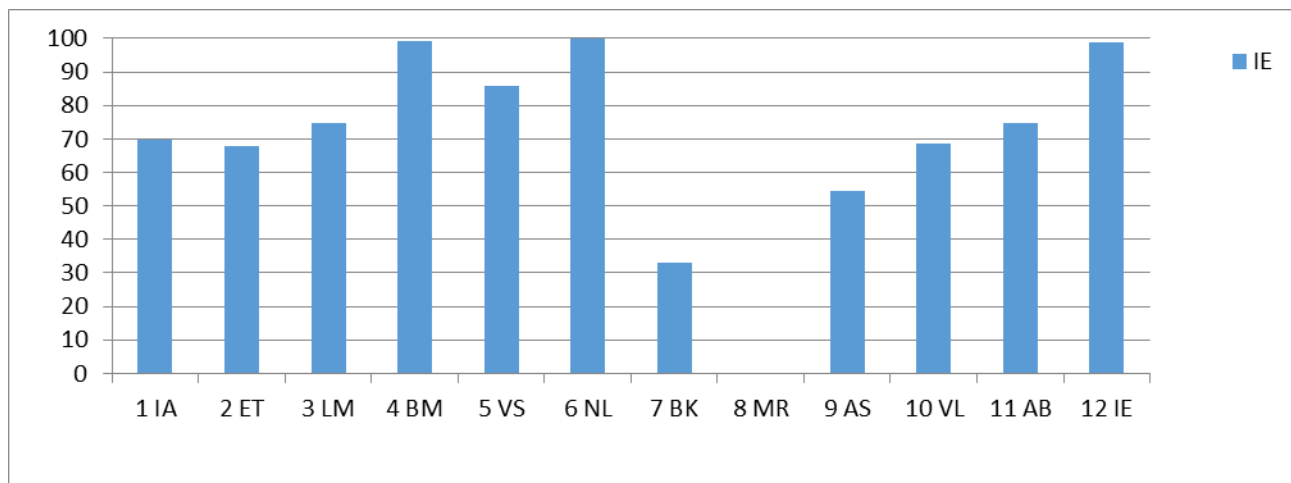
The graph IE shows the change in the information-energy state of a person during PPT). For more details, see section 4.3.



*Fig. 5.2.1 MI profile without correction IE unconscious response.*



*Fig. 5.2.2 MI profile on conscious response only (Yes/No).*



*Fig. 5.2.3 MI profile on subconscious response only (IE).*

Graphs in Figures 5.2.1 -. 5.2.4 are results of testing one person. Graph on conscious response (Fig. 5.2.2) shows that tested person thinks as his strengths Logical-Mathematical (LM), Business-Mercenary (BM), Visual-Spatial (VS), Naturalistic (NL), Verbal-linguistic (VL), Bohemian-Demonstrative (BD), Interpersonal (IE) MI types and weakness is Musical-rhythmic (MR) type. Graph on conscious response (Fig. 5.2.2) shows that tested person reacted most strongly to questions for 4 BM, 5 VS, 6 NL, 12 IE MI types.

Figure 5 clearly shows *difference* (the differential MI profile) between conscious and unconscious responses, obtained when constructing MI profiles. Max difference is 32 % for 10 VL MI type. Five of the twelve MI types more than 0 (above the axis). It means that conscious perceptions of tested person's own abilities have a greater weight (value) than unconscious perceptions. By the "comfort zone" we mean the minimum dispersion of values of the analyzed index lower than  $\pm 10\%$ . 4 BM, 6 NL, 8 MR, 9 AS, 12 IE these are types for the graph fig. 5.2.4.

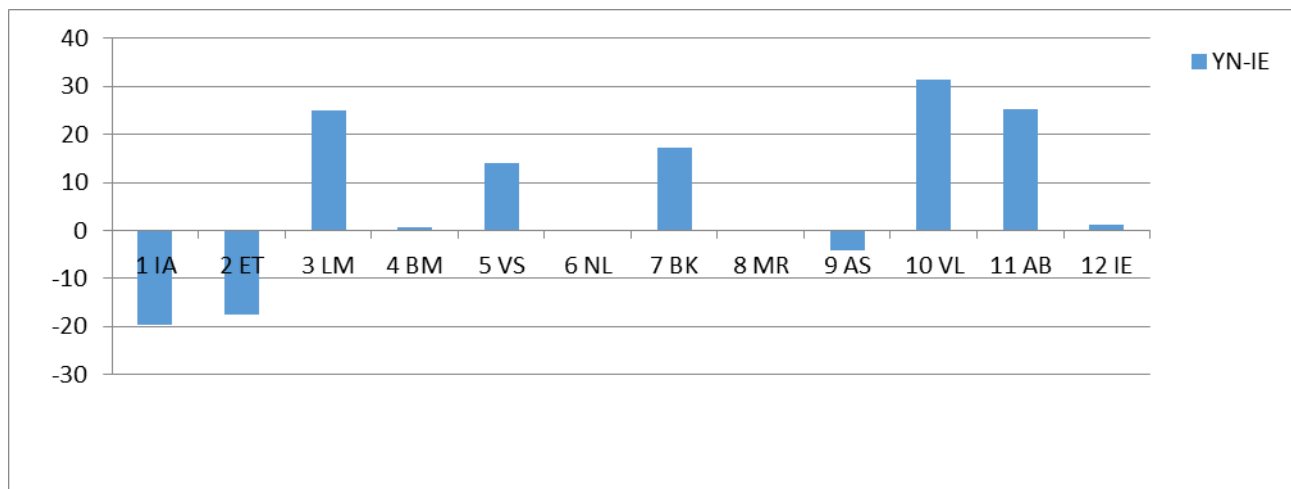
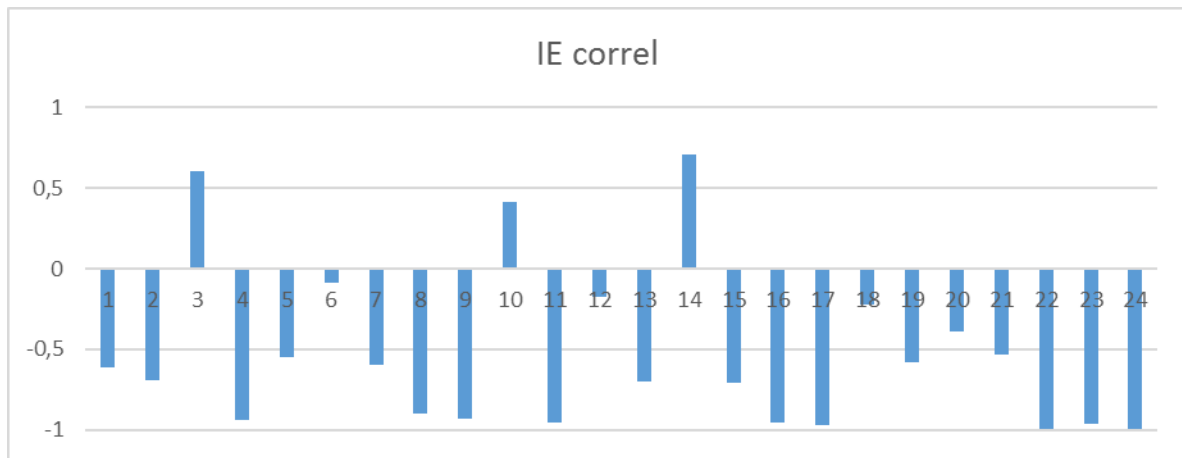


Fig. 5.2.4 Differential MI profile.

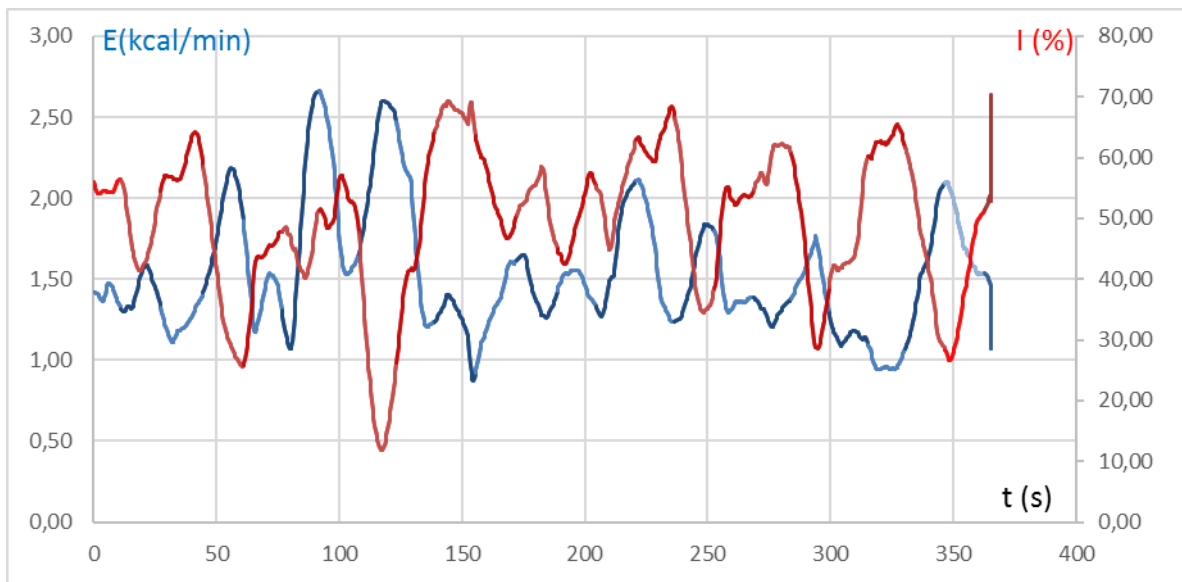
An ideal differential MI profile for the perfect person, from the viewpoint of equality of conscious and unconscious person's responses, should represent small columns of the MI types, which are not going beyond  $\pm 10\%$  or having approximately equal the weight of positive and negative responses in YN-IE graph. In a harmoniously developed person, the area of the integral, which is higher and lower of the axis on the differential profile, should be approximately equal. In this case, a conscious response is prevailing for some MI types, and for other MI types – an unconscious response. At the same time, generally an approximate equality is observed. Figure 5.2.4 represents results indicating that the values of differential MI profile is far from perfect and harmonious.

Graph "IE correl" (Fig. 5.2.5) is very useful for better understanding reactions on different questions. On this graph you can see value of Pearson's correlation coefficient for each question. If a person feels himself well and he does not strain during answer a question, or if he feels bad and strains to respond, then the Pearson's correlation coefficient is higher than 0. If the change I and E varies differently in the process of the response, then the coefficient is negative.



*Fig. 5.2.5 Pearson's correlation coefficient for each question*

Graph IE correl indicates time dependences of Information and Energy parameters analysis on graphs I(t) and E(t) (Fig. 5.2.6) from the file **YYY-MM-DD hh\_mm\_ss\_M.xlsx**. This time dependences give additional information about person replies to corresponding questions.



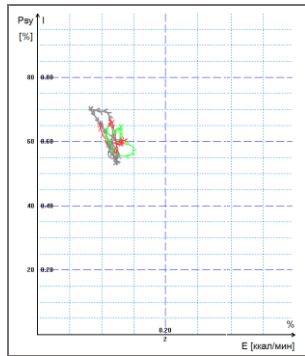
*Fig. 5.2.6 Time dependence of parameters I and E for each question*

### 5.3 Graphs of PPT changes

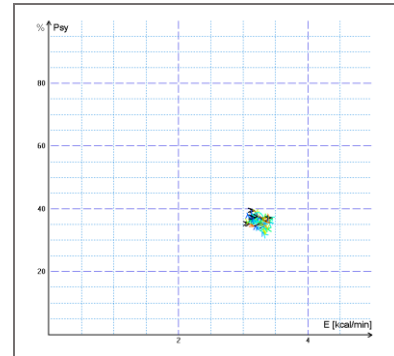
Changing of I-E state of a person to a controlled period of time clearly displayed on the graph (see fig. 5.3). Only a person who is in a relaxed or in a state of high concentration (see fig. 5.3b) may be in a fixed I-E state during such insignificant time as 1 minute. Most of the people make a noticeable fluctuations of I-E state, even for short periods of time, depending on their thoughts (see fig. 5.3a) and under the influence of the environment (see fig. 5.3c).

Color line of I-E state changes corresponds to the «color» of the test question:

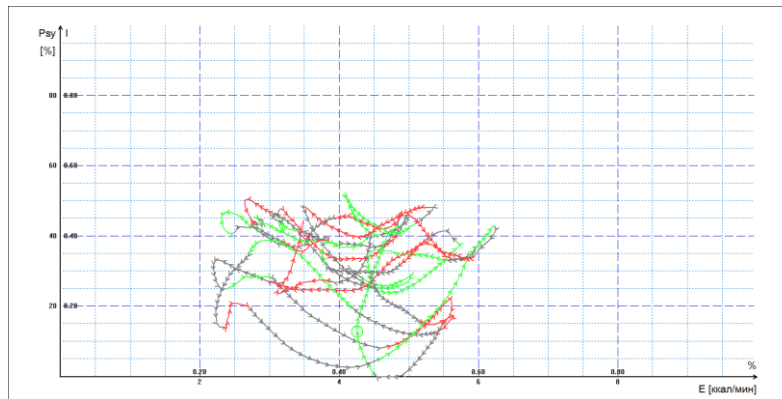
- time between questions – grey;
- control questions – green;
- relevant questions – red.



*a) Changing around the average value*



*b) Stable condition, indicating a high degree of self-control person..*




*c) Periodic change I-E state along a certain trajectory, usually characteristic for an interview, type a question-answer*

*Fig. 5.3 (a, b, c). Change person psycho-energy conditions for the chosen period.*

User can see I-E state graph on tabs  on the main window.

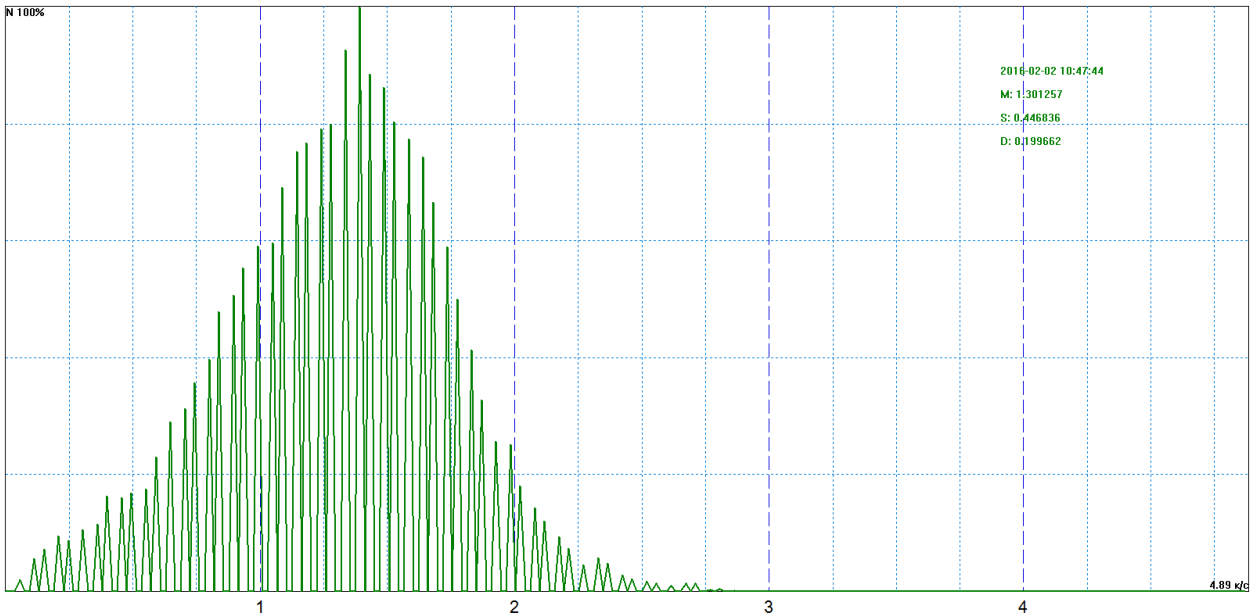
## 5.4 Frequency histogram of PPT

The frequency histogram (Fig. 5.4) of PPT shows the total distribution of the tested person vibrations for all the test time. The similarity of the received histogram to the normal law of distribution means a normal state of the tested person during the test. Asymmetry or multimodality of the received histogram argue of certain deviations from the norm during the test.

User can see histograms on tab  on the main window.

Each histogram is characterized by the following parameters:

- M – the center of weights of frequency distribution (average value of microvibrations frequency);
- S – root-mean-square deviation of frequency distribution;
- D – a dispersion of frequency distribution.



*Fig. 5.4 Example of frequency distribution histograms.*

## 5.5 Psychophysiological status of the person

1. Every from T1-T10 psychophysiological parameters measured by vibraimage system are specified to range 0 - 1 (0 - 100) % using fixed coefficients experimentally selected.

2. Mathematical formula by which measured psychophysiological parameter is determined is primary, and a code name (for example, Agression) is secondary. Psychophysiological meaning of each parameter T1-T10 may be varied depending on the experimental conditions.

3. The set of measured parameters T1-T10 determines the total psychophysiological (psychosomatic, functional) status of a person based on the integral coefficient K.

Statistical processing of parameters measured in a mode «**M**» is carried out by the program Vibrastat.

On Psy variability-Mental basal metabolism diagram (see more information in ch. 4.3) changing of person's state is highlighted with different colors. For example, last question link with red color.

For more information about this file (Fig. 5.5) refer to «Behavior Detection System. VibraImage 10 PRO. Manual», [http://www.psymaker.com/downloads/VI10\\_ManualEng.pdf](http://www.psymaker.com/downloads/VI10_ManualEng.pdf) in the section «M Mode».

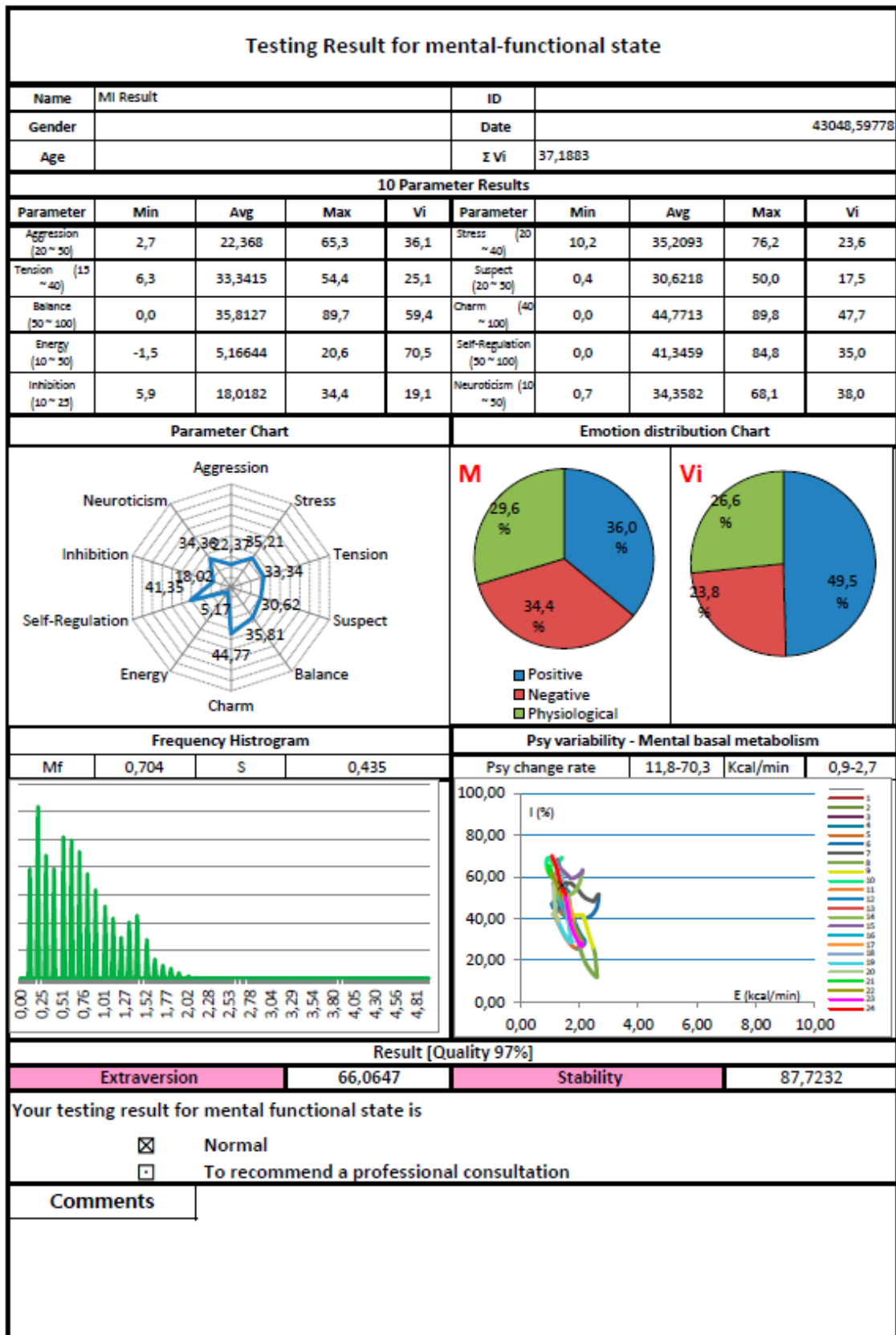


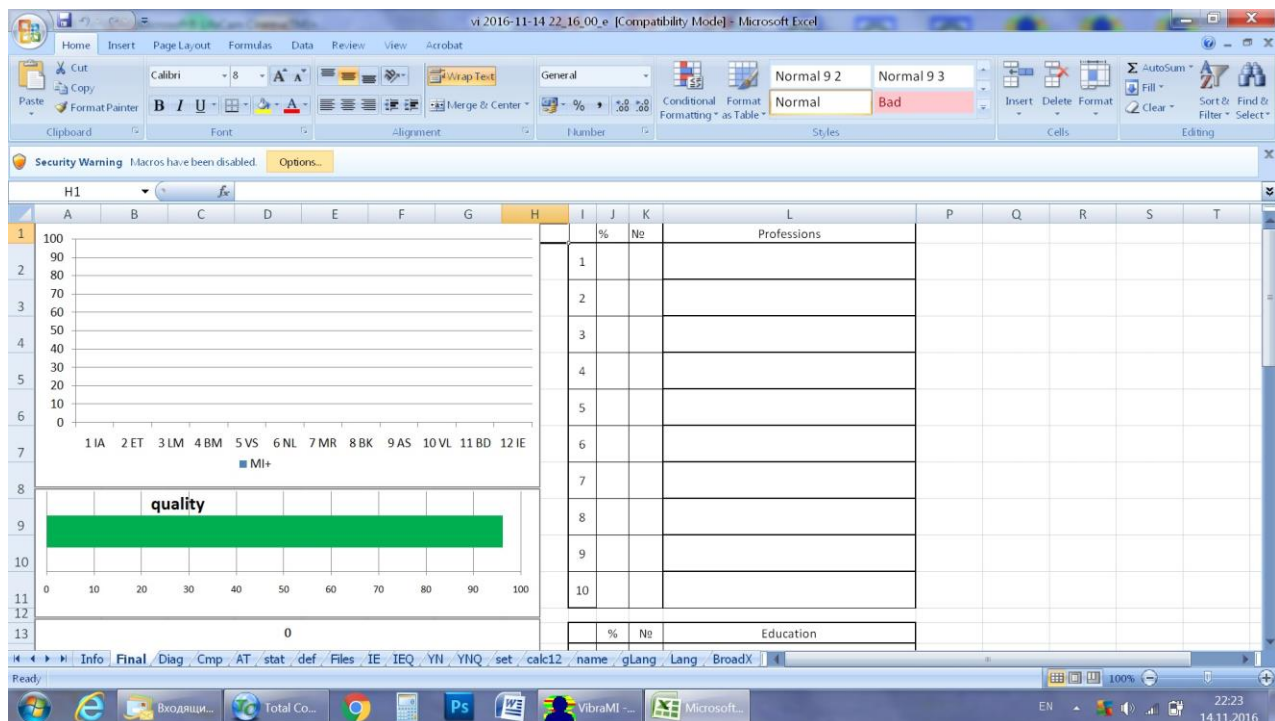
Fig. 5.5 Psycho-emotional status of the person

## 5.6 Recording of technical test results. Excel file start

Full record of values parameters registered by vibraimage system is recorded to a text file with the ending row. This file can be used for statistical research and testing of algorithms for determining PPS and PFT.

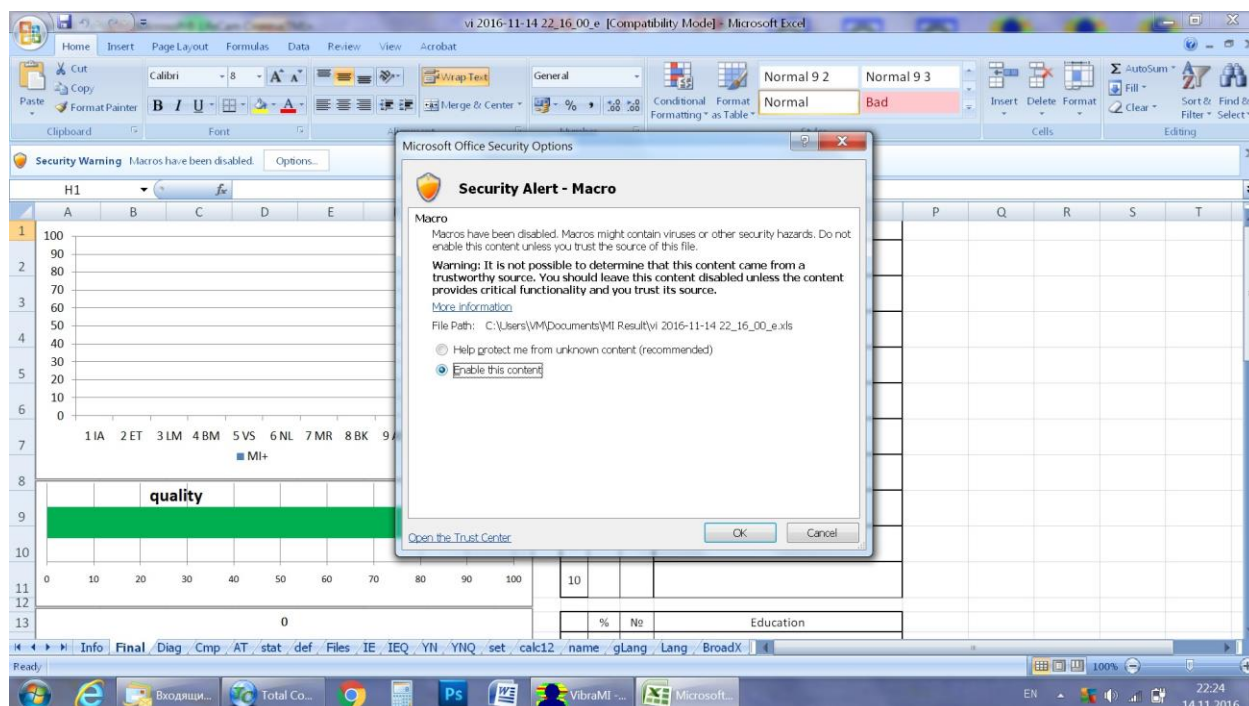
This file can be copied and transferred to Excel for self-treatment.

**Note**, if Macros have been disabled in current Excel program you need to start Macros in manual mode. In this case after test finishing you will see empty table as it is shown on fig. 5.7.1.



*Fig. 5.7.1 Empty table of excel file with disabled macros*

In this case you need to enable Macros function in the manual mode as it is shown on the fig. 5.7.2.



*Fig. 5.7.2 Macros enable function start*

Concrete interface of Macros function enabled depends on the version of stand Excel program and can differs from fig. 5.7.1 and 5.7.2. So you need to use Excel help for starting Macros function in the opened file for calculation of MI parameters.

## 6 Warranty

Maintenance service and service regulations of **VibraMI** system is carried out according to this Manual and instructions of used hardware maintenance (a computer, the camera, etc.).

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Version **VibraMI** 10

December 2016

Updates and questions on [www.psymaker.com](http://www.psymaker.com)

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