

Problems and Peculiarities of the IT Project Management of Ontological Engineering for Person Psychological State Diagnosing

Oleh Veres^[0000-0001-9149-4752]¹, Oksana Oborska^[0000-0003-4121-9685]²,

Andrii Vasyliuk^[0000-0002-3666-7232]³, Yuriy Brezmen^[0000-0003-4962-9929]⁴,

Ihor Rishnyak^[0000-0001-5727-3438]⁵

Lviv Polytechnic National University, Lviv, Ukraine

oleh.m.veres@lpnu.ua¹, oksana949@gmail.com²,
Andrii.S.Vasyliuk@lpnu.ua³, yuriy.brezmen@gmail.com⁴,
Ihor.V.Rishnyak@lpnu.ua⁵

Abstract. The design of information technology of ontological engineering for diagnosing the mental state of a person is carried out. The article investigates the problem of automated development of basic ontology for person psychological state diagnosing. A method, algorithm and means for extracting knowledge from natural text of analyzed person are proposed. It is shown that such an algorithm should be multi-stage and include a hierarchical multi-level procedure for recognizing concepts, relationships, predicates and rules, which are introduced as a result of ontology.

Keywords: ontology, ontology training, automated development, knowledge base, text document.

1 Introduction

Since the time of the first computers, people have used computers to solve a variety of problems, because computers are much faster than we are, allowing them to perform all kinds of tasks faster and more efficiently in all areas of their lives [1-3]. And medicine is no exception [4]. Thanks to computer diagnostics, we can quickly access the information we need, pre-screening it out of the vast array of other irrelevant data [5-7]. We can communicate, share emotions, share and enjoy with others [8-9]. But like any computer, there are failures in the brain. In most cases, they are insignificant and have little or no impact on our daily lives, manifesting only with headache or mild insomnia [10-12]. But sometimes there are failures that lead to a complete change in human behavior, often making it socially unacceptable. In such cases, it is necessary to determine what kind of mental abnormality has occurred and to continue to treat it [13-16]. Mental impairment is a disorder in the brain that leads to changes in

a person's mental or physical health, creating inconvenience for the patient or his or her environment [17-20]. Quite often such inconveniences can cause suffering and impairment of a person's ability to function in life. However, with timely diagnosis and proper treatment, it is possible to get rid of deviations, which contributes to the recovery of the patient and, in turn, his full return to society and a normal life. Mental disorders can be traditionally divided into psychotic disorders (psychoses), that is, painful conditions in which delusional ideas, hallucinations, disturbances of consciousness, major disturbance of emotions and mood, associated with disorders of thinking and activity, and non-psychotic disorders that exist. include neuroses and other types of neurotic disorders, some psychosomatic disorders, mental retardation, most groups of organic personality disorders, alcohol or other addictions, some sexual abnormalities. This division is not accurate because some non-psychotic disorders, such as drug addiction, may have psychotic symptoms such as disorders of consciousness. The purpose of the work is to develop a method, algorithm and software for automated development of a basic ontology for diagnosing a person's psychological state.

2 Formulation of the Problem in General

Obviously, it takes a lot of time and resources to manually build a complete related ontology for a specific subject area. The reason for this cost is that such ontologies must contain tens of thousands of elements in order to be capable of solving the wide range of applications that arise in these software. Therefore, the manual construction of an ontology by a human operator is a lengthy routine process that, in addition, requires a thorough knowledge of the subject area and an understanding of the principles of ontology construction. Therefore, we will build mathematical support for the automation of ontology construction, and more precisely its construction. Because we believe that the basic terms and the relationship between them should be entered manually by an expert person into the ontology. We call this ontology a basic one and denote it $O_{base} = \langle C_b, R_b, F_b \rangle$. That is, the construction of an ontology begins from the moment when it already has some data. Therefore, we will call this process the development of a basic ontology and denote: $\gamma: O_{base} \rightarrow O$. In order to build ontologies that adequately describe semantic software models, it is necessary, first of all, to solve the problems of obtaining knowledge from different sources in order to identify many concepts and establish a hierarchy on that set. Since much of the information is contained in natural-language texts, it is promising to acquire knowledge of textual information as well as intellectually processing specially selected collections of natural-language texts.

3 Subject Area Analysis

3.1 Description of the Subject Area in Terms of Ontological Engineering

Psychiatry is a medical discipline that studies diagnostics and treatment, etiology, pathogenesis and prevalence of mental illness, as well as the organization of psychiatric care for the population. It is part of clinical medicine. In addition to the main research methods used in clinical medicine, such as examination, palpation, and auscultation, a number of techniques are used to study mental illness to identify and evaluate the patient's mental state is observation and conversation. In the case of mental disorders as a result of monitoring the patient can identify the originality of his actions and behavior. If the patient is disturbed by auditory or olfactory hallucinations, he or she may be stuck in the ears or nose.

When observing, it can be noted that the patients close the windows, ventilation openings, so that the gas, which is supposedly released by the neighbors, does not penetrate into the apartment. This behavior may indicate the presence of olfactory hallucinations. In the case of intrusive fears, patients can perform incomprehensible movements, they are rituals. An example is the endless washing of hands with the fear of dirt, crossing over cracks on the asphalt, "to avoid misery.

When talking to a psychiatrist, the patient can inform him of his experiences, fears, fears, bad mood, explaining the wrong behavior, as well as express inadequate situations of judgment and delusional experiences. For the proper assessment of the patient's condition, it is of great importance to collect information about his past life, to relate to the events that occur, and to deal with the people around him.

As a rule, when collecting such information reveals painful tracks of some events and phenomena. In this case, it is a history and mental state of the patient.

Sometimes doctors encounter the phenomenon of anosognosia - the denial of sickness by the patient himself and his close relatives, which is characteristic of such mental illnesses as epilepsy, oligophrenia, schizophrenia. In medical practice, there are cases where the parents of the patient as if they do not see the obvious signs of the disease, being quite educated people and even doctors. Sometimes, despite denying the fact of having a relative's illness, some of them agree to carry out the necessary diagnosis and treatment. In such situations, the psychiatrist must show maximum professionalism, flexibility and tact. It is necessary to carry out treatment without specifying the diagnosis, not insisting on it and not convincing anything of relatives, based on the interests of the patient. Sometimes relatives, denying the illness, refuse to carry out the course of necessary therapy. This behavior can lead to a weighting of the symptoms of the disease and its transition to a chronic course.

Many factors affect the response of the individual and the disease:

- Nature of the disease, its severity and rate of development;
- Understanding of the disease in the patient;
- Nature of treatment and psychotherapeutic setting in the hospital;
- Personal qualities of the patient;

- Attitude towards the illness of the patient, as well as his relatives and colleagues.

It is important for healthcare professionals to detect changes in sensitivity in patients while monitoring them, in order to properly organize care. When hearing loss in patients, you need to talk to them louder, with increasing light sensitivity is darken the ward. It should be borne in mind that unjustified complaints of the patient on the taste of food may be due to changes in the perception of taste, and complaints of bad breath is exacerbation of smell. The general patterns of feeling include the concepts of adaptation, habituation and sensitization. Adaptation leads to changes in sensitivity due to the long acting stimulus. For example, you go out into the darkened room on a clear sunny day outside. At first you see nothing, and then the visual analyzer adapts and you begin to see everything. Habituation is a habit when certain stimuli become so familiar that they cease to affect the activity of the higher parts of the brain. For example, a city dweller does not notice noise from transport and smell of exhaust gases. Doctors do not "notice" the specific odor in hospitals, do not respond to chlorine, and patients need a few days to get used to these smells.

Sensitization is a dramatically increased sensitivity to a specific stimulus. For example, in the ward, where the patient is lying flying fly or mosquito, Specific sound that when they fly after a certain time becomes unbearable for the patient, literally brings him out of equilibrium. In asthenized patients the threshold of sensation decreases, the tendency to sensitization develops. Knocking on the heels of a nurse's shoe or the smell of perfume negatively affect a patient's mental state.

Feeling is at the heart of all mental activity, especially closely related to emotions. Everyone knows how it affects the mood of pain. Emotions may also depend on subthreshold, unconscious feelings. First of all, this refers to the feelings from the internal organs. Very often the first manifestation of the disease is a change in mood.

The sensitivity of the analyzers may vary. Thus, with the organic popping of an analyzer, the sensitivity of other analyzers increases, for example, in the blind, the hearing, the sense of touch, and even the smell are sharpened. The deaf eyesight is sharpening. This should be remembered by nurses who serve similar categories of patients. The central sections of the olfactory receptors are directly connected to those subcortical parts of the brain that house "centers of instincts and emotions". The olfactory receptor signals greatly affect the reticular information, which increases the excitability of the cerebral cortex. It is known that inhalation of vapor on tent alcohol helps to bring out the state of consciousness. Unpleasant odors for a long time acting on it aggravate the course of the disease. Odor sensitivity depends on hormones and the state of the nervous system. It rises in the morning and evening, and in many patients the sense of smell is exacerbated. This must be taken into account when looking after them. The value of skin sensations in the knowledge of the outside world is very great, especially in infants and the blind. Skin sensations strongly influence the emotional state of a person. The best way to reassure your baby is to stroke her, hug her, and hold her tight. If the essence of sensation is mainly the process of analysis, then the basis of perception is mainly synthesis. Perception is not a simple sum of sensations, it is a complex mental process, which, together with the sensation, involves previous experience in the form of knowledge, ideas,

concretization and relationships, judgments and conclusions. Due to the fact that perception depends on previous experience and knowledge, it is largely subjective.

3.2 Functionality of the Software System

This mental deficiency system will have the following features:

1. Functionality selection provides the user with the ability to select a functional application such as passing a diagnosis or viewing a complete list of symptoms.
2. Diagnosis gives the user the opportunity to establish the disease according to the available symptoms, answering the question.
3. The number of assumptions allows the user to receive information about the number of assumptions about possible diseases, based on already existing symptoms.
4. Question output feature allows the user to get an idea of a possible symptom.
5. The screening algorithm is a function responsible for screening out illnesses and symptoms that are impossible by analyzing previously obtained information.
6. Question skip feature is a function designed to avoid muteness to make a diagnosis in the absence of information about a particular symptom.
7. Creating a list of symptoms is responsible for generating a list of potential symptoms.
8. Creating a list of diseases is responsible for forming a list of potential diseases.
9. Symptom Output Function enables the user to receive symptom information.
10. Disease function enables the user to get information about the symptom.
11. Output Output allows the user to retrieve information about the output.

To provide additional information about the functionality of the system, the proposed functions are presented in the form of table 1.

Table 1. The functionality of the system, the proposed functions

No	Status	Priority	Labor intensive	Risk	Stability	Target version
1	Include	Useful	Low	Low	High	1.0
2	Include	Critical	Average	Low	Average	1.0
3	Include	Useful	Average	Low	High	1.0
4	Include	Important	Hard	Low	Average	1.0
5	Include	Critical	High	Average	High	1.0
6	Include	Useful	Low	High	Average	1.0
7	Include	Critical	Average	Low	High	1.0
8	Include	Critical	Average	Low	High	1.0
9	Suggested	Useful	Average	Low	High	1.1
10	Include	Useful	Average	Average	Average	1.0
11	Suggested	Important	High	Low	Average	1.1

3.3 Analysis of known systems

At present, there are no information systems that can fully analyze the data and solve the problems of this problem. Classical methods such as talking to a psychologist or a psychiatrist with a patient are mostly used to identify and diagnose psychiatric abnormalities. Psycho-analysis methods, such as tests, are used for the specific establishment of mental abnormality.

ProfessionalPhychologyTest application. There are many applications of systems for conducting the Rorschach test in electronic format. One example of such applications is the ProfessionalPhychologyTest. The official description of the app on the Google Play Market states that the app provides an opportunity to quickly pass the Rorschach test and get information about its results. However, in reality, this is not true at all. When you open the main application menu, you can see 20 different buttons, which are divided into two groups is cards and answer cards. The new user may have some difficulties understanding the program interface, because the buttons are not formatted and difficult to understand immediately their purpose.

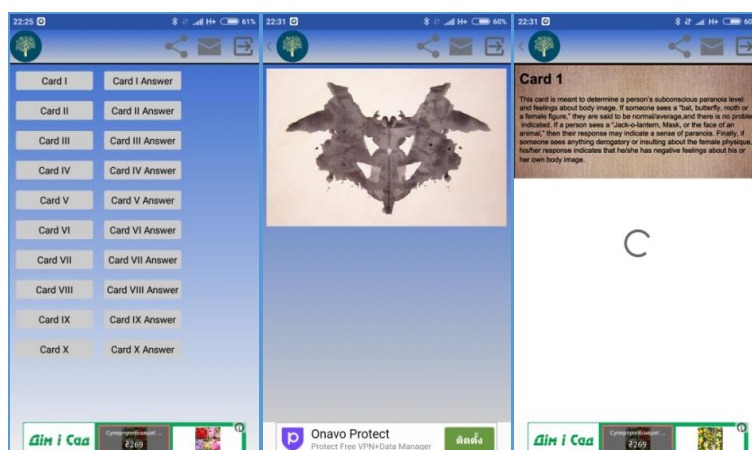


Fig. 1. a) ProfessionalPhychologyTest Main Menu; b) a window depicting one of the Rorschach spots; c) information window

However, the absence of any instruction to indicate the purpose of this image is a serious disadvantage. Clicking on the button from the second column, we get a description of one of the spots, but implemented in the form of an image, without the ability to zoom. The image in rather small font describes only the general information about possible variants of images on a spot. Note that when you first load any of the second column buttons, the application hangs for a while. Also a disadvantage of the ProfessionalPhychologyTest application is the large amount of advertising that sometimes blocks the ability to continue working with the application.

MentalDisorders application. The MentalDisorders Android App is a directory with lots of mental health data. Launching the app opens a large list of mental illnesses to the user. A search for the disease by name is also available. By selecting

any item from the list, you can get a wealth of information with a detailed description of the disease, its origin and development, the available symptoms and treatments.

The disadvantages of the application include the lack of ability to search for mental disorders by symptoms. A serious disadvantage is that among the list of mental illnesses you can find various symptoms, such as depression, which in itself is not a mental disorder. Also, the disadvantages of the application include the presence of advertising in it.

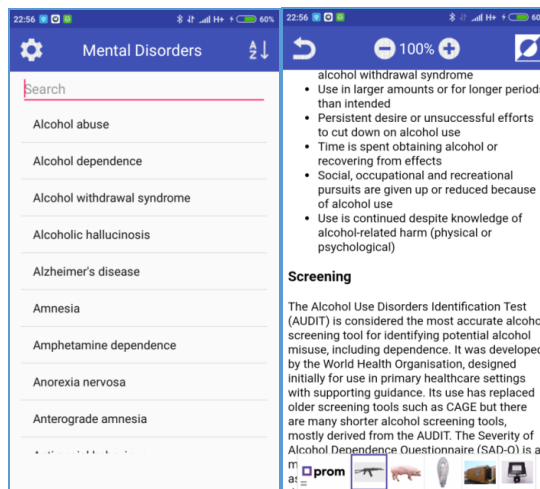


Fig. 2. a) MentalDisorders main window; b) Deviation information window

4 Rorschach Ink Stain Technique

The Rorschach test, also called the ink test, is a psychological testing projection in which a person is asked to describe what he or she sees in 10 ink traits, some black or gray and others co-ler. The test was introduced in 1921 by the Swiss psychiatrist Herman Rohr-shah. It reached its peak in the 1960s, when it was widely used to assess cognition and personality and to diagnose certain psycho-logical conditions.

Responses to the Rorschach test are generally counted based on the location in the spot of things observed, the nature of the stimulus stimulus (eg, shape or color) and the content of perception (eg, animals). From the results of the evaluation, the psychologist tries to describe the personality of the subject, often comparing the estimates with the established norms [5]. The interpretation of the subject's responses is not extremely standardized, however, despite the introduction of the Exner Rating System in 1974, which was designed to address weaknesses in the Rorschach study. Although it is still in use, Rorschach testing is generally considered to be an unreliable method of psychological assessment and diagnosis. Similar tests were developed, in particular, with the American psychologist Wayne Holtzman with two cards. The history of the creation of the Rorschach test is quite interesting. In a small town in Switzerland in 1917, the psychiatrist Herman Rorschach began to carefully

spray paint on maps to study how the mind works. Asking people what they saw, he observed a correlation in the responses of patients with schizophrenia and theorized that mental health could be assessed by the way someone processes visual information.

The original 10 photographs of Rorschach were published in 1921, a year before his death. Once shipped to Chicago, they quickly spread across the United States as a popular personality test. In the second half of the century, trends such as Freudian analysis fell out of favor, and test became synonymous with pseudoscience. Critics have called for a moratorium on its use. But a major 2013 study published by the American Psychological Association found it more effective than previously thought in the diagnosis of mental illness. The American Psychological Association found it more effective than previously thought in the diagnosis of mental illness.

The Rorschach cards and the order in which they are presented to patients have never changed. To maintain their usefulness as a diagnostic tool, psychologists do not want them to be shown outside the clinical setting. The Rorschach cards and the order in which they are presented to patients have never changed.

The whole test is usually kept secret, since each reaction can be interpreted in some way by a psychologist. For example, the question of a card can mean something very important. The psychologist rarely gives the tester any guidance whatsoever and ever how far they should react. If the person asks if they are allowed to touch the card, move it, etc., the psychologist will add it to the calculation and submit it accordingly. On the original maps, on the back are numbers specially designed for use by psychologists. If someone notices the numbers, it is also noted and calculated accordingly. Probably, the original test had one set of procedures to be performed [6].

Another thing to note is the way you express your answer "This ..." is a very bad answer, since the test user should know that the cards are not specific objects / people / creatures. Instead of answering these words, it should be said ... "It looks ..." because it is considered a more psychologically healthy reaction. If for some reason you are able to answer the phrases correctly, there are still opportunities for a test to mark you as mentally retarded or for demonstrating mental illness. Seeing nothing is usually a sign of "backwardness" and many things are a sign of "mental illness". In any case, it seems very difficult to get "good" [7]. Ink stains should be kept very secret so that the subject's reaction to them does not damage them. The idea behind the test is related to the immediate reaction. The reaction is expected to reveal the most intimate actions and secrets of the test subject. Most well-known psychologists no longer use the test because they believe that under the best case scenario they are not very reliable. They also believe that tests can be dangerous because of flexibility in interpretation. In schizophrenia, information is also reduced in different areas of the cerebral cortex. The mechanism of hallucinations in schizophrenia may be the same. Depending on which area of the cortex exhibits increased activity, schizophrenia patients see or hear what is not. Indeed, the group of professor Rene Kahn from Utrecht in a series of reconnaissance experiments has shown that electromagnetic stimulation of the brain reduces the hallucinations of patients with schizophrenia. In contrast, an isolated camera, where patients are still placed in the acute phase, increases the lack of information entering the brain and thus can seriously worsen the situation.

Schizophrenia is more common in men, and in women it is milder. This is due to the characteristic difference in the structure of the brain of a man and a woman: the number of nerve cells in women is much larger. Hallucinations, of course, occur not only in schizophrenia. Most often, they occur in delirium.

Delirium is characterized by a sharp confusion of consciousness, patients are restless, they have impaired memory, they are vicious, noisy and hyperactive, they can fall out of bed, receiving fractures, which makes their position worse. But there is also a quiet form or periods when the patients are apathetically lying in bed and looking in front of them. Their consciousness is broken, they do not know where they are, and sometimes who they are. They cannot think clearly and cannot concentrate on anything. Such a condition is reminiscent of dementia, but delirium occurs suddenly, while dementia is usually post-dysfunctional. In a state of delirium there can be hallucinations, the patient almost does not see any animals. He may refuse to eat or drink because the ants are sitting on the food. One patient saw beetles coming down from the ceiling. The kids saw the dwarves in the fever pitch. Hallucinations and visions are often imbued with fearful memories [10].

5 Methods of Classical Psychiatry

The main task of psychiatry is the diagnosis and treatment of mental disorders, their clinical manifestations and prevention. Psychiatry also includes assistance in combating various types of addiction, pre-examination and assistance with investigations. One of the sections of psychiatry is psychoanalysis, whose representatives, unlike other psychiatrists, did not focus on the exact sciences and at a minimum used mathematical methods when working on the study of patient behavior. This was done in order to form psychology as a separate science, which was complementary to the general knowledge of humanity and not dependent on other disciplines, such as mathematics. An exception is considered medicine, using which psychologists are able to find the causes of mental disorders much more quickly and more accurately make diagnoses. One of the founders of psychoanalysis was Sigmund Freud, whose direction was later called "Freudianism". Freudism aimed to substantially supplement the knowledge possessed by the psychiatrists of those times and, on the basis of this knowledge, to form a theoretical basis for the use of which more new knowledge could be obtained. That is why Freud began his scientific work in psychology in the collection and synthesis of psychotherapy practice, later forming a psychiatric theory from the knowledge. In psychiatry, concepts such as symptom and syn-drama play a fundamental role. Psychopathological symptom is a separate sign of a certain abnormality or disease. Examples include panic, anxiety or fear, hallucinations (visual, auditory, tactile or olfactory), anorexia, and more.

Psychopathological syndrome is a formed deviation in human activity, formed by a set of interrelated and sometimes mutually exacerbating symptoms. Taken together, these symptoms form a persistent syndrome that determines the patient's behavior, perception of the world, and existence in general. Often, these syndromes have complex pathogenetic mechanisms. For the diagnosis of psychopathological

syndrome use the nosological method of establishing the disease. This method is quite reliable and is used to prescribe the necessary treatment and further prevention of mental illness. The nosological method is based on the characteristic clinical pictures of the abnormalities and their probable development. And knowledge of the etiology, pathogenesis and pathoanatomical changes in the body provide the opportunity to appoint a full and correct treatment of a particular mental illness. The syndromic principle is also used to identify and classify mental disorders. This principle involves the distribution of pathological manifestations into individual diseases and pathological conditions, taking into account the characteristics of the clinic and the course of disorders of the psyche, etiology, pathogenesis, anatomo-physiological substrate and the severity of its lesion [8]. The most common mental disorder at the moment is schizophrenia. Schizophrenia patients make up no more than 1% of the total population, but because of the long duration of the disease, schizophrenics make up almost half of the patients in psychiatric clinics. Such patients are often depressed, life seems hopeless to them, about 10% of them try to commit suicide. In schizophrenia, there are two types of symptoms. First, the positive symptoms: delusional ideas and hallucinations. Normally, these phenomena are not observed.

During psychosis, patients may see non-existent occasions, hear voices perceived as completely real (Later, after losing my job, different voices were heard in my apartment ... and the voices in my head disturbed me. Sometimes they sounded threatening and pervading me. through). Brain imaging indicates that brain regions, normally processing voice and image information, are extremely active during hallucinations. Therefore, hallucinations can not be separated from real impressions: they occur in the same areas of the brain, which normally come from stimuli from the outside world. Other patients blame delusional ideas. They think that they are being monitored or controlled by some secret forces (In the last week of work and then two weeks, without any request on my part, I was influenced by some particularly advanced system. In addition, they used my devices to control my brain that on the street could communicate with passers-by, sending them their thoughts) [9].

6 Building an Ontology according to the IDEF5 Concept

For this subject area the key concept is mental disorder. The classification chart below shows the distribution of mental disabilities by origin and cause of origin (Fig. 3).

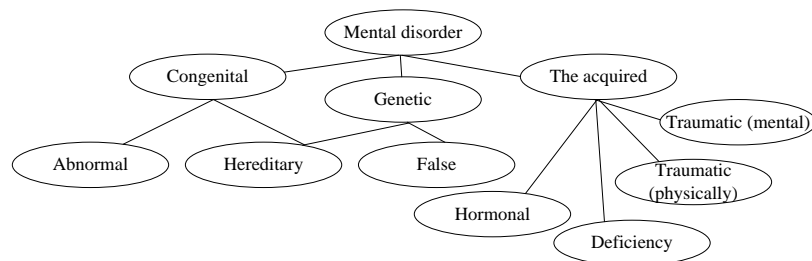


Fig. 3. Classification chart

The figure below (Fig. 4) shows a composite diagram of an information system for diagnosing a person's mental state. Yes, the mentioned IP is divided into two separate modules - the deviation directory and the classifier of the deviations by signs. The first one works under two scenarios, namely sorting the list of all deviations by alphabetical order and by classification. The second, in turn, performs the following tasks: data collection; data analysis; filtering the results.

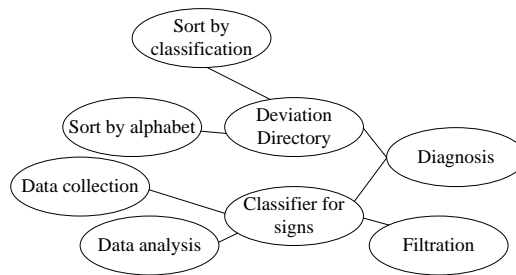


Fig. 4. Composition scheme

After processing the results system, the user is given a "diagnosis" object. The status chart for this property is given below (Fig. 5).

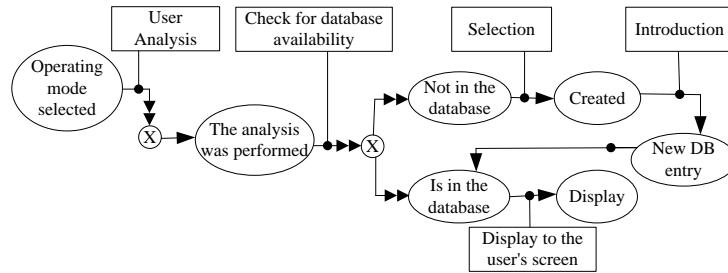


Fig. 5. Object status chart

7 Development of Domain Ontology in Protege Software

Before starting, we create a new project, add the necessary tabs to view and move to the class view area (Fig. 6).

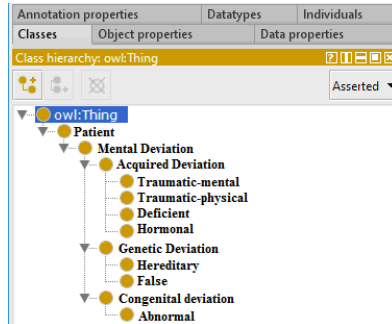


Fig. 6. Classes and relationships

No classes or instances have been created yet. The following relationship classes have been created for this subject area. When creating a slot, it can be given a name, type, default value, temporary value, description, etc. It is worth noting that a class of type SLO can be an object of another class. This is how the Protégé program establishes a relationship between the 2 classes. If any slot, such as a name, has already been created before, it can simply be added to the class (provided it fits) by clicking on the button in the form of a rectangle plus in the upper right corner of the TemplateSlots window. The process of creating a slot is shown in fig. 7. Slots are properties of a class, they allow to describe a class in more detail. The User class has such properties as id, name, login, password, e-mail, see. Fig. 8.

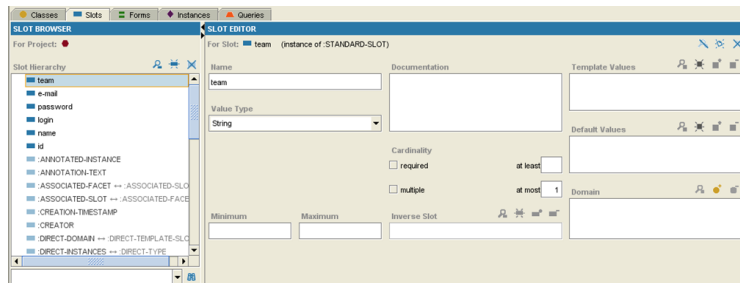


Fig. 7. List of all slots

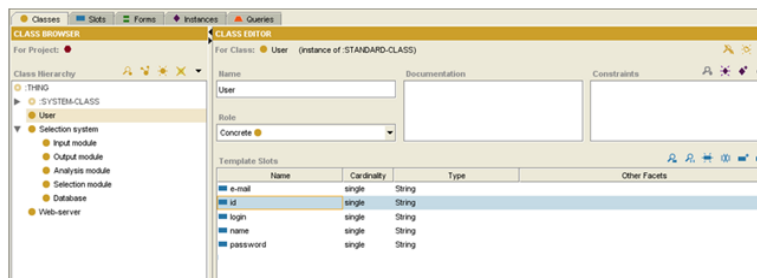


Fig. 8. List of user class slots

Slots by themselves can also have properties. For example, *tor* is always a number. You can also use slots to define relationships between classes. Slot properties, called facets, can be created either on the class tabs (using the slot specification dialog) or on the slots tab (using the slot editor). In the open window you can change the aspect name, minimum and maximum values, as well as the value type. For the User class, I select an aspect named *id* and set the integer value type. Also, its assignments are required. Similarly, the creation and construction of the other aspects of all slots is carried out. Forms contain data entry fields or widgets for each slot associated with the class. There are different types of widgets for different types of slots, for example, Protégé uses a text widget (TextFieldWidget) for slots with a row data type, an integer widget (IntegerFieldWidget) for fields that are represented as an integer, a InstanceListWidget instance list which type is installed as a copy of the class and the power (number of elements) is greater than one, etc. To configure an input form, you need to go to the Forms tab, make sure that the class you want is selected, and then select the required fields that you want to configure. They can be aligned, given certain properties, and more.

8 Description of Software Created and the Logical Structure

The developed information system is called "Mental Assistant", which in English means "Mental (mental) assistant". This software is an archive apk file (AndroidPackage) with an extension.apk that is designed to run on the basis of AndroidOS. Implemented in Java programming language (Fig. 9a).

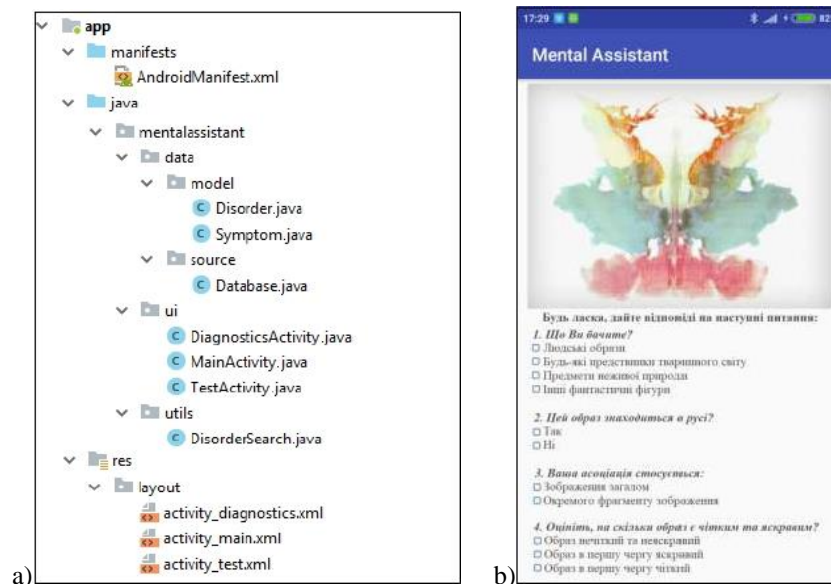


Fig. 9. a) View of structure of the software and b) Diagnostic window view

The software can be run in two modes. The first mode is the Rorschach test. The second is the diagnosis of mental abnormality. This mode has limitations: it is impossible to diagnose a mental disorder that is not in the database.

The MentalAssistant application is developed in Java, which is object-oriented. MentalAssistant application development is based on object-oriented method.

The structure of the software is presented in Fig. 9b, where:

- app - root program folder;
- manifests - package containing manifest;
- java, mentalassistant, data, model, source, ui, utils - packages containing the program's java files;
- res, layout - packages containing xml markup files;
- AndroidManifest.xml - a file containing global values that describe activities, services and interactions with the operating system;
- Disorder.java, Symptom.java, Database.java, DiagnostictsActivity.java, MainActivity.java, TestActivity.java, DisorderSearch.java - files that contain software implementation in Java programming language.
- activity_diagnostics.xml, activity_main.xml, activity_test.xml - markup files.

Database.java contains a database that includes the names of mental illnesses, the names of symptoms and their description. The Disorder.java and Symptom.java classes are designed to implement disease objects, symptom objects, and collection objects to provide the disease objects with the corresponding symptom objects. The DiagnostictsActivity.java, MainActivity.java, and TestActivity.java classes provide for the implementation of user interfaces and their interaction with software logic.

The DisorderSearch.java class implements search and filtering algorithms. Activity_diagnostics.xml, activity_main.xml, and activity_test.xml files are .xml text files containing xml markup data. "AndroidManifest.xml" - the so-called "passport" of the android application, which contains the most important information about the application (application name, version, developer information, etc.)

9 Conclusions

The practical implementation of the information system for diagnosing a person's mental state has been made. The Java targeting programming language for Android development was used for implementation. The created software product is an information system in the form of a mobile application. The system is capable of operating in two modes: conducting a Rorschach ink stain test and diagnosing a mental defect based on available symptoms. For this information system, a description has been created that contains a functional purpose, a mapping of the logical structure, the technical means used, the process of calling and downloading, input and output. A description of the user manual is also provided. The software algorithm allows you to run it in one of two modes. When using the Rorschach Test

mode, the application consistently shows the user 10 images, which at times ask questions about its content, value, color and association (relative to a single part of the image or the whole image). After each of the 10 steps, the user-specified data is stored. After the last, tenth stage, all the stored data is summarized and grouped and then compared with the template data. Based on this comparison, the user is informed about the results of the test and their value. It is carried out in the form of a survey and by a search algorithm based on a comparison of the available symptoms selected by the user during the course of the survey with the data contained in the application database. Three data sets are formed: an array containing all disease data and their symptoms, an intermediate array containing temporary data, and an array of filtered data containing information for the user on the existence of coincidences in diagnosing certain abnormalities. During the survey, a question appears on the screen about the presence of a specific symptom in the subject. Three answer options are available to the user: yes, no and unknown. If 'yes' is selected, then the disease, a symptom of which previously appeared in the question, enters the array with intermediate data, where it is awaiting further examination. If the user has selected the answer "no", then the disease receives a symptom of no symptom, but still falls into the array of intermediate data, pending further review, since the absence of one or more symptoms does not necessarily lead to the absence of a certain mental disorder. If the "unknown" option was selected for the answer to the question, then the symptom, and accordingly the diseases to which it belongs, do not fall into any of the arrays and are subsequently ignored in the program. Each follow-up question about the presence of a particular symptom is selected based on the presence or absence of previous symptoms indicated by the user. This allows you to quickly reduce the array of questions and effectively filter the information you need. The survey is conducted until the deviation is fixed or the question is completed in the database. In this case, a message will be displayed on the possible variants of the disease and information that the available data is only potential due to the lack of sufficient information.

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