

PROCEEDINGS

of the Union of Scientists - Ruse

Book 5
**Mathematics, Informatics and
Physics**

Volume 11, 2014



RUSE

PROCEEDINGS

OF THE UNION OF SCIENTISTS - RUSE

EDITORIAL BOARD

Editor in Chief

Prof. Zlatojivka Zdravkova, PhD

Managing Editor

Assoc. Prof. Tsetska Rashkova, PhD

Members

Assoc. Prof. Petar Rashkov, PhD

Prof. Margarita Teodosieva, PhD

Assoc. Prof. Nadezhda Nancheva, PhD

Print Design

Assist. Prof. Victoria Rashkova, PhD

Union of Scientists - Ruse

16, Konstantin Irechek Street

7000 Ruse

BULGARIA

Phone: (++359 82) 828 135,

(++359 82) 841 634

E-mail: suruse@uni-ruse.bg

web: suruse.uni-ruse.bg

Contacts with Editor

Phone: (++359 82) 888 738

E-mail: zzdravkova@uni-ruse.bg

PROCEEDINGS

of the Union of Scientists – Ruse

ISSN 1314-3077

Proceedings of the Union of Scientists– Ruse

Contains five books:

1. Technical Sciences
2. Medicine and Ecology
3. Agrarian and Veterinary Medical Sciences
4. Social Sciences
5. Mathematics, Informatics and Physics

BOARD OF DIRECTORS OF THE US - RUSE

1. Prof. HristoBeloev, DSc – Chairman
2. Assoc. Prof. Vladimir Hvarchilkov – Vice-Chairman
3. Assoc. Prof. TeodorIliev – Secretary in Chief

SCIENTIFIC SECTIONS WITH US - RUSE

1. Assoc. Prof. AleksandarIvanov – Chairman of "Machine-building Sciences and Technologies" scientific section
2. Prof. OgnjanAlipiev – Chairman of "Agricultural Machinery and Technologies" scientific section
3. Assoc. Prof. Ivan Evtimov– Chairman of "Transport" scientific section
4. Assoc. Prof. TeodorIliev – Chairman of "Electrical Engineering, Electronics and Automation" scientific section
5. Assist. Prof. Diana Marinova – Chairman of "Agrarian Sciences" scientific section
6. SvilenDosev, MD – Chairman of "Medicine and Dentistry" scientific section
7. Assoc. Prof. Vladimir Hvarchilkov – Chairman of "Veterinary Medical Sciences" scientific section
8. Assist. Prof. Anton Nedjalkov – Chairman of "Economics and Law" scientific section
9. Assoc. Prof. TsetskaRashkova – Chairman of "Mathematics, Informatics and Physics" scientific section
10. Assoc. Prof. LjubomirZlatev – Chairman of "History" scientific section
11. Assoc. Prof. RusiRusev – Chairman of "Philology" scientific section
12. Prof. PenkaAngelova, DSc– Chairman of "European Studies" scientific section
13. Prof. AntoanetaMomchilova - Chairman of "Physical Education, Sport and Kinesiterapy" section

CONTROL PANEL OF US - RUSE

1. Assoc. Prof. JordankaVelcheva
2. Assoc. Prof. Nikolai Kotsev
3. Assist. Prof. IvankaDimitrova

EDITOR IN CHIEF OF PROCEEDINGS OF US - RUSE

Prof. ZlatojvkaZdravkova

The Ruse Branch of the Union of Scientists in Bulgari was founded in 1956.

Its first Chairman was Prof. Stoyan Petrov. He was followed by Prof. Trifon Georgiev, Prof. Kolyo Vasilev, Prof. Georgi Popov, Prof. Mityo Kanev, Assoc. Prof. Boris Borisov, Prof. Emil Marinov, Prof. Hristo Beloev. The individual members number nearly 300 recognized scientists from Ruse, organized in 13 scientific sections. There are several collective members too – organizations and companies from Ruse, known for their success in the field of science and higher education, or their applied research activities. The activities of the Union of Scientists – Ruse are numerous: scientific, educational and other humanitarian events directly related to hot issues in the development of Ruse region, including its infrastructure, environment, history and future development; commitment to the development of the scientific organizations in Ruse, the professional development and growth of the scientists and the protection of their individual rights.

The Union of Scientists – Ruse (US – Ruse) organizes publishing of scientific and popular informative literature, and since 1998 – the “Proceedings of the Union of Scientists- Ruse”.

BOOK 5

**"MATHEMATICS,
INFORMATICS AND
PHYSICS"**

VOLUME 11

CONTENTS

Mathematics

Tsetska Rashkova 7
The *T*-ideal of the *X*-figural matrix algebra

Julia Chaparova, Eli Kalcheva 14
Existence and multiplicity of periodic solutions of second – order ODE with sublinear and superlinear terms

Veselina Evtimova 23
A study of the possibilities to establish a stationary mode in an auto fleet

Informatics

Georgi Krastev 29
Software for electronic trade from Mobile terminal

Georgi Krastev 37
Developing a software platform for distance learning in audio-video producing

Valentin Velikov, Aleksandar Iliev 44
Simple systems Aid the software development

Victoria Rashkova 53
Data encryption software

Kamelia Shoylekova 63
Business architecture of an e-commerce company

Valentin Velikov, Malvina Makarieva 72
Parser Java-code to XML-file

Metodi Dimitrov 80
Updating the records of the search engines due to a client request

Svetlozar Tsankov 84
Cognitive approach to developing learning design for interactive multimedia training

Galina Atanasova 91
An empirical study of a model for teaching algorithms

Desislava Baeva, Svilena Marinova 98
Semantic Web in e-commerce

Ivan Stanev, Lyudmil Georgiev 103
Robovisor- Psychotherapist’s selfsupervision robotic assistant in positive psychotherapy

BOOK 5 "MATHEMATICS, INFORMATICS AND PHYSICS" VOLUME 11	Physics	
	<i>Galina Krumova</i>	109
	Nuclear charge form factor and cluster structure	
	<i>Galina Krumova</i>	116
	Contributions of folding, cluster and interference terms to the charge form factor of ${}^6\text{Li}$ Nucleus	

web: suruse.uni-ruse.bg

ROBOVISOR – PSYCHOTHERAPIST’S SELFSUPERVISION ROBOTIC ASSISTANT IN POSITIVE PSYCHOTHERAPY

Ivan Stanev, Lyudmil Georgiev

Angel Kanchev University of Ruse

Abstract: A Selfsupervision Report Generator in the Positive Psychotherapy session context is presented. A methodology for selfsupervision report generation in 4 steps is described. Definition of semi structured interview and its computer image are defined. The software architecture of selfsupervision Report Generator Robovisor is established including its components Linguistic Processor, Model Validator, Report Generator, and Security Manager.

Keywords: positive psychotherapy, selfsupervision methodology, semistructured report data model, Linguistic Processor, Report Validator, Report Generator, Security Manager.

INTRODUCTION

The **main goals of the project** are to **suggest a methodology** based on a computer integrated environment Robovisor (ROBOTised superVISOR) allowing **better levels of selfsupervision** and improvement of **the efficiency of supervision**, achieving the **access to better structured information** as well as **assistance in writing reports** for the Health Insurance companies.

Selfsupervision Methodology

The Methodology (similarly to the shown in [10] and [11]) doesn't require any special efforts by the psychotherapist enhances improvement of psychotherapist work creating an automated sequence of intermediate products (blocks shown by ellipses in Figure 1). These products are result of the fulfillment of the following steps of the Methodology:

- **Step 1:** The **Psychotherapist** describes the specific session by the Natural language text called further **Semistructured Session Report**.
- **Step 2:** Robovisor's **Linguistic Processor** translates automatically the Report, retrieves the information from the report, and dispossessed into a well defined computer data structure called **Session Model**.
- **Step 3:** Robovisor's **Model Verifier** subsystem controls the completeness and the consistence of the Session Model automatically and requires minimal help from the Psychotherapist asking him refining questions. As a result of this step a **Revised Session Model** is established.
- **Step 4:** The Robovisor **Report Generator** subsystem generates the **Session Report** and includes in a structured form the data from the specific session and the omissions of the psychotherapist (e.g. uncovered topics, missed appropriate trans-cultural examples etc.).

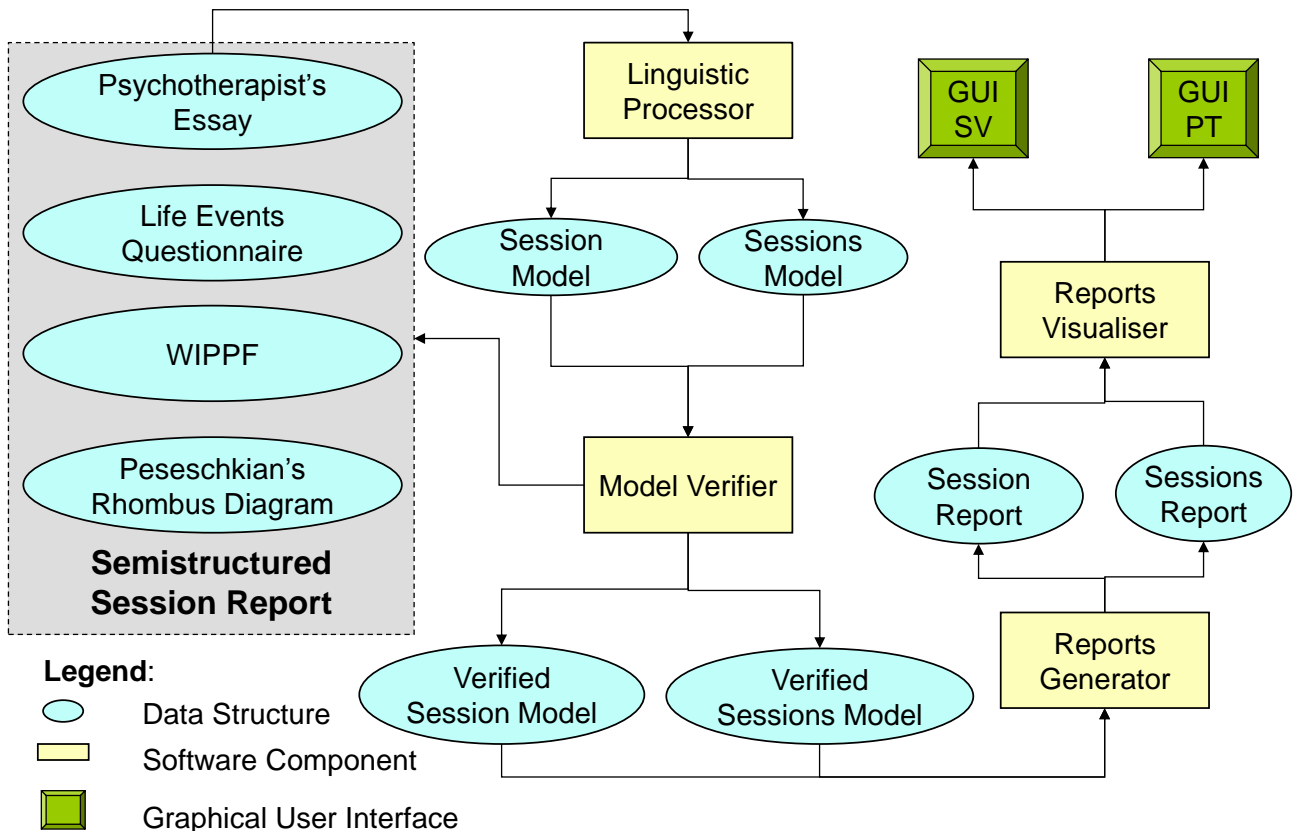


Fig. 1 Robovisor Data Streams

Due to the well defined information structure and the similar characteristic features of the sessions the Methodology allows to create **Sessions Model** about any specific sequence of sessions revealing some omissions the Psychotherapist is not aware of due to the prolonged process of therapy.

Structuring of the Data

The data required by the Methodology is disposed in three basic organizational units.

Semistructured Session Report

This is semistructured basic organizational unit. It is composed of Psychotherapist's Essay, Life Events Questionnaire, WIPPF, Peseschkian's Phombus Diagram (see [4], [5], [6], [7], [8], [2]).

Psychotherapist's Essay is semistructured. The data gathered in the session is filled in its five sections (see Figure 2) as natural text.

- Observation / Distancing
- Making an Inventory
- Situational Encouragement
- Verbalization
- Broadening of Goals

Fig. 2 Psychotherapist's Essay Structure

Life Events questionnaire and **WIPPF** are filled by the client (in some occasions with the help of the therapist).

Peseschkian Phombus Diagram is filled in by the Client with the help of the Psychotherapist. The Psychotherapist enters the data in the computer after the session.

Computer Session Model

Linguistic Processor's task is to process the Semistructured Session report data and to compile it into a Session Model.

Figure 3 shows an example of the Session Model (after [3], [9], and [1]) based on the five basic sections of Semistructured Session Report constructed by structures presenting the data disposed there.

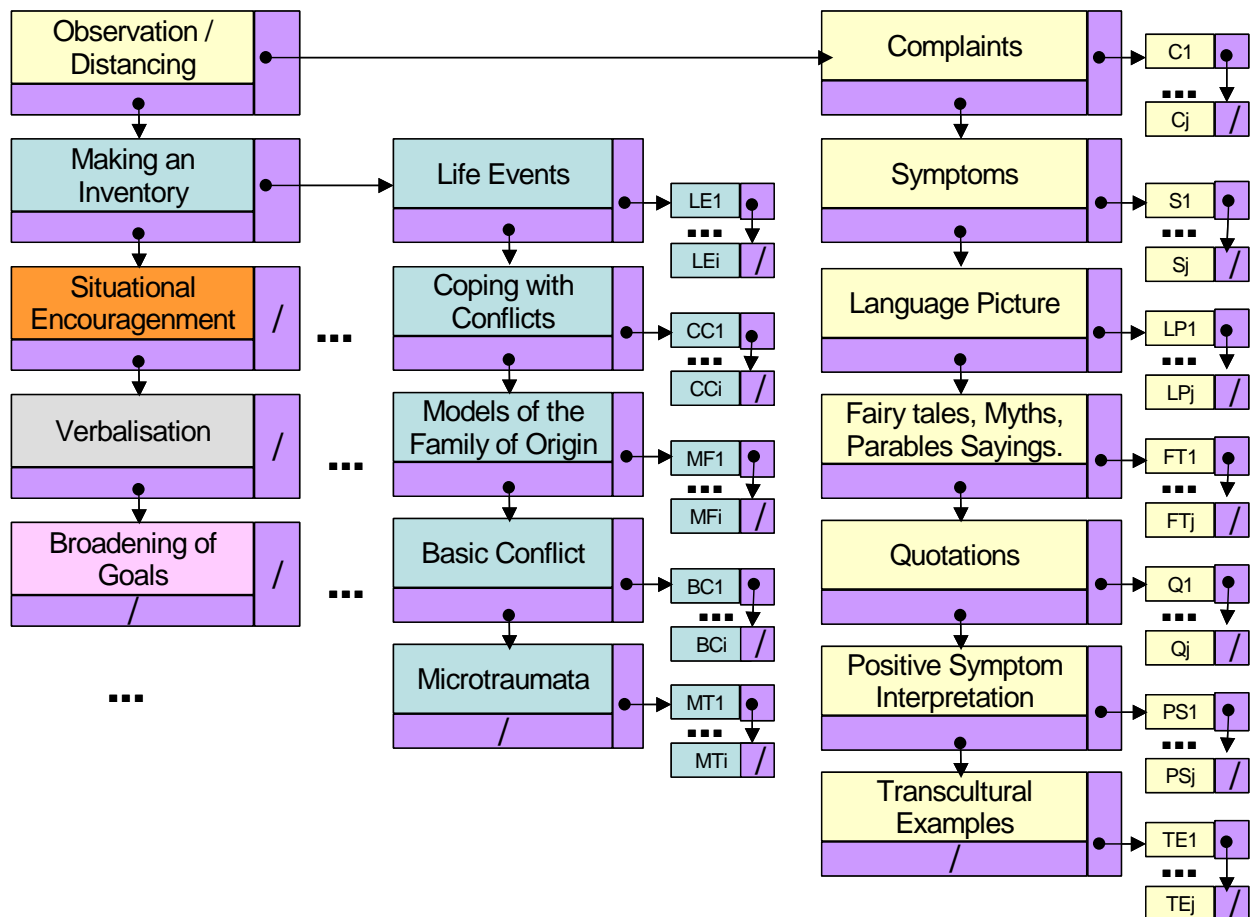


Fig. 3 The Structure of the Positive Psychotherapy Session Model

The data lists attached to the specific **Model Elements** (e.g. $LE_1 - LE_i, \dots$) could be retrieved from the Semistructured Report Texts or the Psychotherapist can specify them selecting items from the **Elements Libraries** (e.g. Libraries of Fairy Tales, Myths, Parables, Sayings, Positive symptom interpretations, Transcultural examples, Standard Language Word forms describing symptoms etc.)

The Psychotherapist adds the new elements to the appropriate Robovisor Library and describes them with key words about the symptoms, the groups the clients belong to (cultural, ethnical, religious, professional), believe system, etc. When necessary the therapist can search the reiterated elements using lists, key words, or other appropriate information retrieval procedures.

The Positive Psychotherapist working with Robovisor will have the opportunity to send all his entries from Elements Libraries to the Positive Psychotherapy Centre. The supervisors will verify the received entries, generalize them in new Elements Libraries set, and return this set to the therapists.

The established session model may be used for sequences of sessions by list extension where the new elements are included without changing the model structure.

Session Report

The Report Generator generates the data from the session model into any format required by the Psychotherapist or Supervisor, or presented into electronic or paper form.

Robovisor's Architecture

Robovisor Architecture shown in Figure 4.

The system is designed to be used by the Psychotherapist as well as by the Supervisor. The system exists in two options – via Internet or as PC Local Installation.

The confidentiality of information requires crypting so the **Security Manager** provides restricted access according to specific access rules defined by the Psychotherapist.

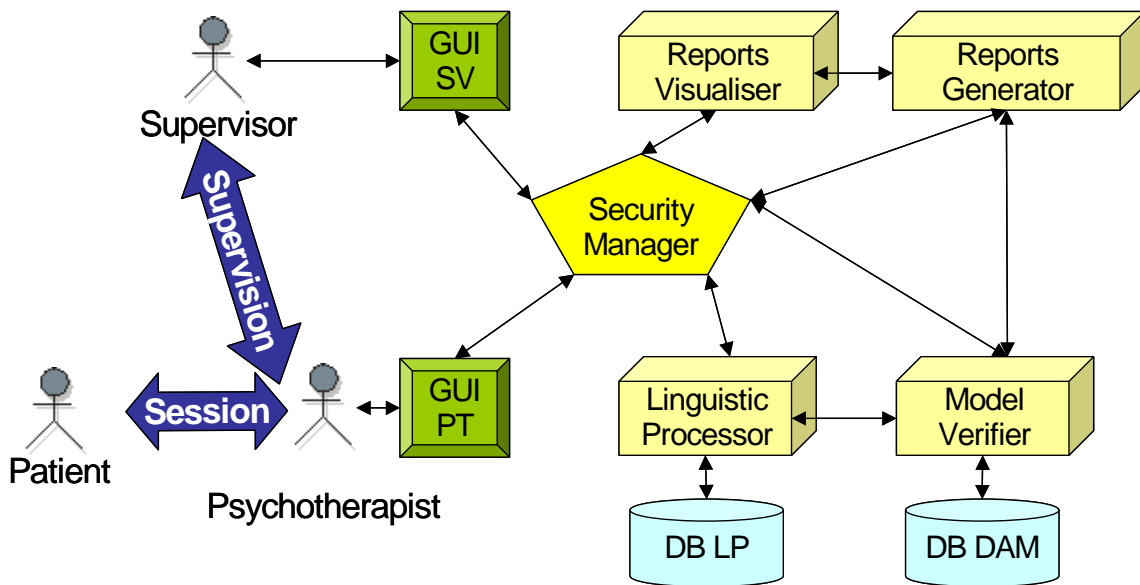


Fig. 4 Robovisor's Architecture

The **Linguistic processor** (described in details in [12]) proceeds the Semistructured Session Report natural language texts. This module provides morphological, syntax, and semantic analysis of the input information. It provides the first level of semantic control of input information, admitting only well-defined syntax and semantic natural language constructs to be proceeded. The **Linguistic Processor Database** is constructed by a Combinatorial dictionary, Grammatical Rules for speech constructs recognition, full set of well-defined syntax sentence structures, a package of semantic characteristics of Combinatorial dictionary entries, syntax – semantic tables of permitted combinations between syntax and semantic structures and other useful data. The Linguistic Processor fills in the data recognized in the natural language essay text into the proper session model elements.

The **Model Verifier** checks the recorded in the Session Model data correctness and completeness. It manages the interaction between the Psychotherapist and Robovisor in case the afore mentioned data is incomplete or incorrect. The **Model Verifier Database** is constructed by the Session Models, and models interpretation rules designed by the supervisors with high level of expertise.

The **Report Generator** generates Session Reports or Therapy Reports according a preliminary defined pattern, or another pattern defined by the therapists for the specific session/s.

The **Reports Visualiser** manages the presentation of the information to the user in the form of a Web site, CD, PC screen or paper print.

CONCLUSIONS

An already developed prototype of Robovisor is used for the checking of the efficiency of the methodology. The tests of the Bulgarian Linguistic Processor are fulfilled successfully. The English Linguistic Processor is in an experimental stage. A Model Verifier is developed and its behavior is under evaluation. The Report Generator and Visualiser are in the last phase of development.

An analysis of the fulfilled tests permits the following conclusions to be done:

- The preliminary preparation of Robovisor (and especially the creation of Combinatorial Dictionary, and other elements of the Linguistic Processor Database is a task that requires a special attention, and a lot of efforts from Computer Scientists, Linguists, and Positive Psychotherapists for the preparation and checking of the information completeness.

- The Model Verifier Database is constructed by relatively simple (in comparison with the Linguistic Processor Database), easier for creation and testing rules. These rules permit the establishment of a well-structured and low-level modified Database.

- After the Databases of Linguistic Processor and Model Verifier are created the Session Model generation is a simple task, and does not require any special (outside the Problem Domain Area) knowledge from the Psychotherapist and the Supervisor.

- The activities related to the support of Robovisor are easier than the activities for the support of any electronic Psychotherapist's archive.

- After a short introductory period of work with Robovisor a centralized dissemination of the Robovisor Libraries can be introduced.

The performance of some further development and evaluation concerning the Session Model structure, English Linguistic Processor, and Robovisor Elements Libraries permits the achievement of the required from the described methodology and prototype goals – i.e. to improve the quality of the personal psychotherapeutic archive, to enhance selfsupervision, and help the Positive Psychotherapist to improve the efficiency of his work.

REFERENCES

- [1] Georgiev L. Viara – a Case Story. Private Practice Achieve. Ruse Bulgaria. 2002. Pp. 11.
- [2] Georgiev L., I. Stanev. Psychotherapy and Prevention of Child and Adolescent Delinquent Behavior. Final Report. Project No9655/1996. Micro-Projects under Phare Lien Program. Ruse. Bulgaria. 1997. Pp. 23.
- [3] Killing G. Better receive knock than miss contact. Zeitschrift fur Positive Psychotherapie. Organ der Deutschen Gesellschaft fur Positive Psychotherapie. Heft 14 – 14Jahrgang – Dezember 1993. (In Bulgarian).
- [4] Peseschkian N. In Search of Meaning. Springer Ferlag Int. 1985. Pp. 216.
- [5] Peseschkian N. Positive Family Therapy. Springer Ferlag Int. 1986. Pp. 338.
- [6] Peseschkian N. Psychotherapy of Everyday Life. Springer Ferlag Int. 1986. Pp. 247.
- [7] Peseschkian N. Oriental Stories as Tools in Psychotherapy. Springer Ferlag Int. 1986. Pp. 192.
- [8] Peseschkian N. Positive Psychotherapy. Springer Ferlag Int. 1987. Pp. 440.

[9] Peseschkian N. Psychosomatic Therapeutic Experience. Day Psychotherapeutic and Psychosomatic Clinic. Wiesbaden. Germany. 1988. Pp.11. (In Bulgarian).

[10] Stanev I., Generation of Computer Programs Specified through Natural Language Texts, T.N.Sys8, Systems Engineering Division, University of Wales, Cardiff, UK, 47, Mar 2000. Pp. 47.

[11] Stanev I., S. Ninova-Kozleva, S. Todorova An Intelligent Product Manuals Generator. In Proceedings of the CompSysTech'2000, Sofia, Bulgaria, June 2000, V.7-1 – V.7-6.

[12] Stanev I. A Methodology for Automated Robot Programming. PhD Thesis. University of Ruse,.2014. (in Bulgarian).

CONTACT ADDRESSES

Pr. Assist Ivan Stanev, PhD
Department of Informatics and
Information Technologies,
Faculty of Natural Sciences and
Education
Angel Kanchev University of Ruse
8 Studentska Str., 7017 Ruse,Bulgaria
Phone: (++359 82) 888 326
E-Mail: istanev@ami.uni-ruse.bg

Lyudmil Georgiev, M.D
psychiatrist, psychotherapist
Third male department at
Byala State Psychiatric Hospital
Cell Phone (++359) 877-354-314,
E-Mail lyudmilgeorgiev@abv.bg

ROBOVISOR – РОБОТИЗИРАН АСИСТЕНТ НА ПСИХОТЕРАПЕВТА ЗА САМОСУПЕРВИЗИЯ СЛЕД СЕСИИ ПО ПОЗИТИВНА ПСИХОТЕРАПИЯ

Иван Станев, Людмил Георгиев

Русенски университет „Ангел Кънчев“, Държавна психиатрична болница Бяла

Резюме: Описано е едно решение, което позволява автоматизирано генериране на отчети за самосупервизия на терапевта, който провежда сесии и цикли от сесии с пациенти в Позитивната психотерапия. Предложена е методика за тази супервизия, реализирана в 4 стъпки. Дефинирано е полуструктурирано интервю и неговия структурен машинен еквивалент. Предложена е архитектурата на софтуерния продукт Robowizor, която включва лингвистичен процесор, валидатор на модели, генератор на самооценки, както и мениджър по сигурността.

Ключови думи: позитивна психотерапия, методика за самосупервизия, машинен модел на самооценка, лингвистичен процесор, валидатор на отчети, генератор на отчети, мениджър по сигурността.

Requirements and guidelines for the authors - "Proceedings of the Union of Scientists - Ruse" Book 5 Mathematics, Informatics and Physics

The Editorial Board accepts for publication annually both scientific, applied research and methodology papers, as well as announcements, reviews, information materials, adds. No honoraria are paid.

The paper scripts submitted to the Board should answer the following requirements:

1. Papers submitted in English are accepted. Their volume should not exceed 8 pages, formatted following the requirements, including reference, tables, figures and abstract.

2. The text should be computer generated (MS Word 2003 for Windows or higher versions) and printed in one copy, possibly on laser printer and on one side of the page. Together with the printed copy the author should submit a disk (or send an e-mail copy to: vkr@ami.uni-ruse.bg).

3. Compulsory requirements on formatting:

~ font - Ariel 12;

~ paper Size - A4;

~ page Setup - Top: 20 mm, Bottom: 15 mm, Left: 20 mm, Right: 20mm;

~ Format/Paragraph/Line spacing - Single;

~ Format/Paragraph/Special: First Line, By: 1 cm;

~ *Leave a blank line under Header - Font Size 14;*

~ Title should be short, no abbreviations, no formulas or special symbols - Font Size 14, centered, Bold, All Caps;

~ *One blank line - Font Size 14;*

~ Name and surname of author(s) - Font Size: 12, centered, Bold;

~ *One blank line - Font Size 12;*

~ Name of place of work - Font Size: 12, centered;

~ *One blank line;*

~ abstract – no formulas - Font Size 10, Italic, 5-6 lines ;

~ keywords - Font Size 10, Italic, 1-2 lines;

~ *one blank line;*

~ text - Font Size 12, Justify;

~ references;

~ contact address - three names of the author(s) scientific title and degree, place of work, telephone number, Email - in the language of the paper.

4. At the end of the paper the authors should write:

~ The title of the paper;

~ Name and surname of the author(s);

~ abstract; keywords.

Note: The parts in item 4 should be in Bulgarian and have to be formatted as in the beginning of the paper.

5. All mathematical signs and other special symbols should be written clearly and legibly so as to avoid ambiguity when read. All formulas, cited in the text, should be numbered on the right.

6. Figures (black and white), made with some of the widespread software, should be integrated in the text.

7. Tables should have numbers and titles above them, centered right.

8. Reference sources cited in the text should be marked by a number in square brackets.

9. Only titles cited in the text should be included in the references, their numbers put in square brackets.

The reference items should be arranged in alphabetical order, using the surname of the first author, and written following the standard. If the main text is in Bulgarian or Russian, the titles in Cyrillic come before those in Latin. If the main text is in English, the titles in Latin come before those in Cyrillic. The paper cited should have: for the first author – surname and first name initial; for the second and other authors – first name initial and surname; title of the paper; name of the publishing source; number of volume (in Arabic figures); year; first and last page number of the paper. For a book cited the following must be marked: author(s) – surname and initials, title, city, publishing house, year of publication.

10. **The author(s) and the reviewer, chosen by the Editorial Board, are responsible for the contents of the materials submitted.**

Important for readers, companies and organizations

1. Authors, who are not members of the Union of Scientists - Ruse, should pay for publishing of materials.

2. Advertising and information materials of group members of the Union of Scientists – Ruse are published free of charge.

3. Advertising and information materials of companies and organizations are charged on negotiable (current) prices.

Editorial Board

ISSN 1314-3077



9 771314 307000