

Applications of Artificial Intelligence in Medicine (survey)

Rudolf Jakša

Center for Intelligent Technologies
Technical University of Košice
SLOVAKIA

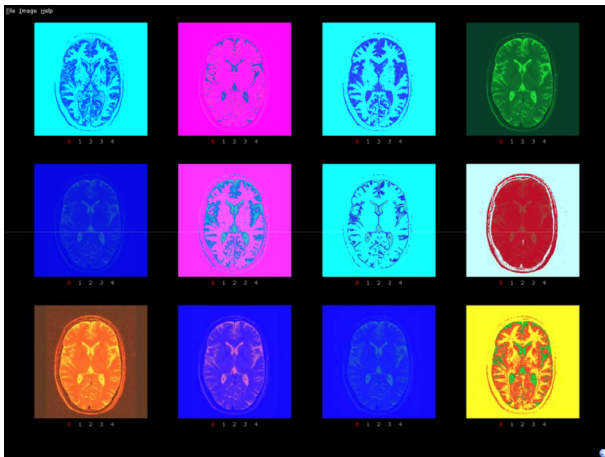
Outline

- 1 From Our Lab**
Color X-ray
Image DB Search
- 2 Web research**
Big AI Systems
Academia
Trends
- 3 Conclusion**

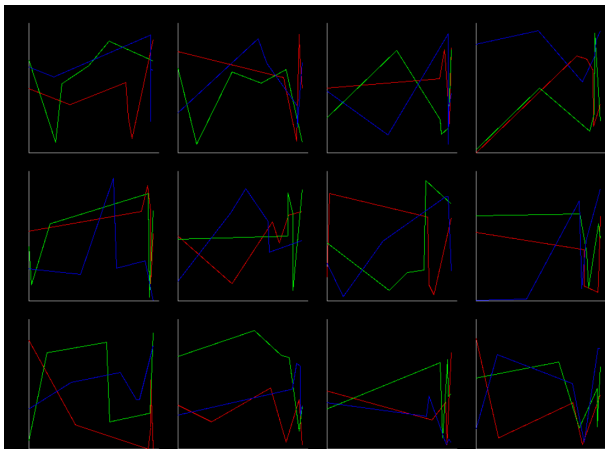
Examples of Medical Artificial Intelligence Applications from Our Lab

- Neupauer: Interactive Evolution of Color in X-ray Images
- Frančák: Interactive Image Database Search

Neupauer: Interactive Evolution of Color in X-ray Images



Neupauer: Interactive Evolution of Color in X-ray Images



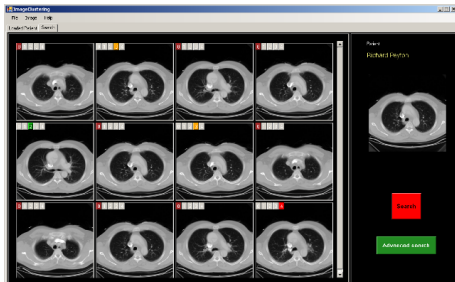
Neupauer: Interactive Evolution of Color in X-ray Images

- AI method: Interactive Evolutionary Computation
- Programming: Image processing, DICOM format
- Conclusion:

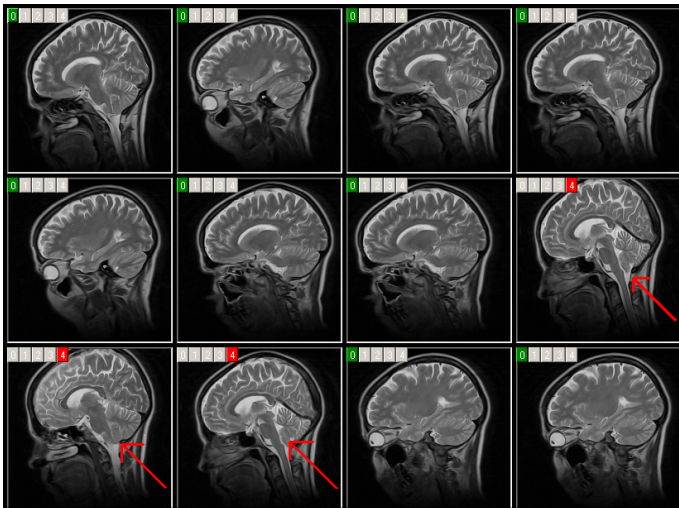
*“If doctor will focus on concrete structure,
optimization is quick.”*

Dr.Kossuth

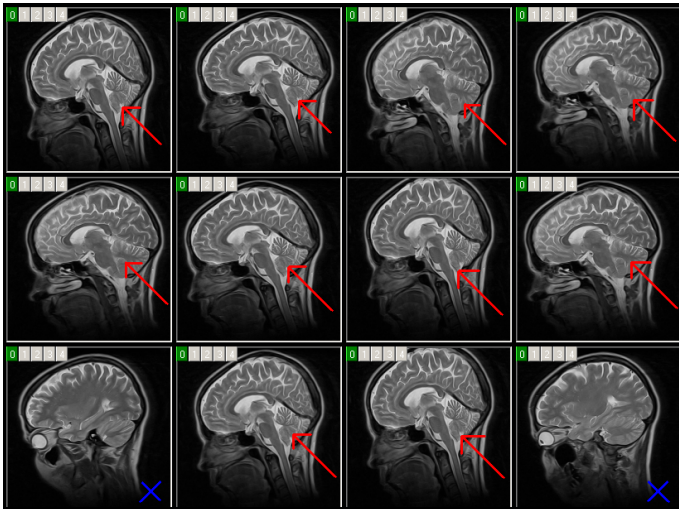
Frančák: Interactive Image Database Search



Frančák: Interactive Image Database Search



Frančák: Interactive Image Database Search



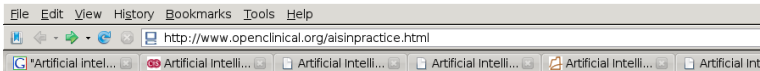
Frančák: Interactive Image Database Search

- AI methods:
 - Self-Organizing Maps
 - Interactive Evolutionary Computation
- Conclusion:
 - this approach may work,
 - will help doctor to elaborate annual reports from his archive,
 - in shared hospital databases: to compare diagnoses

Web Research

- Big AI Systems in Clinical Practice
- Artificial Intelligence in Medicine (journal)
- Medical Informatics Conferences
- Trends in AI in Medicine presence on internet

Survey: AI Systems in Clinical Practice



OPEN CLINICAL knowledge management for medical care

AI Systems in Clinical Practice

Location: Home → Clinical → AI systems in clinical practice

Register with OpenClinical

Main Zones

- About us
- Community
- Background
- Research
- Clinical
- Commercial
- Public

Archive of past and current Artificial Intelligence computer systems used in clinical practice

Acknowledgement	System summaries by category
Much of the content of this archive was originally developed and administered by Enrico Colera, University of New South Wales, Australia. Used with permission. The archive was taken over in 2002 by OpenClinical who continue to maintain and extend it.	<ul style="list-style-type: none">Acute care systemsDecision support systemsEducational systemsLaboratory systemsMedical ImagingQuality assurance and administration

some highlights

PUFF

Expert System for Interpretation of Pulmonary Function Data) was probably the first AI system to be used in clinical practice. Developed by Stanford University and Pacific Medical Center, it entered service in around 1979. Commercial systems that trace back to PUFF remain in use today.

Search this site

Current Zone

CLINICAL

AI systems in clinical practice

- Acute care
- DSS
- Educational
- Laboratory
- Imaging
- QA and Admin

see also

- Discussion on AI systems used in clinical practice

Home
Register
Benefits of registration
Contact Editor
Contribute

Survey: AI Systems in Clinical Practice

- Acute care systems (8) 1987-2004
- Decision support systems (23) 1981-2003
- Educational systems (3) 1989-2002
- Laboratory systems (14) 1987-1996
- Medical Imaging (3)
- Quality assurance and administration (8) 1989-1995

Elsevier Journal: Artificial Intelligence in Medicine

- AI-based clinical decision making
- medical knowledge engineering
- knowledge-based and agent-based systems
- computational intelligence in bio- and clinical medicine
- intelligent medical information systems
- AI in medical education
- intelligent devices and instruments
- automated reasoning and metareasoning in medicine
- methodological, philosophical, ethical, and social issues of AI in medicine

(Current Contents/Clinical Medicine)

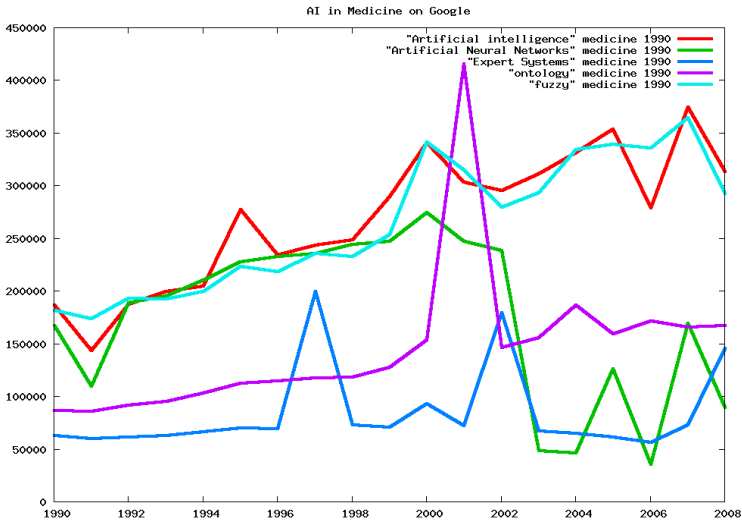
Medical Informatics Conferences

- AIME 2008: Conference on Artificial Intelligence in Medicine,
- AMIA 2008: American Medical Informatics Association 2008 Annual Symposium,
- CBMS 2008: IEEE International Symposium on Computer-Based Medical Systems,
- EMBC 2008: The Annual International Conference of the IEEE Engineering in Medicine and Biology Society,
- MedInfo 2008: World Congress on Health (Medical) Informatics

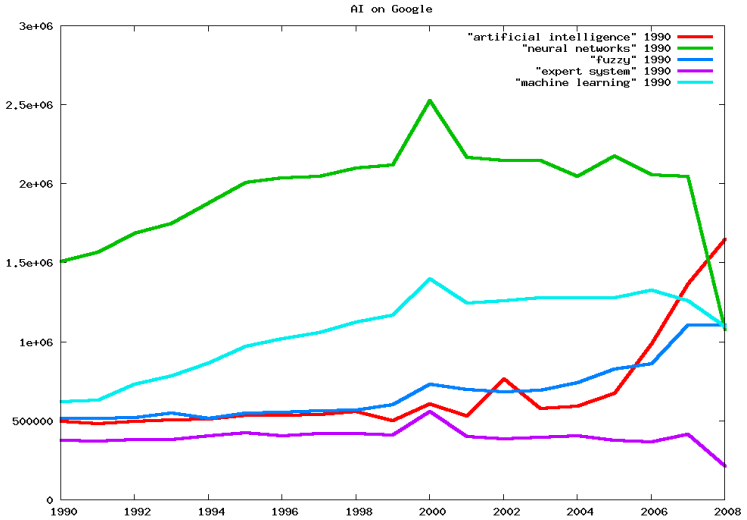
AIME 2007: Sessions

- Agent-based systems
- Temporal Data Mining
- Machine learning and KDD
- Text Mining, Natural language processing and generation
- Ontologies
- Decision Support Systems
- Applications of AI-based Image Processing
- Guidelines
- Workflow Systems

AI in Medicine on Google



AI on Google



IEC in Medicine

Rudolf Jakša

From Our Lab

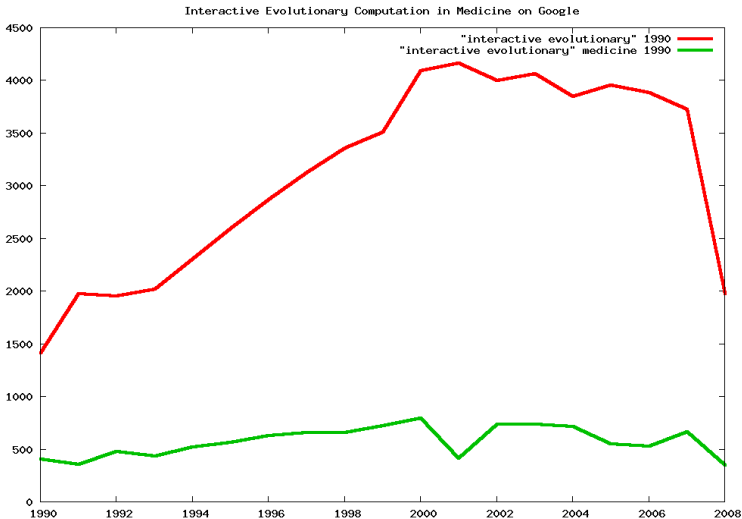
- Color X-ray
- Image DB Search

Web research

- Big AI Systems
- Academia

Trends

Conclusion



Conclusion

- AI in Medicine – stable research area
- AI research – slow progress
- Established:
 - specialized journals,
 - conferences,
 - research topics