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Creating an AI Ecosystem for Multimodal Data Analysis in the MedGIFT Group

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Abstract

Background: The MedGIFT research group is on the border between medical sciences and computer science, namely medical image analysis and machine learning. The group was created in 2002 and has always had the aim to combine medical image data with other sources of information for medical decision support.

Objectives: Learning objectives include:

1. What is required to position a research group in medical image analysis?
2. How to get credibility in a multi-disciplinary domain?
3. How do research topics evolve over time and how to assure to stay relevant?

Outline: The talk will start with an overview of my personal profile and the history of how the MeGFT research group was started because this has had a strong influence on how the group evolved. Even though the initial name was kept, the topics in the group evolved much over time, mainly around medical topics. The development of systematic evaluation in scientific challenges has had a strong influence on the impact of our research group and thus, I will highlight the history of the ImageCLEF benchmark and how it has made datasets available for a large community and helped in further data-sharing efforts. The multidisciplinary nature of the research groups also helped in creating an ecosystem where researchers could flourish in several related disciplines. The close collaboration with several hospitals also assured that relevant topics are treated and in this respect also the final impact of the work.

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Added Value of Structured Reporting for Medical Practice and Management

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Abstract

Background: Structured reports are getting popular gradually. To increase the adaptation of the technology, we will briefly go over the benefits that structured reports can provide to almost all medical staff and the medical community in general.

Objectives: Learning objectives include:

1. What are the benefits of SR for medical doctors?
2. What are the benefits of SR for patients?
3. How can SR boost high quality research?

Outline: First, I will briefly go over some of the known benefits of SR, as follows:

- Disease and domain-specific report templates can increase the clarity and quality of the report.
- The use of common data elements ensures the consistent use of terminology across practices.
- The use of checklists inherently in structured reports reduces diagnostic errors.
- Less grammatical and nongrammatical errors may be introduced into SR even when digital speech recognition is used.
- Preserving the completeness of report documentation improves insurance and other reimbursements.
- It improves quality.
- It may promote evidence-based medicine by integrating clinical decision support tools with radiology reports.

However, the most important factor is to improve research. Each population based on genetic background and ethnicity may require different or specific medical protocols or practice for certain diseases. High quality medical research is needed to address the differences and to build the foundation for more appropriate medical procedures and knowledge generation. The importance of high impact and high-quality research in medicine and medical practice is felt in Iranian universities but irrespective a large amount of government investments on different aspects of medical fields is not

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clearly observable. The universities have abundant numbers of erudite and competent researchers but not enough tagged or labeled data are available for high impact publications. Medical doctors in Iran are mainly practitioners. Although research has gained momentum within the last few years, mainstream respected researchers in medicine do not put research in their first priority. Structured reporting, if performed properly, can provide the main feed for quality research since while medical practitioners perform their regular medical practice. Their diagnosis and observations can be used directly as input to data mining and machine learning algorithms and at the same time be used for population studies.

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Referral Guidelines in Radiology: Point of Care Advice

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Abstract

Background: Referral guidelines are becoming more and more appreciated in health management primarily to optimize resource utilization. But in the case of medical imaging, the wise selection of the most appropriate study is also important from the patient's safety perspective. However, the problem is not limited to the availability of guidelines. Even when they are already developed and published, their practical use should be feasible to improve health care. IT tools are important to bring the guidelines to the point of care and tailor the decision to the patient's problem.

Objectives: By listening to this lecture, the audience is expected to:

1. Explain available imaging referral guidelines.
2. Describe the features of IT-based decision support tools.
3. List the process of using BARTAR application as a national imaging referral guideline platform.

Outline: The most comprehensive repository of imaging referral guidelines is the appropriateness criteria developed by the American College of Radiology.

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There are other national or multinational collections of guidelines but no one is practical. There are IT tools to help practitioners select the best imaging procedure according to the guidelines and considering patient's problems, including ACR Select and iGuide. Every national health system requires an adapted version of the guidelines considering available modalities and the health system. By developing an Iranian collection of imaging referral guidelines, a Persian mobile application is designed to interactively advise medical practitioners by answering questions related to the clinical problem of the case and considering available imaging services in the institution or the region of practice, leading to a list of potential choices in order of appropriateness.

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Experience of Enterprise Imaging in Iran

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Abstract

Background: The use of digital imaging has substantially grown in recent decades in traditional services, new specialties, and departments. The need to share these data among departments and caregivers necessitates central archiving systems to communicate with various viewing applications and electronic medical records. This has promoted the development of modern vendor-neutral archive (VNA) systems. The need to aggregate and share imaging data from various departments has promoted the development of enterprise-imaging (EI) solutions that replace departmental silos of data with central healthcare enterprise databases. The term "enterprise imaging" is relatively new and continues to evolve. Currently, enterprise imaging usually means collecting all patients' data, including images and reports, into one place. There are lots of research demonstrating that image exchange can reduce unnecessary redundancy and provide other compelling values, including cost reduction, patient care improvement, patient satisfaction, research and educational benefits, and so on. Enterprise imaging and VNA are on the horizon for every institution as a mainstream expectation of patients, hospitals, and health care providers. Such a program comes