International Telecommunication Union (ITU)

Junior Professional Officer Program (JPO)

Title: JPO, Junior Artificial Intelligence for Health Officer
Unit: Telecommunication Standardization Bureau (TSB), Telecommunication Standardization Policy Department (TSP)
Organization: International Telecommunication Union (ITU)
Country and Duty Station: ITU Headquarter, Geneva, Switzerland
Duration of assignment: 2 years with possibility of extension for another year

The extension of appointment is subject to yearly review concerning priorities, availability of funds, and satisfactory performance.

Please note that for participants of the ITU JPO-Programme three years work experience are mandatory!

ITU is the United Nations specialized agency for information and communication technologies – ICTs. We allocate global radio spectrum and satellite orbits, develop the technical standards that ensure networks and technologies seamlessly interconnect, and strive to improve access to ICTs to underserved communities worldwide.

ITU is committed to connecting all the world’s people – wherever they live and whatever their means. Through our work, we protect and support everyone’s fundamental right to communicate.

Today, ICTs underpin everything we do. They help manage and control emergency services, water supplies, power networks and food distribution chains. They support health care, education, government services, financial markets, transportation systems, e-commerce platforms and environmental management. And they allow people to communicate with colleagues, friends and family anytime, and almost anywhere.
With the help of our global membership, ITU brings the benefits of modern communication technologies to people everywhere in an efficient, safe, easy and affordable manner.

ITU membership reads like a Who’s Who of the ICT sector. We’re unique among UN agencies in having both public and private sector membership. So in addition to our 193 Member States, ITU membership includes ICT regulators, many leading academic institutions and some 700 tech companies.

In an increasingly interconnected world, ITU is the single global organization embracing all players in this dynamic and fast-growing sector.

The JPO would be based in ITU HQ in Geneva, Switzerland, an international and exciting city that hosts more than 190 international organizations. Geneva hosts more than two thirds of all UN activities and is visited by nearly 3000 heads of states or similar officials every year. It is a great opportunity to be based at the heart of the diplomatic world, and meet people from across the globe.

Organizational Unit:

Within the Telecommunication Standardization Bureau (TSB), the Telecommunication Standardization Policy Department (TSP) is responsible for the policies guiding ITU-T and the maintenance of its relevant position in the global standardization arena. It is responsible for identifying emerging technologies and analyzing technology trends in order to advise membership on emerging standardization developments.

Duties, responsibilities and output expectations:

The Junior Professional Officer will work in the fields of Artificial Intelligence (AI) for health. The focus of the work is on open benchmarks for the evaluation of AI-based methods for health, such as AI-based diagnosis, triage or treatment decisions. The position offered is in arguably one of the most exciting positions in the fields of Artificial Intelligence and health.

The main duties and responsibilities will be to:

1. Conduct technical research and draft reports on the latest AI trends of image analysis for health, with focus on benchmarking AI-based methods.
2. Assist in the project management of an international group. The task of the group described below is daunting – it is similar to designing the approval process of a medication, except that in our case the approval is given to an algorithm rather than a medical drug.

Background

AI has in the past decade seen an enormous rise of interest due to significant advances in effectiveness and use. The health sector, one of the most important sectors for societies and economies worldwide, is particularly interesting for AI applications. The potential for AI-assisted health decision making is immense, yet the sector lacks various forms of standards that would enable the evolution to the fullest extent. For this reason, the International Telecommunication Union (ITU) has established a new Focus Group on "Artificial Intelligence for Health" (FG-AI4H) in partnership with the World Health Organization (WHO). FG-AI4H will identify opportunities for
international standardization, which foster the application of AI to health issues on a global scale. In particular, it will establish a standardized assessment framework with open benchmarks for the evaluation of AI-based methods for health, such as AI-based diagnosis, triage or treatment decisions.

However, AI4H is rarely deployed in practice at a global scale – so far – due to legal, business, technical, or other constraints.

The new Focus Group on Artificial Intelligence for Health will work towards a standardized assessment of AI-based solutions for health, which will assure the quality, foster the adoption in practice and have a strong positive impact on global health.

FG-AI4H will identify common health-specific domains (e.g. general diagnosis, specialty diagnosis [e.g. dermatology], health natural language processing, Rx coding, lab coding, etc.) and for each domain it will work for sourcing of test data, select current gold standard test success rates (e.g. how does a professional score on this test data), set benchmark rates for AI system (to be acceptable for decision support, to be acceptable for autonomous operation), and define acceptable fail modes (e.g. alert human operator if below a given confidence threshold).

Medical, scientific, technical, policy, regulatory, cultural, business and other practical aspects must be considered in relationship to standardization efforts.

The fact that computers are increasingly able to interpret images and text as accurately as humans opens up countless avenues for AI applications in health. Much of the recent work on AI in health has thus gone into applications that revolve around image interpretation and natural language understanding. In the field of medical image analysis, one of the most publicized studies was by Esteva et al. demonstrating the accurate classification of skin lesions using a deep neural network that was trained on clinical images, and assessing its performance by comparing its classifications to those made by board-certified dermatologists, revealing the network had reached human accuracy levels.

A survey published in 2017 reviewed over 300 papers using deep learning in medical image analysis, typically for detection, segmentation, or classification tasks. The reviewed papers covered the analysis of X-ray, CT, MRI, digital pathology, cardiac, abdominal, musculoskeletal, fetal, dermatological and retinal images. In language understanding, the areas of biomedical text mining, electronic health record analysis, sentiment analysis on internet-derived data, and medical decision support systems have shown promising results. Furthermore, AI methods can automatically interpret laboratory results (ranging from standard blood testing to recent advances in high-throughput genomics and proteomics) and time series (e.g. electrocardiogram, temperature, oxygen saturation, blood pressure).

A large part of the world’s population has access to devices that can utilize compute-intensive AI-powered applications, considering the ubiquity of computers and smartphones connected via the internet to powerful computing clusters. For example, relatively accurate detection of skin lesions using a state-of-the art camera-equipped mobile phone is technologically feasible, and medical chatbots are already on the market that can answer basic medical questions. Given the speed at which AI-based algorithms can be developed, improved, and deployed, the technology has the potential for first-class medical decision making accessible worldwide and affordable to the entire global population.

While this progress is exciting, the potential of AI for health also faces a number of challenges. In particular, deep learning models are famously hard to interpret and explain - which may
substantially hinder their acceptance when facing critical or even vital decisions. Thus, interpretability, explainability, and proven robustness (e.g. to outliers and to adversarial attacks) are crucial aspects that have to be considered for trustworthiness. Moreover, health data are sensitive and subject to privacy laws. Therefore, access to sufficient training data is a major limiting factor for the predictive performance of models on new data previously unseen.

This problem is complicated further because most modern AI applications are based on supervised learning and rely on data that are labeled. In the health domain, labels can typically be given only by qualified specialists, in contrast, e.g., to simple object recognition, where photographs can be labeled by legions of laypersons. In addition, machine learning approaches must take into account the bias that both text and image-based medical data most likely contain. In machine learning, algorithms and training data have to be considered in combination. The algorithms can not extrapolate, but can only learn patterns that are present in the training data, which need to be of high quality, sufficiently large to learn the myriad of parameters of the data-hungry algorithms, and theoretically should cover all possible instances including outliers.

Qualifications and experience required

Education:

Master's Degree in information technology, computer science, telecommunication, (life) sciences, medical sciences including medical informatics background or related fields.

Work experience:
At least 3 years of relevant work experience.

Languages:
Knowledge of one of the six official languages of the Union (Arabic, Chinese, English, French, Russian, Spanish) at advanced level and knowledge of a second official language at intermediate level. Knowledge of a third official language would be an advantage.

Key Competencies:

- **Core Competencies**: Applying Expertise; Effective Communication; Learning and Knowledge Sharing; Organizational Commitment; Results-Focused, and Teamwork and Collaboration.

- **Essential Functional Competencies**: Analysis, Judgement and Decision Making; Client and Service Orientation, and; Planning and Organizing.

- **Essential Technical Competencies**: Infotech and biotech competencies. Knowledge of Machine Learning, e.g. at the level of introductory courses offered on www.coursera.org or www.edX.org, is an advantage.
Training and Learning Elements:

The successful candidate must be analytical thinker, enthusiastic learner and creative problem solver. The candidate will work in a multidisciplinary environment and acquire medical, scientific, technical, policy, regulatory, cultural and business knowledge in one of the most exciting and impactful fields: artificial intelligence for health. The candidate will acquire an influential network in the area of artificial intelligence and health. The candidate will work in an international environment. The position may include travel to various corners of the world.

Bitte senden Sie Ihre Bewerbung direkt an das Büro Führungskräfte zu Internationalen Organisationen (BFIO).

Alle Informationen unter www.bfio.de