Real-Time Communication System Powered By AI For Specially Abled

Literature Survey

ABSTRACT

Artificial Intelligence(AI) has proved its power and efficiency into different domains(industry, medicine, economic, etc), hoping for giving a chance for people with disabilities to change their life for the best. Basically, AI offers many advanced tools and machine learning algorithms that could support human capabilities, needs and preferences and improve User Experience (UX). In this paper, we focus on the impact of AI in Human Machine Interaction. Likewise, we aim to demonstrate what is the impact of AI on disability Human life. Finally, we proceed by introducing a revolutionary approach of adaptive user interfaces to users with special needs.

INTRODUCTION

Disability impacts negatively on human life. Each disability presents their specific barriers. These latter cause scarcity of people with disabilities from appropriate services that facilitate their specific tasks using interactive systems as they find difficulties in communicating with the user interfaces of digital applications (web, mobile, desktop, tv, etc). Different solutions were proposed, but they still insufficient and not efficient considering the pervasive environment and the bunch of contextual information that contains. Otherwise, Artificial Intelligence (AI) is an emergent imitator technology to represent the human brain thinks by the integration of the machine's from computing systems. computational power and speed with human perception and intelligence . AI is in growing and possesses the necessary tools that could help users with disability experience in accessing information In fact, users with

disability have to use interactive systems as well-bodied users. But, they are unable to do it, because user interfaces of interactive systems are not adapted to their capabilities. Therefore, we need to improve adaptive interactive systems in order to make them accessible to disabled users. Accessibility of User Interfaces(UI)s is also an emergent and important domain that needs more and more investment . The solutions given are insufficient, superficial and limited to elementary disability. Therefore, to overcome all difficulties and challenges, we need to propose solutions that cover almost of users with disability from different cultural environments, considering almost of platforms used for the interaction.

This paper consolidates research findings in collaboration between accessibility, user interfaces and artificial intelligence. In the end, we present a solution integrating accessibility, user interface and artificial intelligence.

ARTIFICIAL INTELLIGENCE IMPACT

The traditional problems of AI research were how to provide tools for reasoning, knowledge representation, planning, learning, natural language processing, perception and the ability to move and manipulate objects. It had made success offering advanced functionalities in diverse modern domains such as speech recognition, images classifying, game playing, search engines and virtual assistants. It provided tools for organization, selection, filtration and searching for information. The rapid expansion of artificial intelligence is largely related to the popularization of Machine Learning. This scientific approach consists in letting the machines learn independently to perform tasks. Machine learning is a subset of AI that represents a mathematical model that learns how to recognise or to represent a concept through repeated exposure to samples of that concept . Machine Learning has made it possible to equal or even surpass human capacities. For instance, with ML algorithms we can transcript a speech, recognize an emotion, create video, etc.. Interactive Machine Learning (IML) is a set of learning algorithms which combine computational and human agents. IML has attracted interest among Human-Computer Interaction (HCI) researchers due to the unique aspects of establishing

effective human interactions under this paradigm by integrating human experience and domain-knowledge. User with a disability could be the centre of the machine learning loop. IML paradigm is oriented in reinforcement learning, preference learning and active learning. Natural Language Processing (NLP) is a powerful method to understand human languages. It represents an algorithm to manage the interactions between human language and computers. NLP is a set of ML-based algorithms. With NLP, virtual assistants have to grow as Alexa or Siri . Therefore, several questions could be asked: how could AI between three essential parts: Human-Computer Interaction (HCI), Accessibility Context (AC change for better people with disabilities live? What challenges could the Artificial Intelligence attempt when applied to User Interface? How can a User Interface adaptation system give the way to improve its adapting behaviour for accuracy and efficiency? Hence, the challenge is to find an approximation) and Artificial Intelligence(AI) . We have defined the accessibility context (AC) as any information describing the user disability, the information specifying the computing platform used and the information about the particular physical environment of the computing platform at a given user situation. In consequence, we consider the Accessibility Context as any information describing the Disability Profile, the User Identity, the User Situation, the Technical Context and the Environment Context.

ADAPTIVE USER INTERFACES

Artificial Intelligence has demonstrated its potential in advanced user interfaces by the growing of Adaptive User Interfaces(AUI) or Intelligent User Interfaces. These latter use Machine Learning based methods to personalize the UI behaviour according to the context of use. AUI has the potential to be adapted by itself automatically based on the context of use. It can benefit from Artificial Intelligence (AI) in general, and Machine Learning (ML) techniques . Therefore, we propose an Adaptive UI to Accessibility Context AUIAC, an intelligent generic model driven approach of adaptive user interfaces to a given accessibility context. AUIAC has several properties to provide usable and effective solution which are:

• Generic: AUIAC approach is considered generic since it has to be applied for a big range of disabilities and platforms. We need to make accessible a bunch of UI type which are the most used (web UI, mobile UI, desktop UI).

• Adaptive: The adapting system behaves accordingly to the accessibility context based on an adaptivity procedure. In fact, adaptivity automates a little bit the adaptation of the UI to users with special needs.

Intelligent: When the context change, the UI has to change accordingly. This procedure has to be automatic in order to match a large scale of accessibility context and all UIs aspects. Therefore, we are working on integrating Artificial Intelligence in all AUIAC modules based on algorithms of Machine Learning .

• Context-aware: AUIAC approach is an adaptation approach to the accessibility context. It has to take into account all context's aspects. These latter are captured from different sensors connected to the device used. Hence, the approach must to provide a context manager to sense, collect, manage and send informations about context to the adaptation process to adapt the UI accordingly. Context-awareness leads to built pervasive computing interactive systems .

CONCLUSION

Adaptive User Interfaces are in growth due to the use of artificial intelligence which offers a big range of methods based on Machine Learning, Deep Learning and Reinforcement Learning Algorithms . Therefore, Users with disabilities' life has to change and evolve with the emergence of adaptive user interfaces. Additionally, encloses many challenges and opportunities in humanity future, it will empower Disabled user experience (DUX).

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