AI and Ageing

WORKSHOP 1 REPORT
MAY 2021
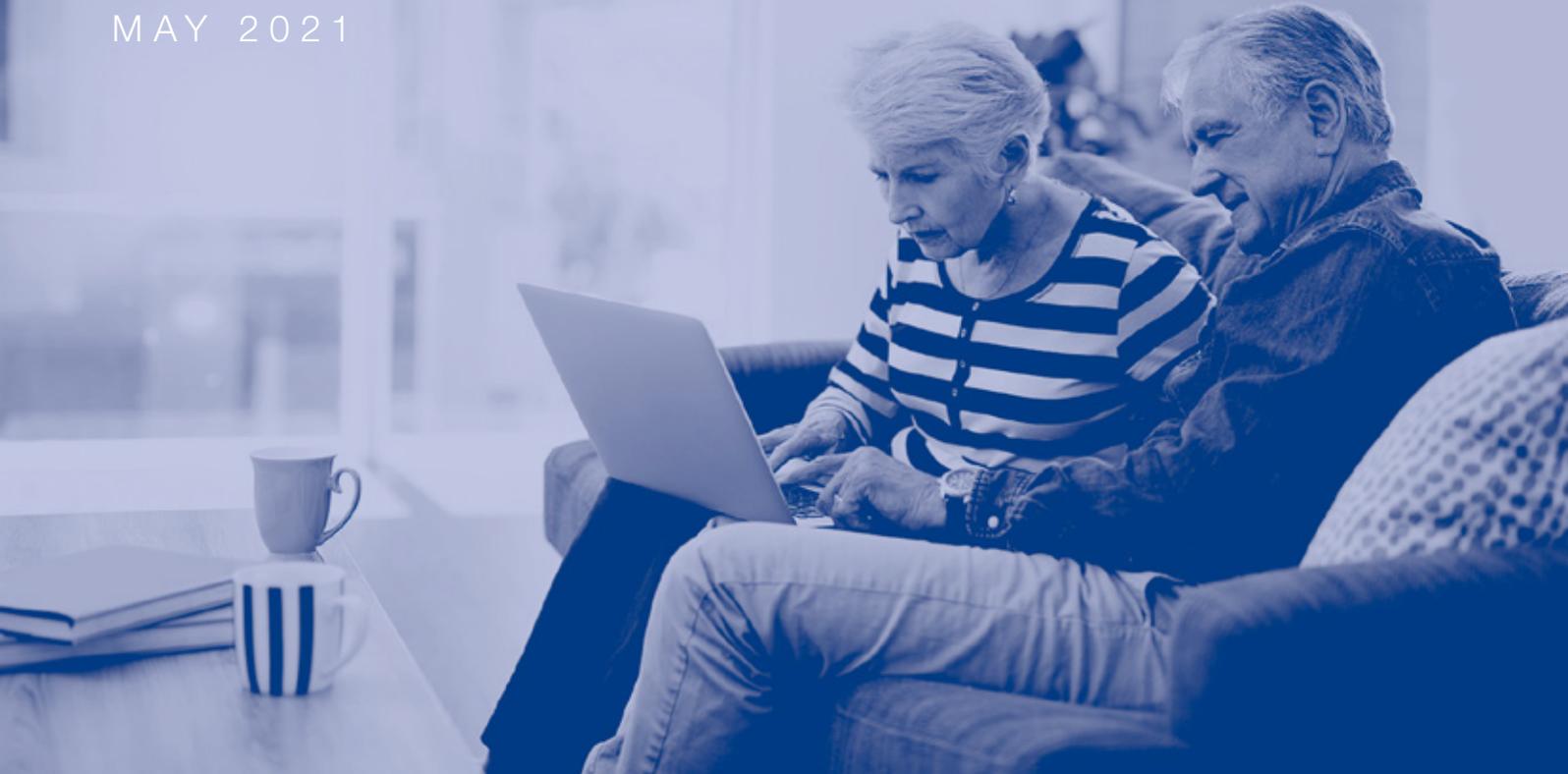
WORLD ECONOMIC FORUM

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Introduction

Artificial Intelligence has the potential to help address the needs of the ageing population. On 25 March 2021, the World Economic Forum hosted a workshop with some 30 stakeholders from academia, the private sector, senior care organizations, healthcare design and civil society across 20+ organizations. The main objective of the discussions was to unlock AI opportunities that have the potential to promote autonomy, safety, well-being and dignity of older adults (60 years or older).

Workshop overview

The workshop began with an overview of the global ageing landscape and context, including the key opportunity areas where technology can be beneficial to examine the role that AI can play in helping address these needs. Key AI categories and emerging AI trends in the ageing space were presented to establish a common ground for discussion.

AI categories	Emerging trends
– Speech to text	– Assistive autonomous robots
– Text to speech	– Self-driving vehicles
– Speech translation	– AI-enabled health smart apps and wearables
– Speaker recognition	
– Computer vision	
– Face recognition	– Voice-activated devices
– Text analytics	– Virtual and augmented reality
– Translator	
– Immersive reader	– Intelligent homes
– Language understanding/ conversational AI	

The following considerations formed the basis for the workshop discussions:

1. Recognize older adults as humans and not as problems to be solved
2. Acknowledge that technology alone cannot address all the needs associated with ageing
3. Focus on AI solutions that cater to the needs of older adults and family caregivers (versus focusing on AI for healthcare providers for diagnosis and treatment)
4. Consider the unique needs of the disabled older population
5. Focus on AI investment that is feasible in the next 5-10 years
6. Focus on the Global North, where AI and technological innovation are currently evolving more rapidly

AI opportunities

Social isolation

– Use augmented reality to virtually connect older adults at home to collaborate and provide guidance to colleagues at work sites
– Enable connections with those with similar interests and mentoring opportunities via algorithmic matching and smart calendaring
– Leverage automatic speech recognition to assist with journaling, capturing memories, authoring articles and books, and sharing with those interested
– Pair older adults (especially those with first-time experience of living alone) with paying short-term or long-term guests based on common interests. Promote intergenerational pairing with students or professionals looking for affordable housing
– Help older adults find love via algorithmic matching that caters to the preferences of older adults
– Enable older adults to spend time with their family and friends via virtual reality (e.g. Alcove) and augmented reality experiences

Financial health and reskilling

– Assist older adults to determine areas where their skills would be most valuable and enable "senior businesses"
– Provide suggestions for part-time employment, based on the experience, skills, interests and availability of older adults
– Identify the skills and job interests of older adults and recommend course mentors
– Use language models such as GPT-3 to build resumes
– Provide financial guidance and budget management that builds financial independence and confidence via a financial advisor interface that uses health, income, location, expense forecasts and other pertinent data
– Protect older adults from financial frauds/scams via early warning and continuous monitoring systems
– Help older adults to balance the need to stay in the workforce longer for financial well-being versus the need to maintain emotional and physical well-being

Mobility

– Facilitate on-demand, personalized transportation via multiple mechanisms (e.g. walking, car rides with multiple stops)
– Provide transporation options in more controlled environments such as retirement communities via self-driving cars
– Assist urban planners to plan transportation routes that anticipate the needs of older adults

Ageing in place

– Unobtrusive way to monitor the heartbeat of the home: includes assessing whether the consumption of water and electricity is within normal ranges and whether ovens and other appliances are in a safe state; monitoring behaviour in terms of sleeping patterns, trips to the kitchen for meals, walking patterns and falls (e.g. via flooring, motion detection, computer vision, wearables). Caregivers are alerted when an abnormality is detected
– Spatial analysis computer vision to understand movements of older adults with dementia that notifies caregivers when there is anabnormality
– Predicts adaptations that need to be made to a home along with projected costs, as occupants age
– Help manage in-home devices by providing assistance with device set up and troubleshooting

Caregiver challenges

– Robotic pets, chatbots and synthetic agents that provide social stimulation, entertainment and reminders to take medications and do physical and mental health exercises. These AI agents react based on the unique behavioural patterns and needs of older adults
– Conversational AI that triages the need to see a healthcare provider and provides peace of mind
– TaskRabbit that matches older adults with competent caregivers based on various criteria
– Voice assistants that minimize the burden on family caregivers with timely guidance (e.g., healthy recipes, exercises) as they are assisting older adults
– Advanced Roomba and smart bathrooms that help caregivers with routine tasks that can be manually intensive (e.g., cleaning, bathing, laundry folding). This can in turn help caregivers spend more quality time with older adults

Health

– Predictive AI that integrates information from multiple sources such as medication bottles, prescriptions and health records to provide healthcare decision-making support to older adults or their caregivers
– Predictive analytics that identify health issues that are likely to arise for an individual (e.g., comparing to appropriate cohort, identifying risks and opportunities) and how these can be pre-emptively mitigated
– Detect falls and create an exercise regime based on risks of frailty
– Track financial transactions and other pertinent data to assess memory loss
– Use facial recognition to address family members and caregivers of older adults with dementia by their names (memory aid)
– Virtual reality that enables caregivers to empathize with what older adults with dementia are experiencing
– Voice assistants and robotic prosthetics to help with repetitive tasks that otherwise require hands
– Robots that lift older adults in need of assistance
– AI and gamification to help with physical rehabilitation as well as mental exercises at home, that adapts based on the individual's abilities and interests
– Wearables that detect changes in sleep and breathing

patterns and prompt to engage in mindfulness, deep breathing and relaxation. Adapts to the wearer's baseline and trends over time

End of life

– A farewell system created using augmented/virtual reality and AI that prepares for closing out life in the best way possible (e.g. prepare older adults to talk with their healthcare provider and family, help older adults understand the financial implications of different care options, provide immersive mediation, enable family members to learn how others have navigated similar situations and to understand what older adults may be experiencing)
– Create a "lived experiences asset" that maps the experience of older adults using photos, audio and videos. AI can be used to engage older adults' memory to build a map of their lives, and this asset can be continuously updated as new events happen. AI would cross-reference the stories, dates, locations, world events and even connect people who are still alive and have had similar life experience
– Generate digital twins of older adults (e.g. in augmented reality), with the ability to "talk" to them and learn about their lives, even after they are deceased

Disability and ageing

– Use of virtual/augmented reality and AI to engage in virtual tourism and immersive experience alone or with family
– Virtually connect older adults with those with similar disabilities or with a broader community that has similar interests
– Use of facial recognition to assist older adults with visual impairment to recognize people

– Use of text-to-speech and computer vision to describe photos, currencies, objects, labels and scenes to older adults with visual impairment (e.g. Seeing AI)
– Leverage solutions like eSight to improve eyesight and technology such as Microsoft Hololens to help older adults navigate buildings and "see" those they are interacting with
– Hearing aids that leverage AI to diminish background noise and cater to the hearing abilities of older adults
– Use of text-to-speech and computer vision to read medication bottles and help older adults with visual impairments to adhere to their medication regimen
– Smart homes and smart wheelchairs that adapt to the changing needs and capabilities of their users

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Next steps

The AI opportunities above are intended to spark ideas for exploration and will require feasibility assessment, and human-centered and ethical product development approaches to bring these to market. The draft timeline for forthcoming work includes:

20 May 2021: Virtual meeting with the project community to establish guidelines that will enable the responsible use of AI that address challenges associated with ageing
June - September 2021: Pilot the AI guidelines with a project partner, iterate and publish
September - November 2021: Public presentation of the AI guidelines via podcasts, conferences, other modes of dissemination
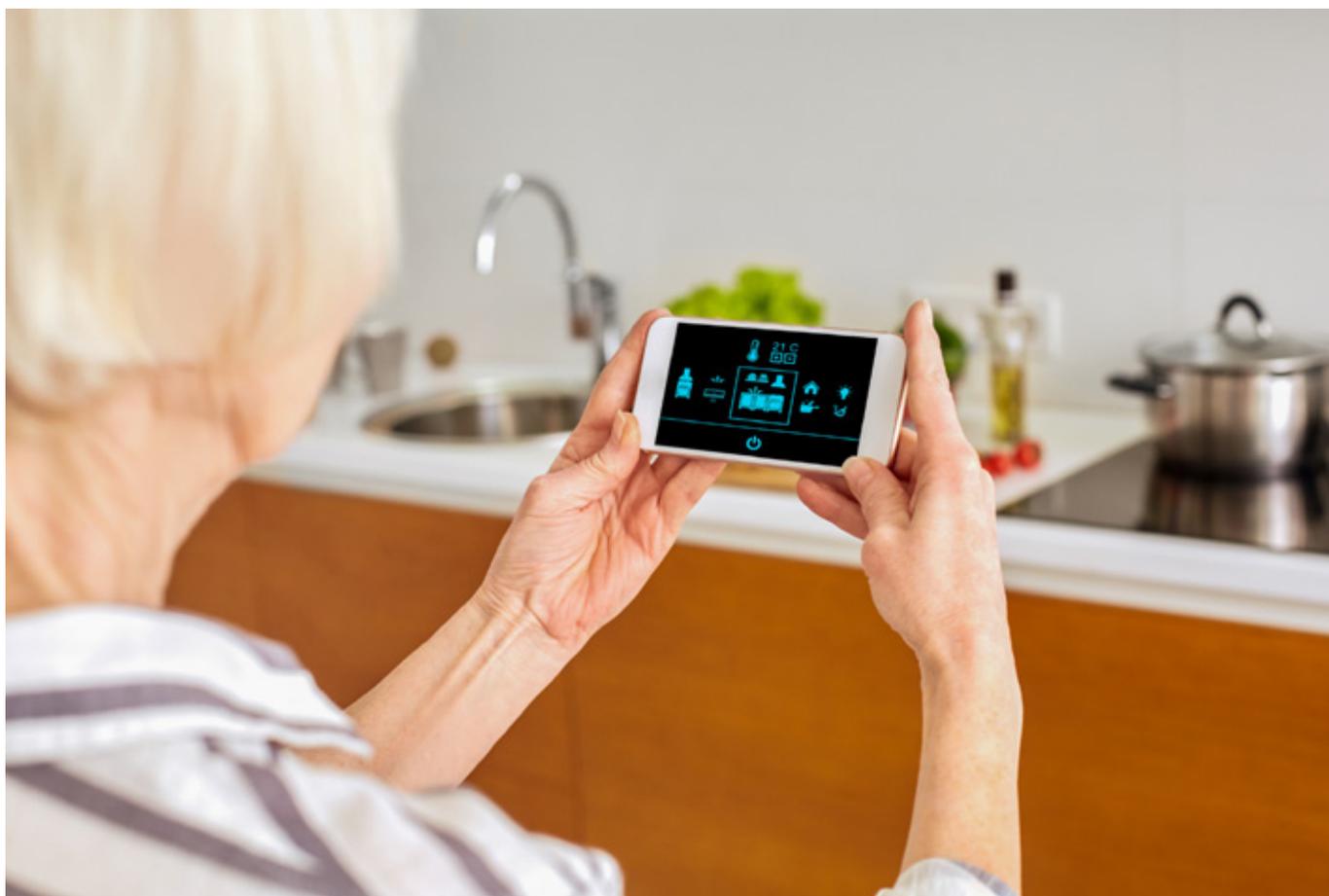
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