|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2022-2024 | | FG-AI4H-S-035 | |
| **ITU-T Focus Group on AI for Health** | |
| **Original: English** | |
| **WG(s):** | | Plenary | Geneva, 3-5 July 2023 | |
| **DOCUMENT** | | | | |
| **Source:** | | INDIA | | |
| **Title:** | | Parameters for the AI system for falls prevention among elderly: Musculoskeletal specialist perspective | | |
| **Contact:** | | Dr Ashish Jaiman Professor Orthopaedics  Central Institute of Orthopaedics, Vardhman Mahavir Medical College and Safdarjung Hospital  New Delhi, INDIA | | Tel: +91 98999 91455 Email: [drashishjaiman@gmail.com](mailto:drashishjaiman@gmail.com) |
| **Contact:** | | Hemendra K Sharma Director, Department of Telecommunication, Govt of India  New Delhi, INDIA | | Tel: +91-8800800600 Email: [hemendrakumar.sharma@gov.in](mailto:hemendrakumar.sharma@gov.in) |

|  |  |
| --- | --- |
| **Abstract:** | Fall prevention is not merely restricted to an episode of a fall; it’s an indicator of health and wellness and it requires a multidisciplinary approach. For artificial intelligence (AI) models to predict and prevent falls, a large amount of data from various streams is required.  This document proposes some data points from musculoskeletal specialist perspective that can be interpreted, analyzed, and learned in order to generate a deep neural AI network that can predict and prevent a fall. Similar data points from other disciplines may be identified by the specialists of that discipline to give a comprehensive directory of the data that can be used for AI modelling. |

**Elderly fall prevention from a musculoskeletal specialist perspective**

The Greatest Generation (born 1901–1924), the Silent Generation (born 1925–1945), the Baby Boomers (born 1946–1964), the Generation X (born 1965–1980), the Millennials (born 1981–1996), the Generation Z (born 1997–2012), and the Generation Alpha (born 2013–2025) are the seven generations that make up today's population. Although it may appear that our topic focuses on the Baby Boomers and earlier generations, but in reality, this topic is relevant to all seven generations.

Fall prevention is not merely restricted to an episode of a fall; it’s an indicator of health and wellness and it requires a multidisciplinary approach that must start at an early age.

At a minimum it entails the following branches of science:

1. Orthopaedician
2. Physician
3. Ophthalmologist
4. ENT
5. Neurologist
6. Nutrition specialist
7. Physiotherapist
8. Psychiatrist
9. Yoga for flexibility and breathing exercises and Meditation
10. Architect
11. Interior designer
12. Social Worker
13. Municipality
14. (More can be added)

For artificial intelligence (AI) models to predict and prevent falls, a large amount of data from various streams is required. This document proposes some data points from musculoskeletal perspective that can be interpreted, analyzed, and learned in order to generate a deep neural AI network that can predict and prevent a fall.

Musculoskeletal disorders that increase the risk of falling can be measured objectively or subjectively, recorded in a database, and then connected and correlated to falls via artificial intelligence (AI). A few such broad disarrays are:

1. Lower limb deformity (bone and joints) and or pain leading to gait and posture abnormality and increased chances of fall.
2. Upper limb deformity (bone and joints) and or pain leading to inability to properly hold ambulatory assistive devices or inability to hold protective devices and thereby falls and also leading to fall of objects and secondary falls. It also leads to uncoordinated gait and posture abnormalities and secondary fall.
3. Stiff and or painful and or flexed/ extended/ tilted/ rotated neck leading to improper vision and secondary fall. It also leads to uncoordinated gait and posture abnormalities and secondary fall.
4. Stiff and or painful and or flexed/ extended/ tilted/ rotated back leading to improper posture and secondary fall. It also leads to uncoordinated gait and posture abnormalities and secondary fall.
5. Sarcopenia (muscle weakness) and unstable gait and risk of fall and inability to properly hold ambulatory assistive devices or inability to hold protective devices and thereby falls and also leading to fall of objects and secondary falls. It also leads to uncoordinated gait and posture abnormalities and secondary fall.
6. Improper use of ambulatory assistive devices that can lead to a situation in which despite the use of assistive devise fall could not be prevented.
7. Osteoporosis or osteopenia itself increases the chances of fall.

Therefore, we recommend that the various specialties as mentioned earlier be enlisted and questioned about parameters in their fields that can be related to fall, and that data of every fall at certain chosen centers be noted in relation to all the predestined points and newer discoveries. This data would then be investigated, comprehended, mastered, associated and connected with fall by an AI model to prevent falls.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_