

**VISION ATTENTIVE MODEL FOR EARLY  
RECOGNITION OF SARCOPENIA WITH LIMITED  
MOBILITY OF ELDERS IN DOMESTIC  
ENVIRONMENT**

H.M.K.K.M.B. Herath

(228055G)

Master of Science (Major Component of Research)

Department of Electrical Engineering  
Faculty of Engineering

University of Moratuwa  
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## DECLARATION

I declare that this is my work, and this Dissertation does not incorporate without acknowledgment any material previously submitted for a Degree or Diploma in any other University or Institute of higher learning. To the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgment is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

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The above candidate has carried out research for the MSc by Research Dissertation under our supervision. We confirm that the declaration made above by the student is true and correct.

Name of Supervisor: Prof. A.G.B.P Jayasekara

Signature of the Supervisor:

Date:

Name of Co-Supervisor: Dr. B.G.D.A. Madhusanka

Signature of the Supervisor: *UOM Verified Signature*

Date: 21-12-2023

## DEDICATION

*Dedicated*  
*To my loving parents and wife*

## ACKNOWLEDGMENT

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## ABSTRACT

Sarcopenia, a condition marked by age-related loss of muscle mass and function (especially in elders), is becoming more commonplace worldwide. Sarcopenia screening is necessary to identify at-risk people and implement measures to stop or slow their growth, especially in elders. Since many older people reject wearable sensor-based technologies, there is still a need for vision-attentive-based techniques for sarcopenia screening through the functional mobility of older people. In this research, combining the Timed Up and Go test (TUG-T), 3 Meters Walk Test (3mW-T), and fall score model built a vision attentive system for screening for sarcopenia in elders. The t-test applied to the collected dataset indicated a direct correlation between sarcopenia and factors such as TUG time ( $p=0.004$ ), gait speed ( $p=0.006$ ), fall score ( $p=0.021$ ), and age ( $p=0.002$ ). The primary discovery of this research indicates that older individuals afflicted by sarcopenia exhibit a TUG time exceeding 13.1 ( $\pm 0.35$ ) seconds, along with a gait speed slower than 0.7 ( $\pm 0.07$ ) m/s. Moreover, using the TUG test, gait speed, and fall score, the system successfully recognized sarcopenia in individuals with an accuracy of 93.7 ( $\pm 1.9$ ) %, 96.1 ( $\pm 2.1$ ) %, and 92.14 ( $\pm 4.6$ ) %, respectively. The method can potentially be an effective sarcopenia screening tool, as evidenced by its overall accuracy of 91.2%. These findings suggest that a vision-attentive system can be effective for sarcopenia screening and early detection, which may eventually enhance the elderly's clinical outcomes and quality of life.

**Keywords:** Geriatric assessment, Functional mobility estimation, Sarcopenia screening, TUG test, Vision attentive model

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## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
3mWT	3-meters Walk Test
6mWT	6-Minute Walk Test
ADL	Activities of Daily Living
ANN	Artificial Neural Network
AWGS	Asian Working Group for Sarcopenia
BMI	Body Mass Index
DNN	Deep Neural Network
EWGSOP	European Working Group on Sarcopenia in Older People
FCE	Work-Specific Functional Capacity Evaluation
FMS	Functional Movement Screen
FRT	Functional Reach Test
GUI	Graphical User Interface
ICRP	International Commission on Radiological Protection
IDE	Integrated Development Environment
IMU	Inertial Measurement Units
ISAK	International Society for the Advancement of Kinanthropometry
NIOSH	National Institute for Occupational Safety and Health
ROC	Receiver Operating Characteristic
SDOC	Sarcopenia Definition and Outcomes Consortium
SFMA	Selective Functional Movement Assessment
SLST	Single Leg Squat Test
SPPB	Short Physical Performance Battery
TUG	Timed Up and Go
WHO	World Health Organization
YBT	Y-Balance Test

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