

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202241052932 A

(19) INDIA

(22) Date of filing of Application :16/09/2022

(43) Publication Date : 23/09/2022

(54) Title of the invention : ARTIFICIAL INTELLIGENCE ENABLED FALL CARE WEARABLE SYSTEM FOR ELDER'S

<p>(51) International classification : G01P0015080000, G08B0021040000, G06N0020000000, A41D0013018000, A61B0005021000</p> <p>(86) International Application No : NA Filing Date : NA</p> <p>(87) International Publication No : NA</p> <p>(61) Patent of Addition to Application Number : NA Filing Date : NA</p> <p>(62) Divisional to Application Number : NA Filing Date : NA</p>	<p>(71)Name of Applicant : 1)VIGNAN'S LARA INSTITUTE OF TECHNOLOGY &amp; SCIENCE Address of Applicant :VIGNAN'S LARA INSTITUTE OF TECHNOLOGY &amp; SCIENCE, VADLAMUDI-522213, GUNTUR, A P, INDIA ----- Name of Applicant : NA Address of Applicant : NA</p> <p>(72)Name of Inventor : 1)DR. K. S. BALAMURUGAN Address of Applicant :LLC PRESIDENT &amp; PROFESSOR, DEPARTMENT OF ECE, VIGNAN'S LARA INSTITUTE OF TECHNOLOGY &amp; SCIENCE VADLAMUDI-522213, GUNTUR, A P, INDIA ----- 2)DR. K. PIANEENDRA KUMAR Address of Applicant :PRINCIPAL, VIGNAN'S LARA INSTITUTE OF TECHNOLOGY &amp; SCIENCE VADLAMUDI-522213, GUNTUR, A P, INDIA. ----- 3)DR. M. KALA MUTIUMARI Address of Applicant :FOUNDER &amp; CEO, RURALCARE INNOVATORS LLP. HO: OOMATCHIKULAM, MADURAI-625014, TN, INDIA. BO. ROBERTSONPET, KGF, KARNATAKA 563 122. ----- 4)S. M. ANU Address of Applicant :PROJECT MANAGER, RURALCARE INNOVATORS LLP, H/O: OOMATCHIKULAM, MADURAI-625014, TN, INDIA. ----- 5)DR JILENDRA KUMAR SAINI Address of Applicant :ASSOCIATE PROFESSOR, VIGNAN'S LARA INSTITUTE OF TECHNOLOGY &amp; SCIENCE VADLAMUDI-522213, GUNTUR, A.P, INDIA. ----- 6)C. THIANGAM Address of Applicant :ASSISTANT PROFESSOR, DEPARTMENT OF ECE, ST.MOTHER THERESA ENGINEERING COLLEGE, VAGAIKULAM, THOOTHUKUDI, TN, INDIA. ----- 7)DR K.M. PALANISWAMY Address of Applicant :PROFESSOR IN ECE, DR.T.THIMMAIAH INSTITUTE OF TECHNOLOGY, KGF, KARNATAKA. ----- 8)DR. MIRZA SHAFI SHAHSAVAR Address of Applicant :PROFESSOR IN ECE, CHALAPATHI INSTITUTE OF ENGINEERING &amp; TECHNOLOGY, LAM- 522034, GUNTUR, A.P, LNDIA. ----- 9)ARUL SINDHIA.P Address of Applicant :TEACHING FELLOW, DEPARTMENT OF ECE, UNIVERSITY COLLEGE OF ENGINEERING, NAGERCOIL. ----- 10)DR. S. SUGUMARAN Address of Applicant :PROFESSOR, DEPARTMENT OF ECE, VISHNU INSTITUTE OF TECHNOLOGY, KOVVADA-534202, A.P, INDIA -----</p>
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(57) Abstract :  
Abstract: This invention employs airbags that inflate when the elderly person wearing it falls down. The airbag is filled with small quantities of sodium azide placed into it for quick generation of large volume of nitrogen gas. The released nitrogen gas inflates the airbag. The fall is detected by a set of 3D MEMS gyroscope accelerometers along with BP level sensor. When the elderly person wearing it falls, the accelerometer readings changes quickly and it initiates current flow into the electric coil imbedded in sodium azide. Similarly, the sodium azide reaction is also triggered if the blood pressure level shoots beyond a threshold point. This electric coil's temperature quickly rises to 300 degree Celsius when current flows through it. This triggers a chemical combustion reaction which makes the sodium azide to decompose into sodium metal and large volume of nitrogen gas. This nitrogen gas inflates the airbag. The data from the blood pressure sensor and the 3D MEMS sensor are collected for a large number of elderly people. The data pertaining to fall and high blood pressure is collected. The normal reading pertaining to safe state of the elderly person is clearly classified differentially from the readings pertaining to the falling state of elder. Once the ensemble machine learning model is trained for a high level accuracy of such detection, the trained model is incorporated into the system.

No. of Pages : 6 No. of Claims : 5

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## Patent Search

Invention Title	ARTIFICIAL INTELLIGENCE ENABLED FALL CARE WEARABLE SYSTEM FOR ELDERLY
Publication Number	38/2022
Publication Date	23/09/2022
Publication Type	INA
Application Number	202241052932
Application Filing Date	16/09/2022
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	PHYSICS
Classification (IPC)	G01P0015080000, G08B0021040000, G06N0020000000, A41D0013018000, A61B0005021000

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### Abstract:

Abstract: This invention employs airbags that inflate when the elderly person wearing it falls down. The airbag is filled with small quantities of sodium azide placed in generation of large volume of nitrogen gas. The released nitrogen gas inflates the airbag. The fall is detected by a set of 3D MEMS gyroscope accelerometers along w sensor. When the elderly person wearing it falls, the accelerometer readings changes quickly and it initiates current flow into the electric coil imbedded in sodium azide the sodium azide reaction is also triggered if the blood pressure level shoots beyond a threshold point. This electric coil's temperature quickly rises to 300 degree Cel current flows through it. This triggers a chemical combustion reaction which makes the sodium azide to decompose into sodium metal and large volume of nitrogen nitrogen gas inflates the airbag. The data from the blood pressure sensor and the 3D MEMS sensor are collected for a large number of elderly people. The data perta and high blood pressure is collected. The normal reading pertaining to safe state of the elderly person is clearly classified differentially from the readings pertaining t state of elder. Once the ensemble machine learning model is trained for a high level accuracy of such detection, the trained model is incorporated into the system.

Complete Specification

## Claims:

- 1) An air-bag system work by the elderly around the waist that inflates when they fall down employing fall detection by 3D MEMS accelerometer and blood pressure data.
- 2) As claimed in Claim 1, using blood pressure sensor to identify the fall of the elderly person.
- 3) As claimed in Claim 1, using sodium azide to generate large volume of nitrogen gas.
- 4) As claimed in Claim 1, employing ensemble machine learning model to identify falling of the elder from the sensor data.
- 5) As claimed in Claim 1, employing 3D MEMS accelerometer in combination with the blood pressure sensor to identify the falling of the elder.

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Page last updated on: 26/06/2019