IoT Based Automated Myo Neuro Stimulator For Neuro Paralytic Patients

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Submitted By:

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Objective of Innovation

- **Bring back Near-Normal Life(Rehabilitation) of Neuro -Paralytic Patients**
- **Self motivated, Regularized exercises**
- **No manual assistance-Normal Routine Activities**

Problem Addressed

We all know someone - a brother, sister, friend, neighbor, or colleague -**living with paralysis**. They aren't strangers, But

- ✓ **They are mostly unnoticed and separated**
- ✓ **Need maximum care with compulsory manual assistance for rehabilitation**

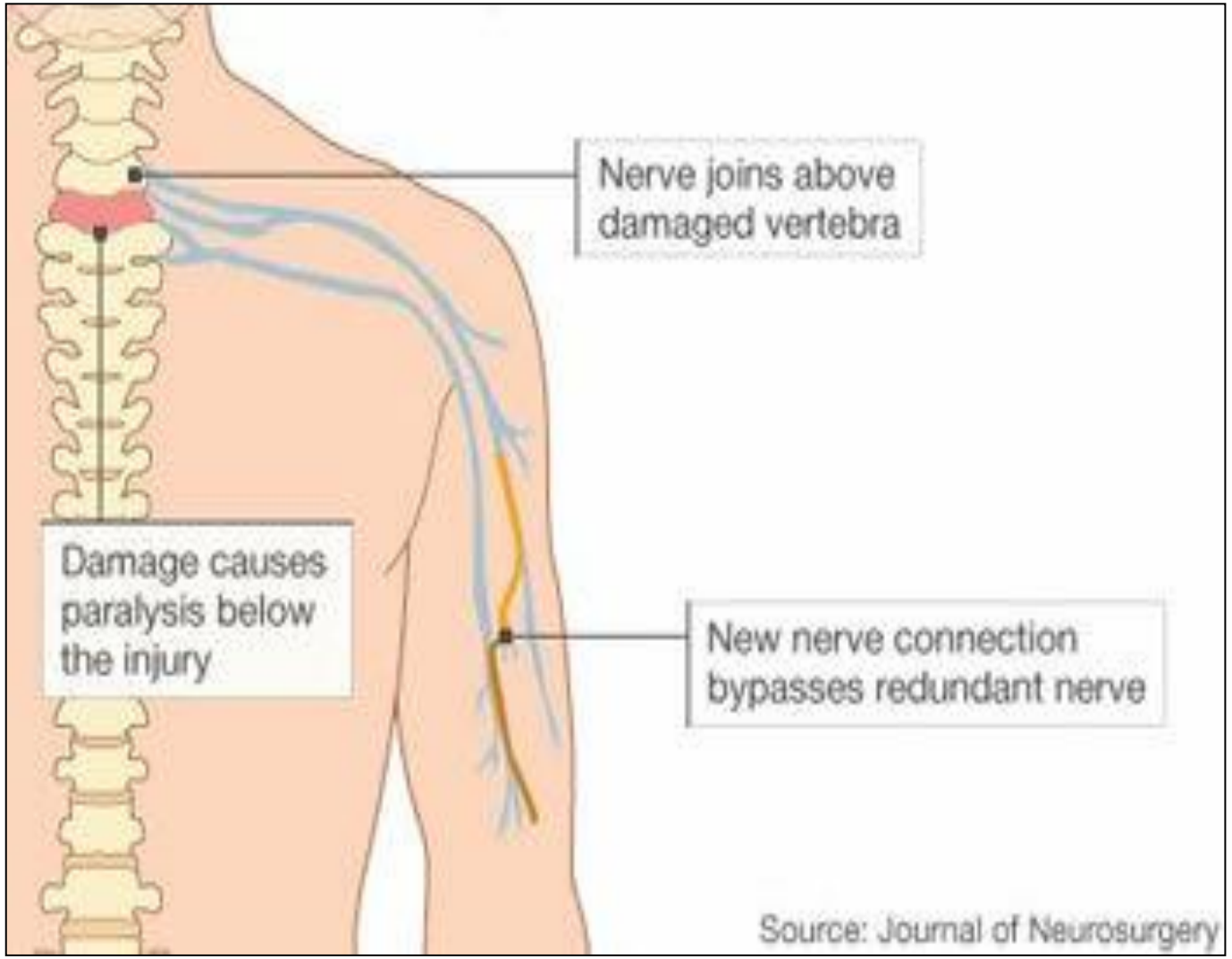
Motivation

Paralytic Patient Care – Faster and Self Motivated Recovery of Paralytic Patients

Paralysis Prevalence and Health Disparities Survey (PPHDS)-2020:

- ✓ Approximately 2.5% of total population are living with paralysis
- ✓ 1.8 % of paralytic patients are hopeless and completely dependent

Neuro Pralysis



- ✓ Loss of strength in and control over a muscle or group of muscles .
- ✓ More likely due to **damage of chain of nerve cells** that runs from the body part to brain and back again.

(Nerve cells deliver the signals for our muscles to move)

Neuro Paralysis

Etiological Cause of Neuro Paralysis

- ✓ Guillain-Barré syndrome
- ✓ Stroke
- ✓ Myasthenia Gravis
- ✓ Botulism
- ✓ Drugs
- ✓ Head Injury/Trauma
- ✓ Infections

Clinical Features of Neuro Paralysis

- ✓ Muscle Weakness
- ✓ Stiffness of one/both sides of body
- ✓ Muscle Spasticity/Permanently Contracted Muscle
- ✓ Poor Fine Motor Skills
- ✓ Trouble Walking
- ✓ Poor Balance
- ✓ Cranial/Spinal Nerve dysfunction

Patient Rehabilitation

Exercise -Foundation of the healing and recovery process

- ✓ Active rehab exercise -Movement on our own
- ✓ Passive exercise requires assisting movement
- ✓ Require **help of a caregiver, therapist, or family member** to move the affected arm or leg

- ➢ Needs pain-free ,comfortable and friendly exercise platform
- ➢ Needs more positive and energized enforcement (Self Interest)

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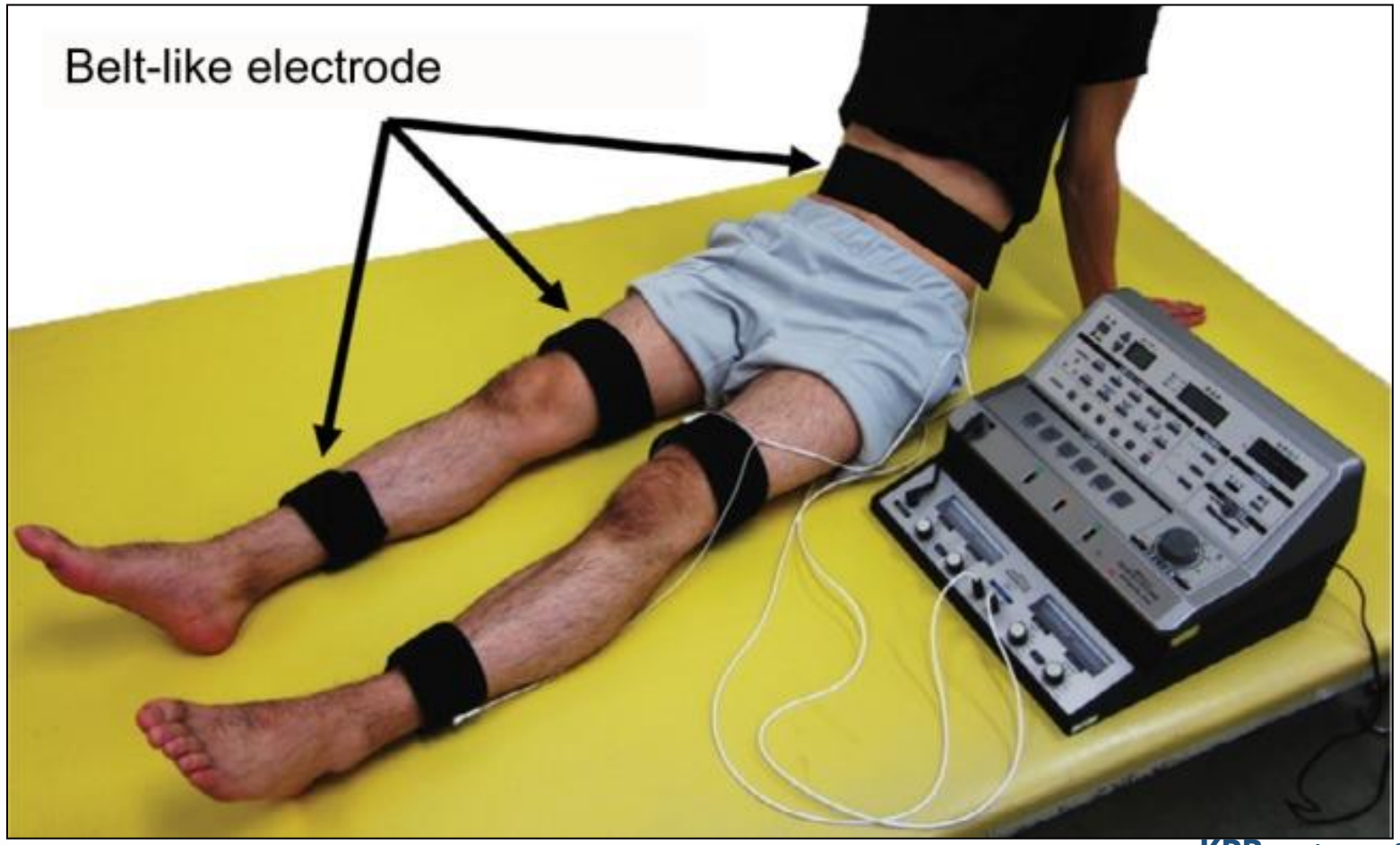
EXISTING SOLUTION

1.Exercise-Manually Assisted

2.Electrical Stimulation for Stroke Rehabilitation

- It is used for paralyzed lower limbs after stroke in preventing forefoot dropping

3.Belt Electrode Skeletal Muscle Electrical Stimulation (B-SES)



➢B-SES - stimulate all the muscles in the lower extremities

4.Functional Electrical Stimulation(FES) Devices

A. NESS L300 and wireless foot switch for gait
B. NESS H200, which is worn over the paralyzed arm and hand for upper limb motion

Proposed Innovation

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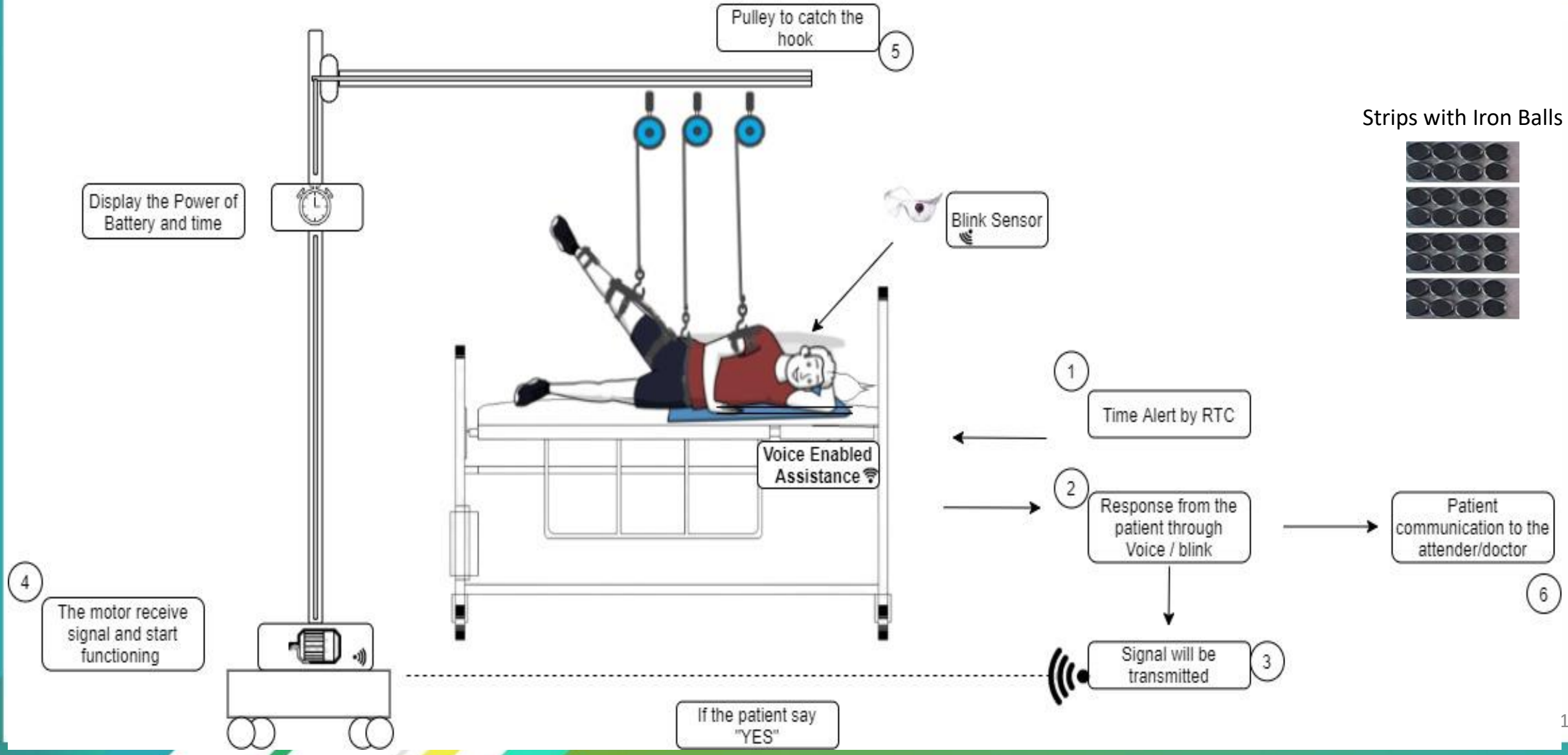
"IoT Based Myo Neuro Stimulator for Neuro Paralytic Patients"

Goal:

To **recover** **motor loss** and **sensory loss** in the affected parts of paralytic patients through exercise,

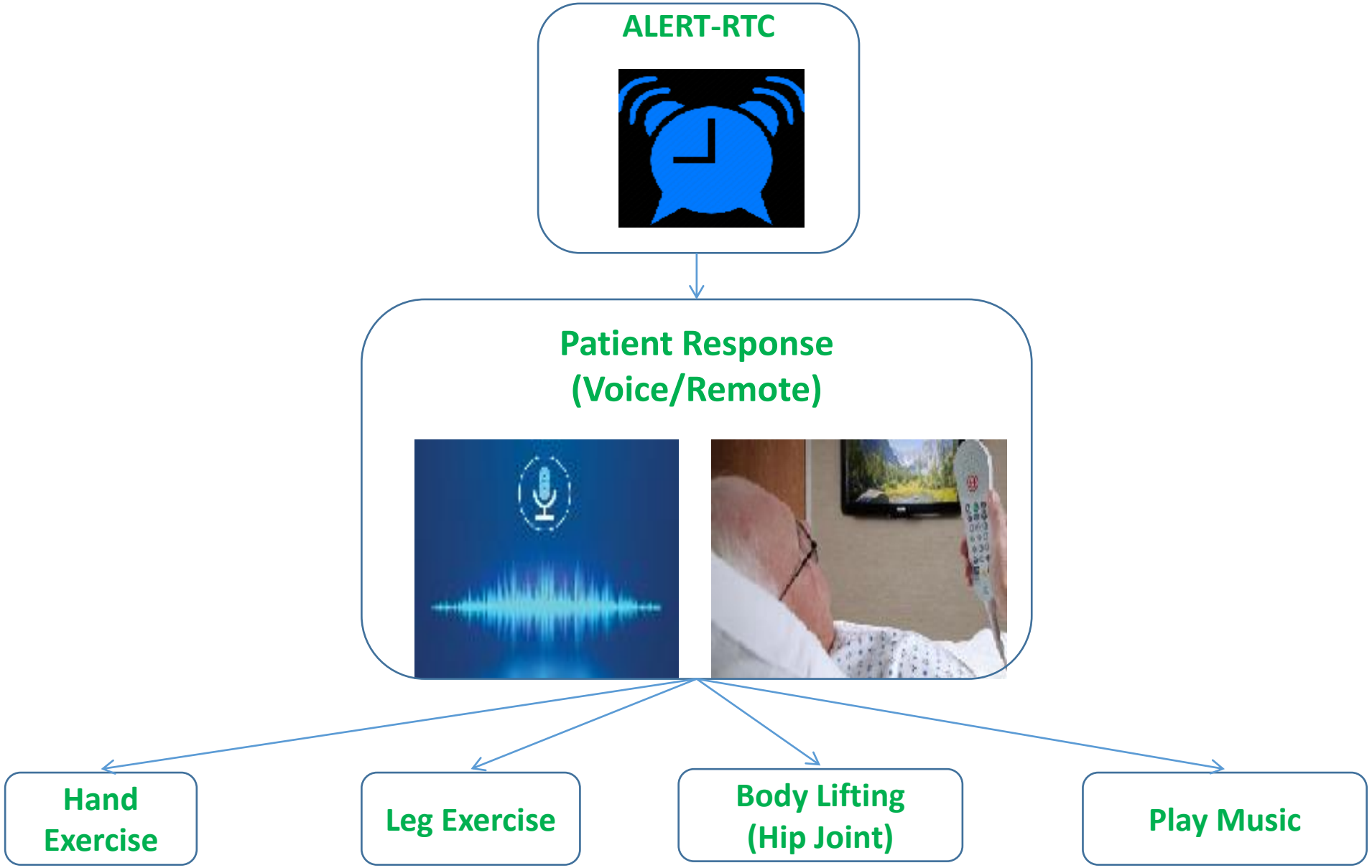
- ✓ In absence of care givers
- ✓ Patient Convenient Time

BLOCK DIAGRAM

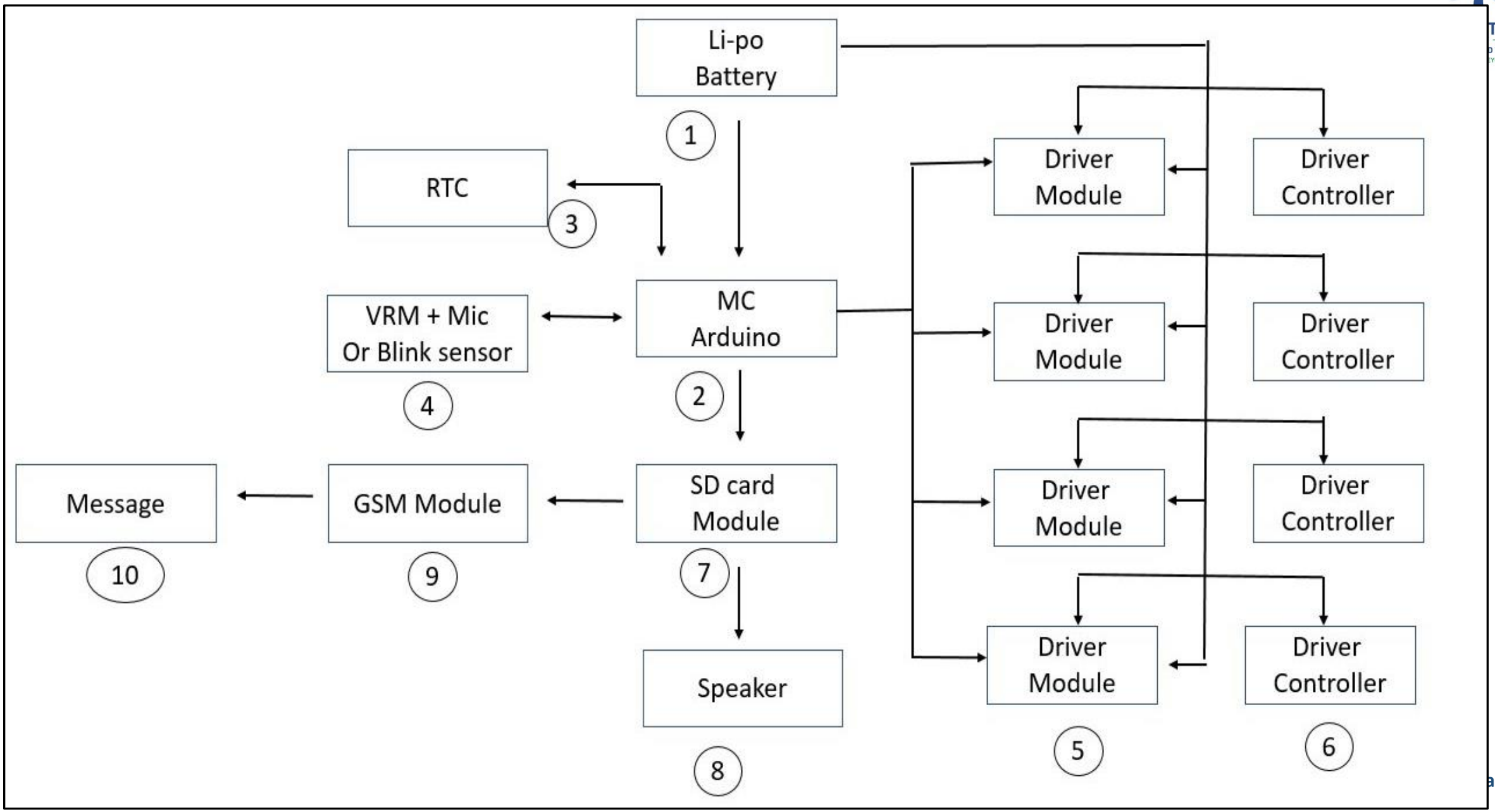


Strips with Iron Balls

Work Flow


ALERT-RTC
Patient Response
(Voice/Remote)
Hand
Exercise
Leg Exercise
Body Lifting
(Hip Joint)
Play Music

SCHEMATIC DIAGRAM OF INNOVATION



COMPONENETS

- A Microcontroller (1)
- A Real Time Controller (2)
- A DC motor and Driver module (3)
- A Li-Po battery (4)
- A SD Card Module (5)
- A Speaker (6)
- A Voice Recognition Module (7)
- A GSM module (8) and
- A Blink Sensor (9)


NoVeLtY

Novelty of Proposed Innovation

Facilitates:

1.Safety Features –Limit Switch Controlled

- ✓ **Controlled Angular Movement**
- ✓ **Position Based and Timer based – Auto Off**

2.Regularized - Timer Based Patient Alert

3.Interest based Activation

4.Patient Convenient Control

- ✓ Voice Control
- ✓ Remote Control

Novelty of Proposed Innovation

5. Selected Activation

Convenient based body part activation(Based on pain and cramp)

6.Relxed Journey

Mentally Relaxed, Motivated Journey –Musical System Enabled

7. Emergency Communication

To care givers- GSM Supported

8. Intelligent Evaluation and Display

Display the count and period of exercise

Benefits of Proposed Innovation

- **Prevents patients from atrophy or muscle loss** due to physical inactivity
- Facilitates - Regularized exercises ,**even in the absence of their care takers**
- Patients interest based body part activation
- **Patient convenient**

Benefits of Proposed Innovation

- **Eliminates the need of long time assistance**
- **Facilitates adjustable arm and leg holder**
- Automated process of exercise based on patients interest
- Remote and voice recognition system
- **GSM Support** -To contact for emergency needs
- **Music System** -Maintain patients' attention and interest until completion

EXISTING Vs PROPOSED

Existing Vs Proposed

- **Non-Electrode System:** Non placement of electrodes on the human body
  - No direct exposure to electric voltage across the body

- **Fully Automated:** No Human presence (Care taker) is warranted always

- **Patients Convenient and interest:** Start and Stop based on interest

- **Mode of Activation/Control : Complete controlled automation** through **Remote or Voice**

EXISTING Vs PROPOSED

- **Aligned with the guidelines** of Physiotherapist

- **SMS Communication**

  Single button based or voice controlled SMS alert system to care taker of respective patients.

- **Psychological encouragement or stimulation**

  Facilitated through **music system as part of this invention.**

- **Cost :**The invention would be cost effective and affordable to lower class and middle class people.

FUTURE EXTENSION

- Communication support for fully paralytic patients through Eye Blink Sensor Module.
- Visualization of Periodic Improvement

MILESTONES REACHED

1.Patent

Filed and Published patent for the proposed invention

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते
GOVERNMENT OF INDIA

Controller General of Patents,Designs and Trademarks
Department of Industrial Policy and Promotion
Ministry of Commerce and Industry

Application Details	
APPLICATION NUMBER	202041031299
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	22/07/2020
APPLICANT NAME	1 . K. Vidhya 2 . Dr. P. Rathan 3 . M. Premkumar Balaji D
TITLE OF INVENTION	IOT BASED AUTOMATED MYONEURO STIMULATOR FOR NEURO PARALYTIC PATIENTS
FIELD OF INVENTION	ELECTRONICS
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	vidhya.k@kpriet.ac.in
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	22/07/2020
PUBLICATION DATE (U/S 11A)	07/08/2020

Application Status			
			View Documents

2.Startup Registration(MSME)

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2.Startup Registered under MSME

भारत सरकार
Government of India
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Ministry of Micro, Small and Medium Enterprises

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सूक्ष्म, लघु एवं मध्यम उद्यम
MICRO, SMALL & MEDIUM ENTERPRISES

UDYAM
REGISTRATION CERTIFICATE

TYPE OF ENTERPRISE	MICRO	MANUFACTURING
UDYAM REGISTRATION NUMBER	UDYAM-TN-03-0001862	
NAME OF ENTERPRISE	SRI SAIRAM INFOTECH	

OFFICAL ADDRESS OF ENTERPRISE			
Flat/Door/Block No.	2ND FLOOR	Name of Premises/ Building	-
Village/Town	SIDDHAPUDUR	Block	SIDDHAPUDUR
Road/Street/Lane	52-53 NGN STREET	City	SIDDHAPUDUR
State	TAMIL NADU	District	COIMBATORE , Pin 641044
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DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE	13/08/2020

3.Prototype

3.Completion of Prototype Development(80%)

MILESTONES REACHED

QUERIES