

# Report of Patent Publication on the Topic Development of a Central Monitoring Station for An Effective Handling of Patients in Hospitals Through Al and Data Science

Date of Event	11-03-2022	
Faculty Name /Inventor(s)	Dr. ARUN KUMAR MARANDI, SWETA KUMARI BARNWAL, KUMAR SHUBHAM AND SNEHA KASHYAP	
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No. Of Participant	NA	

Dr. ARUN KUMAR MARANDI Assistant Professor form Department of Computer Science & IT, ARKA JAIN University has published a Patent on the topic of - "Development of a Central Monitoring Station for An Effective Handling of Patients in Hospitals Through AI and Data Science", on 11-03-2022. APPLICATION NUMBER: - 202231006036

ABSTRACT OF THE INVENTION Nowadays hospitals play a vital role in the health care system. It involves in treating the minor and serious diseases, illnesses and disorders of the body function based on varying types and severity level. The establishments of hospitals are becoming more and its services are essential in modern society. Caring the patients in the hospitals is a spirited task; both man power and the equipment are involving in monitoring/caring the patients. Even the minor deviations in that will cause the loss of lives especially in the case of intensive care patients. In this scenario, there is a need for central monitoring system which facilitate the quick and easy access of patient instantaneous data/information and helpful in preventing their loss of lives. In the present invention each unit of measuring equipment are integrated with central monitoring station through IoT and Cloud data base. The monitoring parameters from the measuring equipment transfers to the cloud, then cloud to central monitoring station where doctor/expert monitoring the present status of the patient. The data received from each patient's monitoring unit has been handled using data science and the same has been analysed through artificial intelligence. The various alarming devices associated with the central monitoring station alert the observer to take the remedial actions immediately. Therefore, the patient in critical situation is swiftly identified and rescue from that critical stage. The entire invention contributes for the life of patient.



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### (http://ipindia.nic.in/index.htm)



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Application Details				
APPLICATION NUMBER	202231006036			
APPLICATION TYPE	ORDINARY APPLICATION			
DATE OF FILING	04/02/2022			
APPLICANT NAME	ARKA JAIN University			
TITLE OF INVENTION	DEVELOPMENT OF A CENTRAL MONITORING STATION FOR ANEFFECTIVE HANDLING OF PATIENTS IN HOSPITALS THROUGHAI AND DATA SCIENCE			
FIELD OF INVENTION	ELECTRONICS			
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PRIORITY DATE				
REQUEST FOR EXAMINATION DATE				
PUBLICATION DATE (U/S 11A)	11/03/2022			

Application Status					
APPLICATION STATUS	Awaiting Request for Examination				
	View Documents				



In case of any discrepancy in status, kindly contact ipo-helpdesk@nic.in

### FORM 2

### THE PATENT ACT 1970 &

The Patents Rules, 2003

### **COMPLETE SPECIFICATION**

(See section 10 and rule 13)

### TITLE OF THE INVENTION:

# DEVELOPMENT OF A CENTRAL MONITORING STATION FOR ANEFFECTIVE HANDLING OF PATIENTS IN HOSPITALS THROUGH AI AND DATA SCIENCE

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### PREAMBLE TO THE DESCRIPTION

PROVISIONAL	COMPLETE
The following specification describes the	the following specification Invention. Particularly describes the invention and the manner in which it is to be performed.

#### FIELD OF THE INVENTION

The field of this invention relates to electronics, medical sciences and more particularly in the development of a central monitoring station for an effective handling of patients in hospitals through AI and data science.

### BACKGROUND OF THE INVENTION

This invention relates to the development of a central monitoring station for an effective handling of patients in hospitals through AI and data science.

Artificial intelligent and data science find its applications in many domains such as agriculture, industries, automation, transportation and etc., however the possibilities of exploration in healthcare field is flourished. Even though these techniques have been adopted in the healthcare domain it still has the gap to adopt more and more. Worldwide healthcare sector evolved in different period of time. Health care financing, care delivery and workforce diversity are the various parts of healthcare domain. In the 21st Century, health care systems across the world are focusing policy efforts on improving the quality of healthcare delivered to their population. In contrast, healthcare quality improvement in earlier time periods arose from a series of seemingly unrelated incidents and developments. Healthcare has become one of India's largest sectors, both in terms of revenue and employment. Healthcare comprises hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment. The Indian healthcare sector is growing at a brisk pace due to its strengthening coverage, services and increasing expenditure by public as well private players. The healthcare market can increase three-fold to Rs. 8.6 trillion (US\$ 133.44 billion) by 2022. In Budget 2021, India's public expenditure on healthcare stood at 1.2% as a percentage of the GDP. Shortage skilled man power, negligence of monitoring the patient due to overload and discontinuity in monitoring the patient are found to be the major causes for patients. In modern society workforce at hospitals continues to encounter these challenges across the globe. Hence, the need for central monitoring system is more which facilitate the quick and easy access of patient instantaneous data/information and helpful in preventing their loss of lives.

#### PRIOR ART STATEMENT

1. The US patent number US 8,566,115 B2 dated on Oct. 22, 2013 is about the invention of "Syndicating surgical data in a healthcare environment". The inventor presented the systems and methods for syndication and management of structured and unstructured data to assist institutional healthcare delivery, healthcare providers' practices, healthcare providers' group practices, collaborative academic research and decision making in healthcare, including through the utilization of medical devices and healthcare pools.

However, the proposed method receives only the surgical data as pool data through the computer and sharing the same to the authenticated group of people for various reasons.

2. The Russian Patent number RU2722748C2, Date of Patent: 03.06.2020 is about "Apparatus and method of measuring vegetative functions for diagnosing and confirming the clinical effectiveness of the patient and the results thereof". This invention describes the methods and systems for the bioanalytical analysis. It uses the measurement of direct pain bio signals for diagnosing pain and assessing the effectiveness of the treatment results, comprising: apparatus for measuring activity of a pain matrix, comprising a set of sensors configured to be placed on the body contralateral, and at least one additional sensor, configured to be placed on the body ipsilateral, wherein said device is configured to measure differences in voltage or current, obtained from measurements of the contralateral sensor to determine the reaction of the pain matrix as a deviation of the corresponding biosignal, indicating an increase or decrease of the individual sensation of pain; wherein said device is configured to measure differences in impedance, conductivity, voltage or current based on measurements of one of contralateral transducers and at least one ipsilateral sensor for calibration and normalization of the biosignal obtained from contralateral sensors; constant machine-readable medium in network of central processors, having a memory and a data storage and having a computer program implemented thereon, causing one or more central processors to perform certain steps; controller and/or processor, configured to: collect and obtain data on activity of the pain matrix from signals of the contralateral and ipsilateral sensors; obtaining access to measured activity of pain matrix and data, associated with biophysical, biological, psychological, social, environmental and demographic information on the patient and other

patients; identifying a population with similar data, associated with biophysical, biological, psychological, social, environmental and demographic information on the patient and other patients; determining treatment or results of treating a patient and a similar population and correlating said treatment and treatment results with biosignal deviations, associated with pain matrix activity to determine the clinical effectiveness of the patient.

However, the system proposed in the invention is only suitable to analyses the pain level of each patients using the complex sensors arrangements.

3. United States Patent Pub. No.: US20200043612A1, Published on Feb' 02, 2020 is about "Dynamically determining risk of clinical condition". The system in this invention is describes the methods and computer-readable media are provided for facilitating clinical decision support and managing patient population health by health-related entities including caregivers, health care administrators, insurance providers, and patients. Embodiments of the invention provide decision support services including providing timely contextual patient information including condition risks, risk factors and relevant clinical information that are dynamically updatable; imputing missing patient information; dynamically generating assessments for obtaining additional patient information based on context; data-mining and information discovery services including discovering new knowledge; identifying or evaluating treatments or sequences of patient care actions and behaviors, and providing recommendations based on this; intelligent, adaptive decision support services including identifying critical junctures in patient care processes, such as points in time that warrant close attention by caregivers; near-real time querying across diverse health records data sources, which may use diverse clinical nomenclatures and ontologies; improved natural language processing services; and other decision support services.

However, this invention discusses only the clinical decision support systems through which the history of patients and allied details are stored and handled using data mining.

4. United States Pub. No.: **US8407068B2** and the Pub. Date: 2013-03-26 is about the "Medicine management apparatus and medicine management system". This proposed invention deals with the medicine management apparatus which includes medicine storage which stores a plurality of medicines used

at a site of medical care; a storage and retrieval detector which, when a medicine handling personnel manipulates the apparatus to store or retrieve an accommodated medicine to be accommodated in the apparatus, physically detects the target accommodated medicine for which the apparatus is manipulated, differentiating it from the other accommodated medicines; and a counter which counts each type of the plurality of accommodated medicines. An injection prescription receiver receives injection prescription data from an external prescription analyzer. A retrieval determining unit determines whether the accommodated medicine detected as being retrieved is the accommodated medicine directed by the injection prescription data to be retrieved. A retrieval completion notification unit transmits a retrieval completion signal to the prescription analyzer, prompted by the completion of the retrieval of the accommodated medicine directed by the prescription data to be retrieved.

However, this invention only addresses the issue of medicines storage and retrieval process for the improvement.

From the patent literature survey, it is identified that no prior inventions are about the reliable and efficient system for the patients and their life saving which are not facilitating the medical aided activities. Prior arts are not focusing on real-time and continuous monitoring of patients for life saving and alerting system is incorporated.

### **OBJECTIVE OF THE INVENTION**

- 1. To develop a central monitoring station for an effective handling of patients.
- 2. To completely avoiding the minor deviations in the criticality of the patients that will cause the loss of lives especially in the case of intensive care patients.
- 3. To facilitate the central monitoring system for the quick assessment of patient's data to prevent the loss of lives.
- 4. To develop the alarming system to alert the observer to take the remedial actions immediately.
- 5. To offer the patients and doctors instant interactive methodology for an effective analytic process to identify the severity of the patients.

#### SUMMARY OF THE INVENTION

The problem mentioned in the background can be solved by developing a central monitoring station for an effective handling of patients in hospitals through AI and data science.

The aim of the invention is to develop an effective system called central monitoring station for an effective handling of patients in hospitals through AI and data science. This invention comprises of the patient monitoring zone, cloud and central monitoring station. Patient's monitoring zone further comprising of facilities for patients and various parameters measuring equipment. At cloud, the data can be stored and it is used to transfer the data to various receiving nodes viz. display and mobiles. Since it is a universal database, any nodes can be integrated through programming. Central monitoring station comprises of the alarming/ warning devices and display unit. These devices can alert the supervisor/s who monitored the central monitoring station continuously. At the display unit data of each patient's conditions has been displayed. The measuring equipment continuously recorded the patient's data. It has been transmitting to the cloud. At the cloud the data can be stored and it is used to transfer the data to various receiving nodes viz. display and mobiles. Cloud transfers the data to central monitoring station and mobile as well. This data has been analyzed using artificial intelligent techniques for finding the abnormalities. Alerting devices will be enabled when abnormalities found and during normal conditions it is in a disable position.

This entire arrangement of the invention facilitates the efficient way of monitoring the patient's conditions and helpful in taking necessary actions.

### BRIEF DESCRIPTION OF THE DRAWINGS

Other features of the invention are described through the drawings from Figure 1 to 2 in which,

- **FIG. 1** represents the overall diagram of central monitoring station for an effective handling of patients in hospitals through AI and data science.
- **FIG. 2** represents the process carried out in a central monitoring station for an effective handling of patients in hospitals through AI and data science.

### DETAILED DESCRIPTIONOF THE INVENTION

FIG. 1 represents the overall diagram of central monitoring station for an effective handling of patients in hospitals through AI and data science. This invention comprises of the patient monitoring zone, cloud and central monitoring station. Patient's monitoring zone further comprising of various parameters measuring equipment. At cloud the data can be stored and it is used to transfer the data to various receiving nodes viz. display and mobiles. Central monitoring station has the alarming/ warning devices. It also comprises of the display unit.

FIG. 2 represents the process carried out in a central monitoring station for an effective handling of patients in hospitals through AI and data science. The patient's data has been continuously recorded by the measuring equipment and it transmit to the cloud. At cloud the data can be stored and it is used to transfer the data to various receiving nodes viz. display and mobiles. Cloud transfers the data to central monitoring station and mobile as well. This data has been analyzed using artificial intelligent techniques. If abnormalities found, then alerting devices enabled otherwise it is in a disable position.

### WE CLAIMS

- 1. A development of a central monitoring station for an effective handling of patients in hospitals through AI and data science comprising of,
  - a. patient monitoring zone
  - b. Cloud and
  - c. central monitoring station
- 2. A development of a central monitoring station for an effective handling of patients in hospitals through AI and data science according to claim 1, wherein the patient's monitoring zone further comprising of basic facilities for patients and different measuring equipment.
- 3. A development of a central monitoring station for an effective handling of patients in hospitals through AI and data science according to claim 1, wherein the data can be stored at cloud and it is used to transfer the data to various nodes viz. central monitoring station and mobiles.
- 4. A development of a central monitoring station for an effective handling of patients in hospitals through AI and data science according to claim 1, wherein the central monitoring station further comprises of the alarming/ warning devices and display unit.
- 5. The central monitoring station according to claim 4, wherein the alarming/ warning devices alert the supervisor/s who monitored the central monitoring station continuously.
- 6. The central monitoring station according to claim 4, wherein the display unit thedata of each patient's conditions has been displayed.
- 7. The measuring equipment according to claim 2, wherein the measuring equipment continuously recorded the patient's data and it has been transmitting to the cloud.
- 8. The cloud according to claim 3, wherein the cloud stores the data and it is transfer to central monitoring station and mobile as well. This data has been analyzed using artificial intelligent techniques for finding the abnormalities.



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# DEVELOPMENT OF A CENTRAL MONITORING STATION FOR AN EFFECTIVE HANDLING OF PATIENTS IN HOSPITALS THROUGH AI AND DATA SCIENCE

### ABSTRACT OF THE INVENTION

Nowadays hospitals play a vital role in the health care system. It involves in treating the minor and serious diseases, illnesses and disorders of the body function based on varying types and severity level. The establishments of hospitals are becoming more and its services are essential in modern society. Caring the patients in the hospitals is a spirited task; both man power and the equipment are involving in monitoring/caring the patients. Even the minor deviations in that will cause the loss of lives especially in the case of intensive care patients. In this scenario, there is a need for central monitoring system which facilitate the quick and easy access of patient instantaneous data/information and helpful in preventing their loss of lives. In the present invention each unit of measuring equipment are integrated with central monitoring station through IoT and Cloud data base. The monitoring parameters from the measuring equipment transfers to the cloud, then cloud to central monitoring station where doctor/expert monitoring the present status of the patient. The data received from each patient's monitoring unit has been handled using data science and the same has been analyzed through artificial intelligence. The various alarming devices associated with the central monitoring station alert the observer to take the remedial actions immediately. Therefore, the patient in critical situation is swiftly identified and rescue from that critical stage. The entire invention contributes for the life of patient.



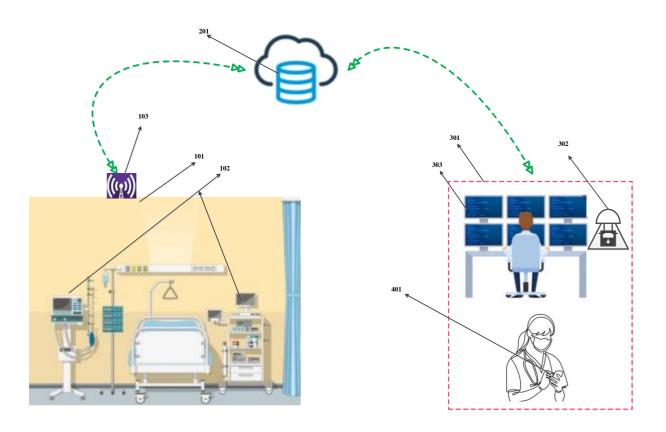
Jasbir Singh Dhanjal

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04-Feb-2022

**Fig.1** 



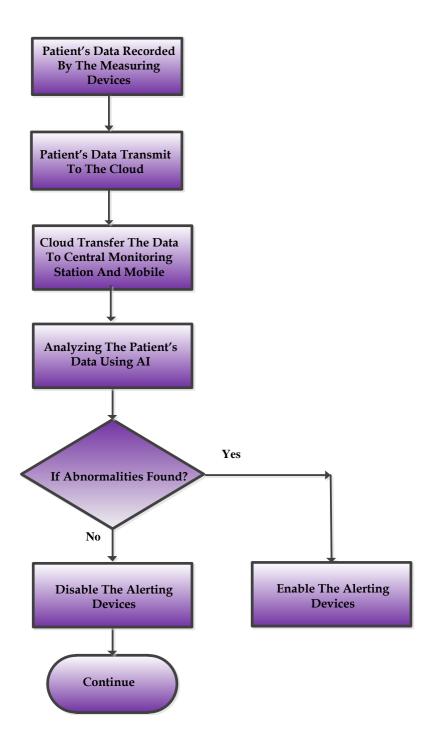


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**Fig.2** 





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### "FORM 28

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**AND** 

### THE PATENTS RULES, 2003

### TO BE SUBMITTED BY A SMALL ENTITY / STARTUP

[See rules 2 (fa), 2(fb) and 7]

1 Insert name, address and nationality.

I/We ARKA JAIN University, Opp.To Kerala Public School, Mohanpur, Gamharia Dist, Seraikela Kharsawan-832108 Jharkhand.....

applicant/ patentee in respect of the patent application "DEVELOPMENT OF A CENTRAL MONITORING STATION FOR ANEFFECTIVE HANDLING OF PATIENTS IN HOSPITALS THROUGH AI AND DATA SCIENCE

herehy declare that I/we am/are a small entity in



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ARKA JAIN University, Jharkhand

04-Feb-2022

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	ii. For claiming the status of a startup				
	A. For an Indian applicant: Any doc	cument as evidence of eligibility, as defined in rule 2(fb).			
	B. In case of a foreign entity: Any o	ther document.			
3	To be signed by the applicant(s) /	The information provided herein is correct to the best			
	patentee (s) / authorised registered of my/our knowledge and belief.				
	patent agent.	Jashir Singh Dhanjal			
4	Name of the natural person who has	Registrar ARKA JAIN University, Jharkhand			

Designation and official seal, if any,	
of the person who has signed.	
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	At;

### FORM 1 THE PATENTS ACT, 1970 (39 of 1970)

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## THE PATENTS RULES, 2003 APPLICATION FOR GRANT OF PATENT

[See sections 7,54 & 135 and rule 20(1)]

(FOR	<b>OFFICE</b>	<b>USE</b>	ONLY)	)
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Application No.:
Filing Date:
Amount of Fee Paid:
CBR No.:

Signature: .....

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### 5. PRIORITY PARTICULARS OF THE APPLICATION(S) FILED IN CONVENTION COUNTRY:

Sr.No.	Country	Application Number	Filing Date	Name of the Applicant	Tilte of the Invention
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### 6. PARTICULARS FOR FILING PATENT COOPERATION TREATY (PCT) NATIONAL PHASE APPLICATION:

International Application Number	International Filing Date as Allotted by the Receiving Office
PCT//	

### 7. PARTICULARS FOR FILING DIVISIONAL APPLICATION

Original (first) Application Number Date of	of Filing of Original (first) Application
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### 8. PARTICULARS FOR FILING PATENT OF ADDITION:

Main Application / Patent Number:	Date of Filing of Main Application

### 9. DECLARATIONS:

### (i) Declaration by the inventor(s)

I/We ,Dr. ARUN KUMAR MARANDI,SWETA KUMARI BARNWAL,KUMAR SHUBHAM,SNEHA KASHYAP,Dr. DINDAYAL MAHTO, is/are the true & first inventor(s) for this invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

- (a) Date: ----
- (b) Signature(s) of the inventor(s): .....
- (c) Name(s): Dr. ARUN KUMAR MARANDI,SWETA KUMARI BARNWAL,KUMAR SHUBHAM,SNEHA KASHYAP,Dr. DINDAYAL MAHTO

### (ii) Declaration by the applicant(s) in the convention country

I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.

- (a) Date: ----
- (b) Signature(s): .....
- (c) Name(s) of the singnatory: ARKA JAIN University

### (iii) Declaration by the applicant(s)

- The Complete specification relationg to the invention is filed with this application.
- I am/We are, in the possession of the above mentioned invention.
- There is no lawful ground of objection to the grant of the Patent to me/us.
- I am/We are, the assignee or legal representative to true first inventors.

### 10. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION:

Sr.	Document Description	FileName

I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters stated hering are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this(Final Payment Date): -----

-2, 12.101 W	
	Signature:
	Name: Divya Sridharan
To The Controller of Patents	
The Patent office at KOLKATA	

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### "FORM 28

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### THE PATENTS RULES, 2003

### TO BE SUBMITTED BY A SMALL ENTITY / STARTUP

[See rules 2 (fa), 2(fb) and 7]

1 Insert name, address and nationality.

I/We ARKA JAIN University, Opp.To Kerala Public School, Mohanpur, Gamharia Dist, Seraikela Kharsawan-832108 Jharkhand.....

applicant/ patentee in respect of the patent application "DEVELOPMENT OF A CENTRAL MONITORING STATION FOR ANEFFECTIVE HANDLING OF PATIENTS IN HOSPITALS THROUGH AI AND DATA SCIENCE

herehy declare that I/we am/are a small entity in



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Jasbir Singh Dhanjal
Registrar

ARKA JAIN University, Jharkhand

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	B. In case of a foreign entity: Any other document.		
	ii. For claiming the status of a startup		
	A. For an Indian applicant: Any document as evidence of eligibility, as defined in rule 2(fb).		
	B. In case of a foreign entity: Any o	ther document.	
3	To be signed by the applicant(s) /	The information provided herein is correct to the best	
	patentee (s) / authorised registered	of my/our knowledge and belief.	
	patent agent.	Jasbir Singh Dhanjal	
4	Name of the natural person who has	Registrar ARKA JAIN University, Jharkhand	

Designation and official seal, if any,	
of the person who has signed.	
	То
	The Controller of Patents,
	The Patent Office,
	At;

### FORM 9

THE PATENT ACT, 1970
(39 of 1970)
&
THE PATENTS RULES, 2003

### REQUEST FOR PUBLICATION

[See section 11A (2) rule 24A]

I/We **ARKA JAIN University,ARKA JAIN University,ARKA JAIN University** hereby request for early publication of my/our [Patent Application No.] TEMP/E-1/6919/2022-KOL

Dated **04/02/2022 00:00:00** under section 11A(2) of the Act.

Dated this(Final Payment Date):--

Signature

Name of the signatory

To,

The Controller of Patents,

The Patent Office,

At Kolkata

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