FORM 2

THE PATENT ACT 1970

(39 of 1970)

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The Patents Rules, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

1. TITLE OF THE INVENTION:

"IoT-BASED MODERN FOOD SERVICE SYSTEM"

2. APPLICANT(S):

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3. PREAMBLE TO THE DESCRIPTION:

The following specification particularly describes the invention and the manner in which it is to be performed.

4. DESCRIPTION:

FIELD OF INVENTION

The current invention is meant for technology-driven hygienic food service system using IoT technology. It is useful in all situations and more useful in virus based pandemics. As the COVID-19 pandemic is transmitted, directly and indirectly, through contact, the probability of virus infection increases exponentially in crowded places. Hence, this setup incorporates adequate sanitary procedures that serve food on a train without human contact. This provides a fun-filled eating experience with cutting-edge technologies like Rapid Prototyping, CNC Machining and Laser Cutting. It is operated using batteries that can be recharged, which minimizes the risk of dealing with high power supplies. The system is controlled wirelessly by an application called Blynk IoT. The train engine is embedded with a small circuit that consists of a Wi-Fi-enabled microcontroller that communicates with the smart device and moves forward or reverse based on commands. The same logic will be implemented in the tracks inspired by actual railways where the track changes its position with the help of a servo motor. Overall, this model is easy to manufacture and implement. Various train designs can be rendered using 3D printing, while wireless technology reduces circuitry and wiring complexity. The current invention named IoT Based Modern Food Service System is an innovative concept in the Hospitality sector where food wheels up to the table on a locomotive and parks at the ordered place. The locomotive will be running on numerous tracks providing multiple paths that cover all the tables in a restaurant. By raising efficiency and lowering labor costs this approach can replace humans in terms of accuracy, quality of service, and satisfaction. Recently, consumers' sensitivity to restaurants' hygienic affairs has increased due to mass awareness through media and government restrictions.

BACKGROUND OF THE INENTION

The restaurant industry in India is a worthwhile prospect with a reasonable return on investment in the majority of circumstances. The Indian restaurant sector is developing at a 7% yearly rate and is valued at Rs. 75,000 crores. The business is

highly fragmented with 1.5 million dining establishments, of which hardly more than 3,000 are organized. Unfortunately, huge losses have occurred during the Pandemic times in this prosperous industry. According to research by the National Restaurant Association of India, the Indian food services business was no exception and had a 53% decline in growth in FY2021 compared to the prior fiscal year (NRAI). Nearly 2.4 million jobs were lost in India as a result of the decline in the food services sector, which forced the permanent closure of over 25% of food company owners. Due to recent pandemic situation due to Covid-19, there has been sea change in thinking of customers and food business owners.

There is need for technology-driven contactless healthy and hygienic food service in the hospitality sector. Towards this end the current invention named IoT Based Modern Food Service System is an innovative concept in the Hospitality sector where food wheels up to the table on a locomotive and parks at the ordered place. The locomotive will be running on numerous tracks providing multiple paths that cover all the tables in a restaurant. By raising efficiency and lowering labor costs this approach can replace humans in terms of accuracy, quality of service, and satisfaction. Recently, consumers' sensitivity to restaurants' hygienic affairs has increased due to mass awareness through media and government restrictions.

OBJECTS OF THE INVENTION

1. Therefore, the object of the present invention is an IoT Based Modern Food Service System to promote technology-driven contactless healthy and hygienic food service.

2. Another object of the present invention is a computer-aided design for train, engine, bogies and tracks used in the current invention.

3. Another object of the present invention is a simple and rechargeable DC power supply to train circuitry which eliminates issues of high voltages.

4. Another object of the present invention is a Wi-Fi enable microcontroller and smart device using Blynk IoT for train and track switching.

5. Yet another objective of the present invention is a solution to deal with problems such as Covid-19 pandemic and general technology-driven contactless healthy and hygienic food service.

STATEMENT OF THE INVENTION

The present invention titled **"IoT-Based Modern Food Service System"** is meant for an innovative concept in the Hospitality sector where food wheels up to the table on a locomotive and parks at the ordered place. The locomotive will be running on numerous tracks providing multiple paths that cover all the tables in a restaurant. By raising efficiency and lowering labor costs this approach can replace humans in terms of accuracy, quality of service, and satisfaction. The system has train, tracks, bogies and Blynk app based on IoT to realize this innovative food service system. The train has different important components involved. They are known as microcontroller (ESP 8266), power supply unit, ultrasonic sensor, motor driver and DC motor. The current invention has tracks that are controlled along with train using the IoT-enabled app.

The track is the most important part of this system as the train must run on it without any problem. It was carefully scrutinized every part and then proceeded with the metal laser cutting. It is a precise and efficient method of cutting the metal into precise shapes and sizes. In the case of miniature train tracks, metal laser cutting can be used to create highly accurate and durable tracks that can withstand the wear and tear of regular use. The system needs Wi-Fi connectivity and IoT Blynk app to be connected prior to actual functionality of the food service system. Through the application, the track is set properly and place the train with food on the track. Then operate it to move the train on track to the desired destination. Once the train reaches its destination, it waits there till food is served. Afterwards, the train moves in reverse direction to the source point again that is a

point located nearby kitchen. This is an iterative process for the train and tracks to function as desired to serve all customers until the food service facility is closed for the day.

BRIEF DESCRIPTION OF THE DRAWING

The current invention named IoT Based Modern Food Service System is an innovative concept in the Hospitality sector where food wheels up to the table on a locomotive and parks at the ordered place. The locomotive will be running on numerous tracks providing multiple paths that cover all the tables in a restaurant. By raising efficiency and lowering labor costs this approach can replace humans in terms of accuracy, quality of service, and satisfaction. The current invention is illustrated with the help of many drawings given below.

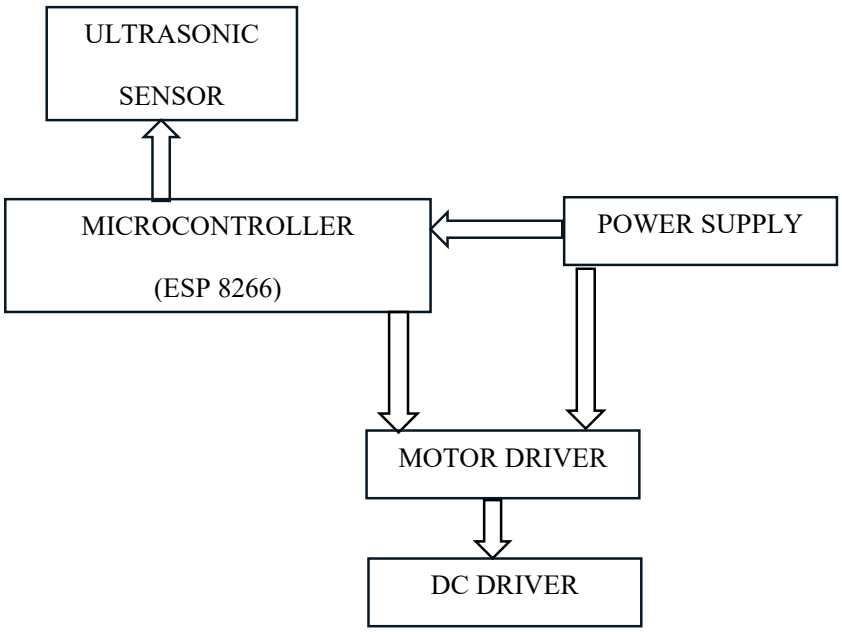

Figure 1: Illustrates the block diagram of train involved in the current invention known as IoT-Based Modern Food Service System

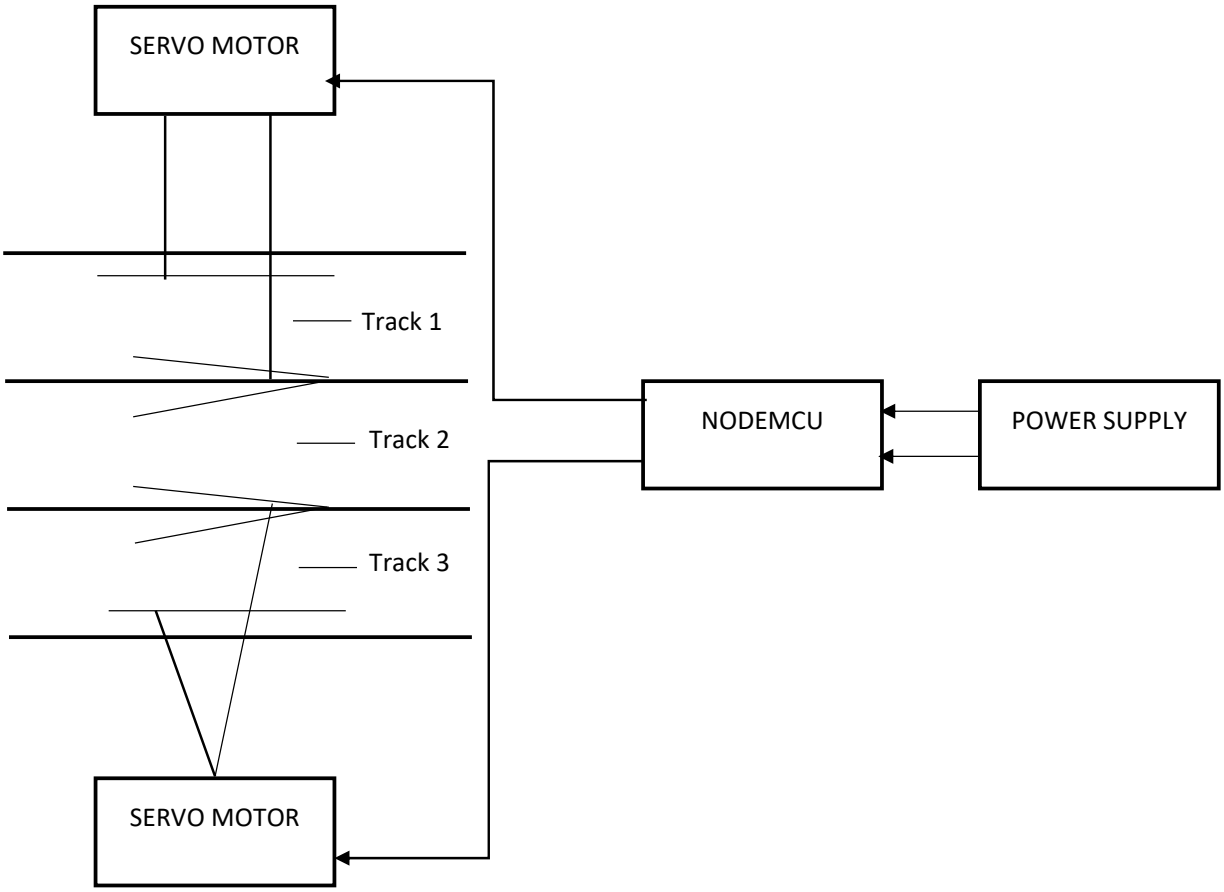

Figure 2: Illustrates the block diagram of track involved in the current invention known as IoT-Based Modern Food Service System

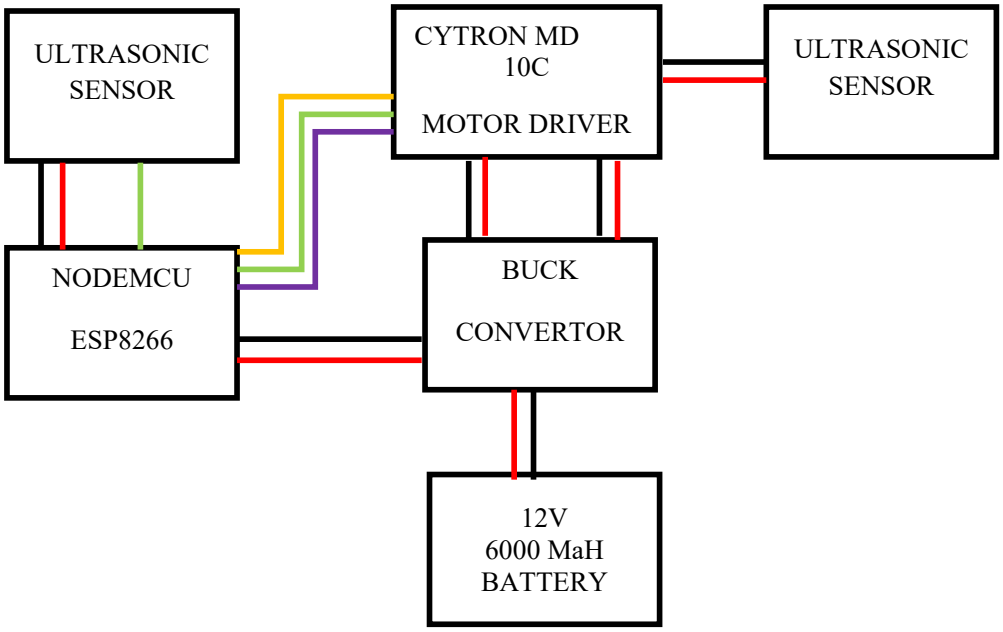

Figure 3: Illustrates the circuit diagram of train involved in the current invention known as IoT-Based Modern Food Service System

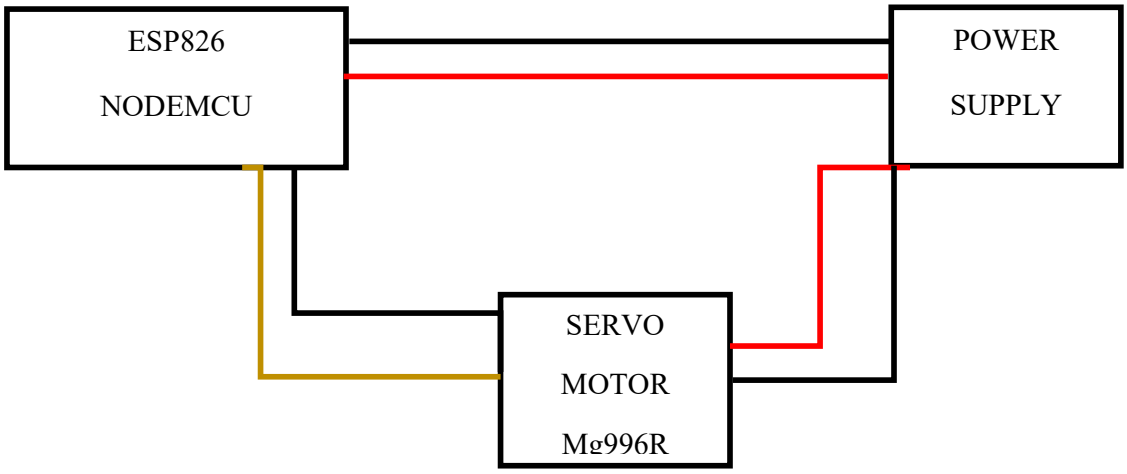

Figure 4: Illustrates the circuit diagram of tracks involved in the current invention known as IoT-Based Modern Food Service System

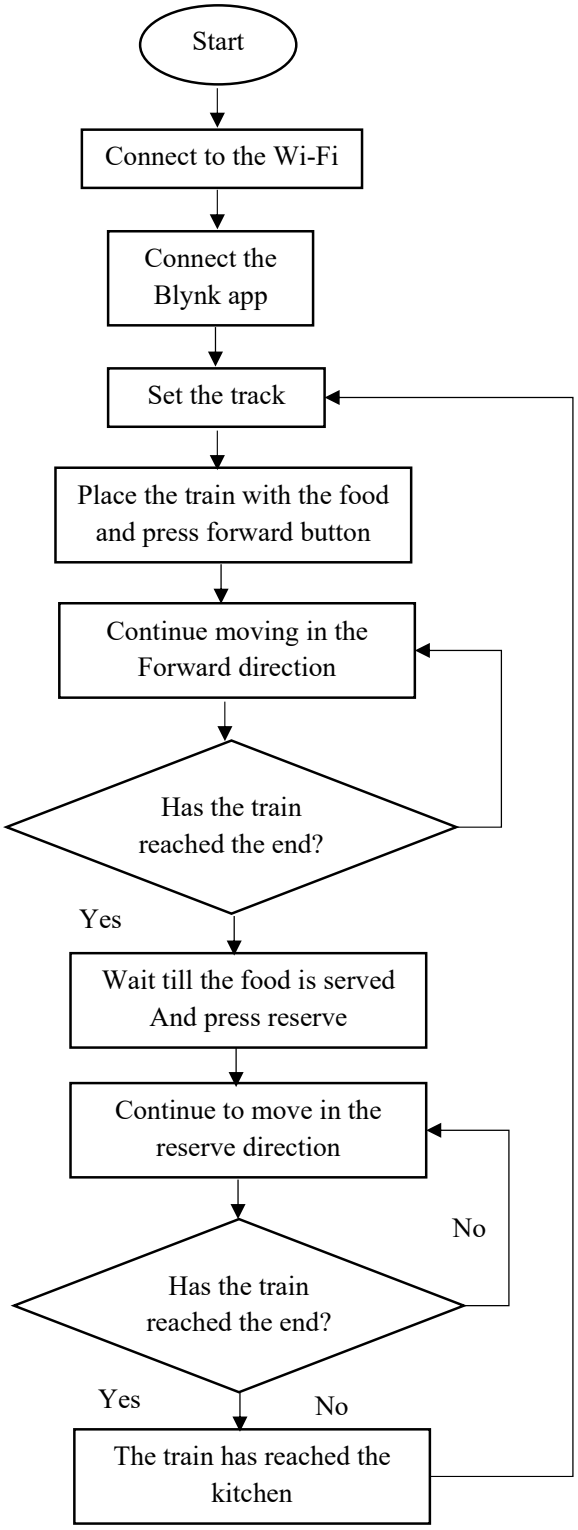

Figure 5: Illustrates functional flow of the current invention known as IoT-Based Modern Food Service System

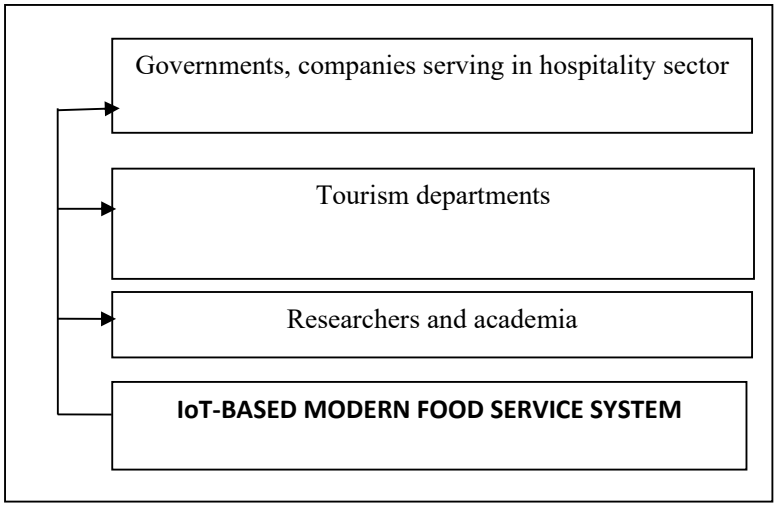

Figure 6: Stakeholders for which the invention is beneficial

DETAILED DESCRIPTION OF DRAWINGS

The current invention named IoT Based Modern Food Service System is an innovative concept in the Hospitality sector where food wheels up to the table on a locomotive and parks at the ordered place. The locomotive will be running on numerous tracks providing multiple paths that cover all the tables in a restaurant. By raising efficiency and lowering labor costs this approach can replace humans in terms of accuracy, quality of service, and satisfaction. The diagrams provided in the previous section are described in detail in this section.

Referring to Figure 1, it illustrates the block diagram of train involved in the current invention known as IoT-Based Modern Food Service System. It has different important components involved. They are known as microcontroller (ESP 8266), power supply unit, ultrasonic sensor, motor driver and DC motor. To design the train engine, the designer began by sketching the basic shape of the train engine in SolidWorks, using reference images to get an idea of the required

shape and details. Next, the designer extruded the sketch to create a 3D object, using the Extrude tool to give it depth and volume. The edges of the 3D object were then filleted to create smooth curves and edges. Details such as wheels, windows, and other features, were added to the train engine using the Extrude, Cut, and Sweep tools. After completing the 3D model, the designer selected PETG filament as the material for 3D printing. PETG was chosen due to its strength and durability, as well as its resistance to heat and impact. The 3D model was then exported as an STL file and sent to a 3D printer for printing. After printing, the designer performed some post-processing steps, such as sanding, polishing, or painting, to give the train engine a smooth finish and the desired black color. The final product was a sleek and modern train engine that was strong, durable, and resistant to heat and impact, created using SolidWorks software and PETG filament.

Referring to Figure 2, it illustrates the block diagram of track involved in the current invention known as IoT-Based Modern Food Service System. It makes use of two servo motors linked to NODEMCU and power supply. The track is the most important part of this system as the train must run on it without any problem. We carefully scrutinized every part and then proceeded with the metal laser cutting. It is a precise and efficient method of cutting the metal into precise shapes and sizes. In the case of miniature train tracks, metal laser cutting can be used to create highly accurate and durable tracks that can withstand the wear and tear of regular use.

Referring to Figure 3, it illustrates the circuit diagram of train involved in the current invention known as IoT-Based Modern Food Service System. The circuit diagram shows connected components such as ultrasonic sensor, NODEMCU ESP8266, Cytron MD 10C motor driver, 12V DV motor, buck converter and 12V 6000 MaH battery. The circuits associated with train functionality play key role in rendering desired functionality of the train involved in the current invention.

Referring to Figure 4, it illustrates the circuit diagram of tracks involved in the current invention known as IoT-Based Modern Food Service System. The circuit diagram shows connected components such as NODEMCU ESP8266, servo motor Mg996R and power supply. The circuits associated with tracks functionality play important role in rendering desired functionality of the tracks helping the train to move in the tracks without collision.

Referring to Figure 5, it illustrates functional flow of the current invention known as IoT-Based Modern Food Service System. The system needs Wi-Fi connectivity and IoT Blynk app to be connected prior to actual functionality of the food service system. Through the application, the track is set properly and place the train with food on the track. Then operate it to move the train on track to the desired destination. Once the train reaches its destination, it waits there till food is served. Afterwards, the train moves in reverse direction to the source point again that is a point located nearby kitchen. This is an iterative process for the train and tracks to function as desired to serve all customers until the food service facility is closed for the day.

Referring to Figure 6, it illustrates that the current invention is useful for different stakeholders. They include governments, companies in hospitality business, tourism departments, researchers and academia.

5. CLAIM

1. An IoT Based Modern Food Service System to promote technology-driven contactless healthy and hygienic food service.

2. A computer-aided design for train, engine, bogies and tracks used in the current invention.

3. A simple and rechargeable DC power supply to train circuitry which eliminates issues of high voltages.

4. A Wi-Fi enable microcontroller and smart device using Blynk IoT for train and track switching.

5. A solution to deal with problems such as Covid-19 pandemic and general technology-driven contactless healthy and hygienic food service.

6. DATE AND SIGNATURE:

Dated this September 08, 2023

Authorized Patent Agent Signature: 

Authorized Patent Agent Name: **PUTTA GANESH**
(IN/PA/2933)

7. ABSTRACT

The current invention named IoT Based Modern Food Service System is an innovative concept in the Hospitality sector where food wheels up to the table on a locomotive and parks at the ordered place. The locomotive will be running on numerous tracks providing multiple paths that cover all the tables in a restaurant. By raising efficiency and lowering labor costs this approach can replace humans in terms of accuracy, quality of service, and satisfaction. Recently, consumers' sensitivity to restaurants' hygienic affairs has increased due to mass awareness through media and government restrictions. As the COVID-19 pandemic is transmitted, directly and indirectly, through contact, the probability of virus infection increases exponentially in crowded places. Hence, this setup incorporates adequate sanitary procedures that serve food on a train without human contact. This provides a fun-filled eating experience with cutting-edge technologies like Rapid Prototyping, CNC Machining and Laser Cutting. It is operated using batteries that can be recharged, which minimizes the risk of dealing with high power supplies. The system is controlled wirelessly by an application called Blynk IoT. The train engine is embedded with a small circuit that consists of a Wi-Fi-enabled microcontroller that communicates with the smart device and moves forward or reverse based on commands. The same logic will be implemented in the tracks inspired by actual railways where the track changes its position with the help of a servo motor. Overall, this model is easy to manufacture and implement. Various train designs can be rendered using 3D printing, while wireless technology reduces circuitry and wiring complexity. The current invention is beneficial to many stakeholders such as governments, companies in hospitality sector, tourism departments, researchers and academia.