Annexure1b- Complete filing

INVENTION DISCLOSURE FORM

1 Title: LPG Stove Control Based on Object Detection (LPGCOD) -

The main purpose of **LPG Stove Control Based on Object Detection** is to reduce accidents which happens during object (body parts or clothes) falls on the burner while stove is on.in order to reduce such kind of hazard, we designed a gas stove using sensor and image processing to control the gas flame. The use of modern AI powered system will help to minimize the accident related to LPG.

2. INTERNAL INVENTOR(S)/ STUDENT(S):

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2. DESCRIPTION OF THE INVENTION

their independence and comfort in the kitchen.

A. PROBLEM ADDRESSED BY THE INVENTION:

Traditional LPG gas control have no inbuilt intelligence for object detection and flame control which leads to fire and burn to hands. Your innovative use of object detection technology in LPG gas stoves make them more intelligent for controlling flames in order to reduce the hazard related to LPG. This technology has the potential to make kitchens safer and more inclusive for everyone. For parents with young children, the peace of mind that comes with knowing gas stoves can automatically react to object contact is invaluable. Similarly, those with elderly family members or disabilities can find comfort in this extra layer of protection. For individuals with limited dexterity or motor skills, the ability to cook without worrying about accidental burns could increase

This groundbreaking approach promises to redefine the gas burner technology experience across a wide range of applications.

B. STATE OF THE ART/ RESEARCH GAP:

Patent Number	Description	Gap
CN101625132A	The automatic gas stove is	There is no object detection
China	controlled automatically	and flame control
	according to the change of the	technology in this invention.
	weight of the heated cooking	
	utensil, without being controlled	
	manually, thereby being	
	protected against dry heating,	
	flameout and waste, and the	
	automatic gas stove is	
	convenient to use and simple in	
	structure.	
CN203190466U	The intelligent gas stove	There is no decision made
China	comprises a stove body, wherein	based on image processing
	a program controller, a gas flow	to control the gas valve
	proportion control valve and an	_
	acousto-optic alarm are arranged	
	in the stove body; a touch screen	
	is arranged in an operation area	
	of the stove body; an infrared	
	pan bottom temperature detector	
	is arranged in a cooking area of	
	the stove body; the output end of	
	an infrared temperature sensor is	
	connected with the input end of	
	the program controller; the	
	output and input ends of the	
	touch screen are respectively	
	connected with the input and	
	output ends of the program	
	controller; the output end of the	
	program controller is connected	
	to the gas flow control valve and	
	the acousto-optic alarm. The	
	intelligent gas stove has the	
	characteristics of energy	
	conservation, environmental	
	friendliness, cooking process	
	optimization and safety.	
	As abada al as bette a s Col	There is no desiring and
EP2199683	technical solution of the present	There is no decision made
	invention used to solve the	based on image processing
	technical problem is described	to control the gas valve
	as follows. The gas stove	
	includes a panel, a burner,	

	a thermocouple and an ignition needle disposed near the burner, and at least one control switch disposed on the panel to control and set gas supply at the corresponding burner. The gas stove further includes a main switch. When the main switch is turned on, a working status of the gas stove is suspended and/or locked. When the main switch is turned off, the suspended and/or locked working status of the gas stove is automatically restored. Regarding the gas stove in the technical solution of the present invention, the working status of the whole gas stove can be suspended and restored rapidly and all the settings of the working status are reserved during the period of suspension.	
IPR-219187	This work switches off the L.P.G Gas stove automatically in two modes (1) Whistle Mode, (2) Timer Mode. In the whistle mode, after the required number of whistle is reached, the gas supply to the stove is switched off by a solenoid valve. The required number can be set by the user. In timer mode user have to set the off time of the stove. After the set time is reached, the stove is switched off automatically	This Gas Stove cannot make AI based decision.
CN102032602A	Purposed work C is mainly focused upon a Microprocessor-controlled system detects flame and pot temperature irregularities using sensors. Automatic shutoff via electromagnetic valve ensures safety, while the system adjusts flame strength and alerts users with sounds and a real-time	But in our purposed system, is fully based upon smart technology implementation with features like hand and cloth detection.

display for enhanced kitchen	
safety and gas leak prevention.	

B. DETAILED DESCRIPTION:

There are Various gas stove safety features, none currently exist that automatically minimizes the gas flame solely based on hand or clothes near stove. Existing patents for gas stove safety focus on mechanisms like flame failure detectors, which sense if the flame has extinguished and cut off the gas supply. Others may involve timers that automatically shut off the gas after a specific period. Currently, there is no commercially available gas stoves equipped with sensors that can detect object in proximity of the flame. The present solution will provide intelligent gas input control based on image processing and decision based on object differentiation for controlling gas input flow to burner, the optical sensor used to detect the objects around the gas burner, the data from sensor is transmitted to inbuilt processing module where prediction about the things is done using inbuilt image processing module, control signal is transmitted to gas flow control system for controlling the gas flow to burner. Accordingly, gas flame can be controlled.

HARDWARE

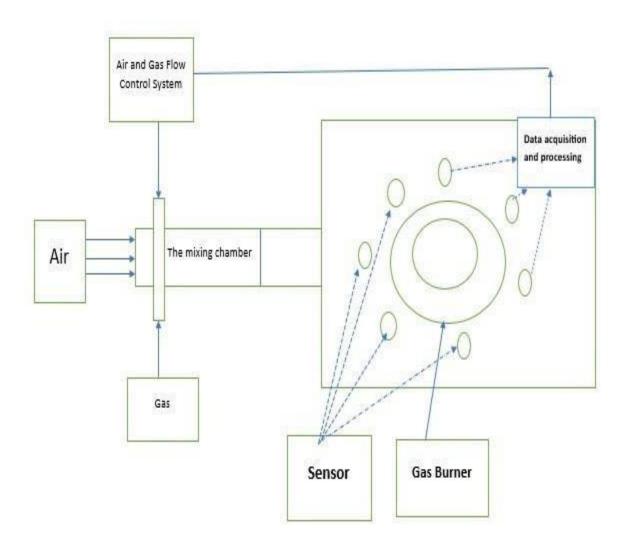
Image Sensor: These Sensor capture the visual information over the gas stove.

Ignition System: The electric spark is generated to ignite the gas when control system is turned on.

Digital Gas flow Controller: Used to adjust the control valve in real time based on feedback from sensor in order to maintain the desired flow rate.

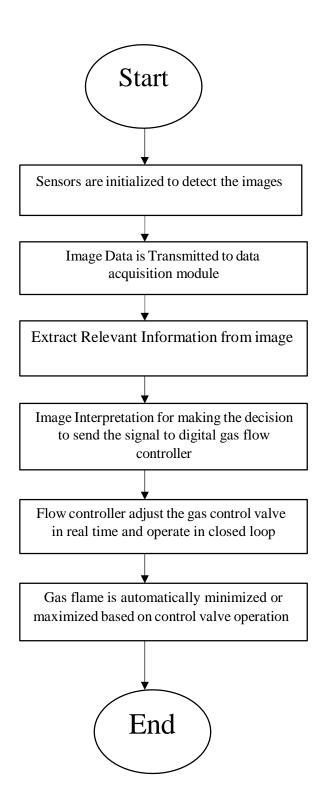
Gas Mixing Chamber: It is used to ensure that the LPG-air mixture is within the flammable limits for efficient and safe combustion.

Data Acquisition and Image Processing Module: It is designed to capture, process and analyze the image data from sensors installed over the gas stove.



Design

Flow chart



C. RESULTS AND ADVANTAGES:

Safety Features:

 Compared to traditional LPG gas stove, your approach for automation of stoves makes them more intelligent for controlling flames in order to reduce the hazard related to LPG.

Remote Monitoring and Control:

 Users can monitor and control the gas stove remotely using a mobile app or a web interface, these additional features can be added by using internet connectivity to stove. This allows for convenient control even when not physically present in the kitchen.

Additional Advantages:

- **Scalability:** additional features by using advanced IOT innovation can be incorporated in this design.
- **Energy Efficient Design:** By optimizing the gas control through automation can make this design energy efficient.
- **Future-proof design:** This technology aligns with the trend towards faster and more efficient appliances for home automation.

E. ALTERNATIVES/ EXPANSION: Any variables which are necessary for your invention to be covered? (150 words)

F. WORKING PROTOTYPE/ FORMULATION/ DESIGN/COMPOSITION: Within 6 months.

G. DATA: No other data required in this invention.

3. **USE AND DISCLOSURE (IMPORTANT):** Please answer the following questions:

A. Have you described or shown your invention/ design to anyone or in any conference?	YES()	NO (✓)
B. Have you made any attempts to commercialize your invention (for example, have you approached any companies about purchasing or manufacturing your invention)?	YES()	NO (✔)
C. Has your invention been described in any printed publication, or any other form of media, such as the Internet?	YES()	NO (✔)
D. Do you have any collaboration with any other institute or organization on the same? Provide name and other details	YES()	NO (✓)

E. Name of Regulatory body or any other approvals if required.	YES ()	NO (✓)
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- **4.** Provide links and dates of such activities if you have disclosed the information in public before sharing with us. Not Applicable.
- **5.** Provide the terms and conditions of the MOU also if the work is done in collaboration within or outside university. Not Applicable.
- **6.** Potential Chances of Commercialization. computer chip manufacturing/ computer hardware industry.
- **7.** List of companies which can be contacted for commercialization along with the website link. Under development.
- **8.** Market potential of the invention. Not yet determined.
- **9.** Any basic patent which has been used and we need to pay royalty to them. None.
- **10. FILING OPTIONS:** Please indicate the level of your work which can be considered for provisional/ complete/ PCT filings.
- 11. **KEYWORDS:** Image Sensor, Gas Burner, Ignition System, Mixing Chamber, Image Processing, Image classification and analysis, Gas Control Valve.
- **12. LOG BOOKS AND NOTEBOOKS:** Please provide log books and note books with date when the idea was discussed with your team.