NATIONAL INSTITUTE OF TECHNOLOGY JAMSHEDPUR

TITLE OF THE PROJECT:

AUTOMATED SOLAR TRACKER FOR SOLAR COOKER

Problem-

- Inefficient in cloudy or low-sunlight conditions.
- Long cooking times compared to traditional methods.
- Required outdoor cooking which is not preferred by common people.
- Small cooking capacity unsuitable for larger groups.
- Required manual adjustments for perfect reflection.

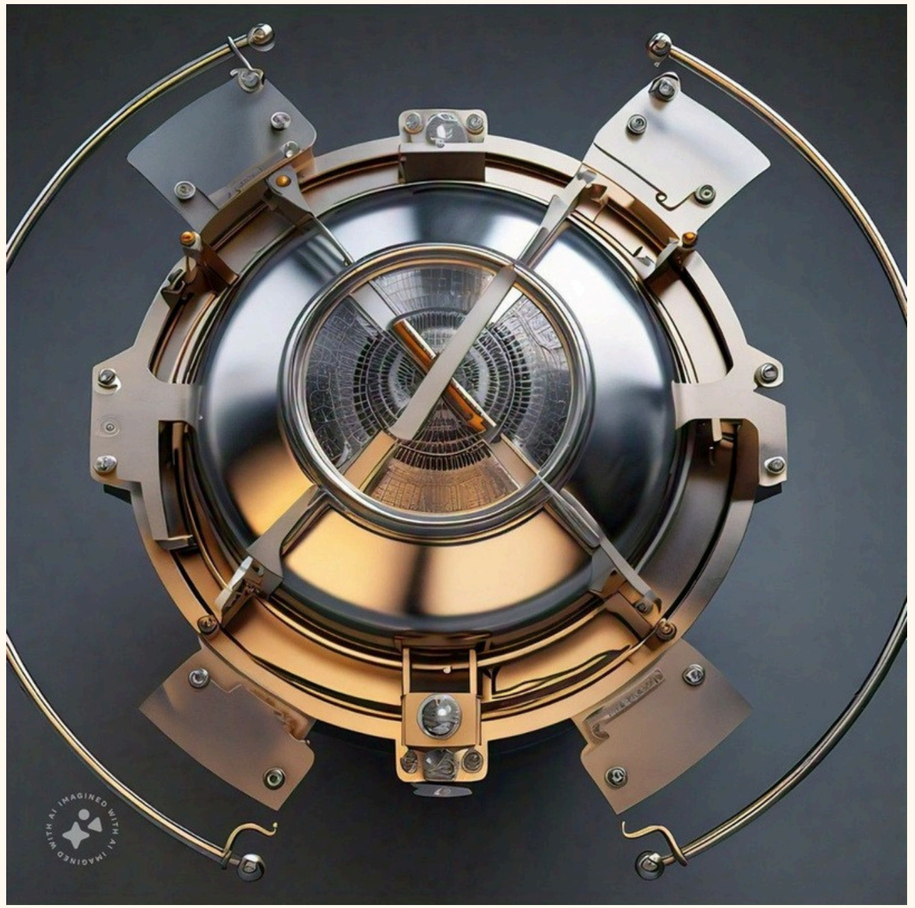
AI generated image

This commercially available solar cooker has no automation

Solutions : Ideation

The idea prepared till now:

- **Aim:** To develop motorized solar cooker with automatic adjustments.
- Power sources to be used: solar reflector and a solar panel.
- This solar reflector generates the water vapor and that vapor is used in steam heating system.
- There will be a small heating stove which utilizes that water steam and used to cook food.
- We will tra**n**sfer water steam using pipes.



AI generated image

Here we will implement and electronic system which control the movement of the solar cooker to stay focused on the vaporiser.

Market Research-

Diverse Product Range: Various solar cooking systems are available, including solar ovens, panel cookers, and parabolic cookers, each catering to different cooking needs and environments. But all required manual adjustments and outdoor cooking.
Growing Demand: Increasing global awareness of sustainable living has led to a steady rise in demand for eco-friendly cooking alternatives, including solar cookers.
Regional Popularity: Solar cooking is more prevalent in regions with high solar insolation, such as Africa, India, and parts of South America, where it is promoted as a sustainable solution. So in our country we definitely required this type of system.
Price Sensitivity: The market is highly price-sensitive, with consumers often balancing cost with durability, efficiency, and ease of use when choosing a solar cooking system. So we need to make them affordable to end users.

Traction

- In the past we have made an Microcontroller based solar tracker which can follow sunlight.
- It will require only few watts of energy for movements and that can be done by a small solar panel.
- Hardware components : Control Unit: Raspberry pi or ESP microcontroller, Camera module, Gear motors: For reflector movement, Motor drivers.
- Software tools: Programming languages: Python, C/C++,
- Workshop for solar reflector prototyping and development.

TimeLine-

- Phase 1: Development of hardware components and their final prototyping 2 months
- Phase 2: Development of software programs and outdoor testing 1 months
- Phase 3: Final product development for end user 2 months
- Phase 4: Necessary changes if required 1 months

Budget estimation:

Total estimated cost: Rs. 15,000

Sl. no.	Funding requirement areas	Cost (INR)
1.	Raspberry Pi	5000
2.	Camera	1000
3.	Gear Motor	1600
4.	Motor Driver	1000
5.	Timing belt	1000
6.	Timing Pulley	400
7.	Miscellaneous cost	5,000

Conclusion

- **The solar cooking industry has significant potential, driven by the increasing demand for energy as the population grows.**
- **With rising temperatures year by year, utilizing solar thermal energy for cooking is a better alternative to relying on other energy sources.**
- **Solar thermal energy can also be applied in other areas, such as waste plastic pyrolysis and power generation in power plants.**
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Thank You