



# Vishwakarma Institute Of Technology, Pune

Department  
Of  
Instrumentation & control engineering

**Automatic temperature tracking system for COVID-19 vaccine supply chain.**

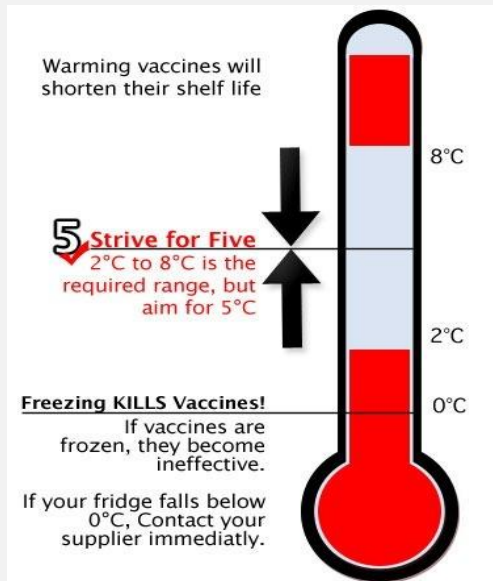
By  
Harsh Bhutada  
Pradnya Kamble  
Hitesh Kumkar  
Hrushikesh Sohoni

Guided by  
Prof.P.M.Kanjalkar



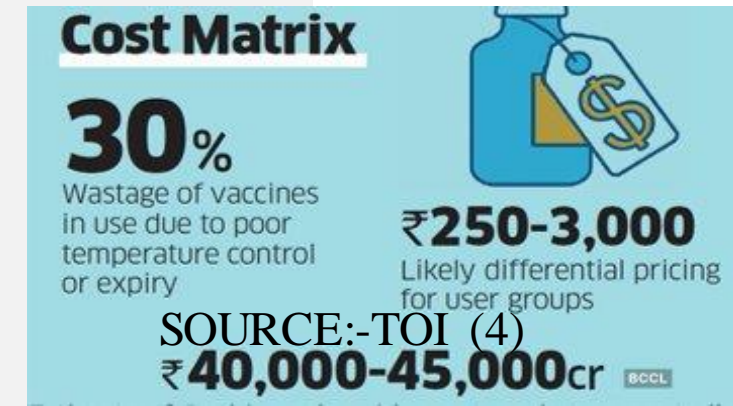
# Introduction

- ❑ We are aware that certain medicines are **temperature sensitive** and have certain **specified** maximum **temperature**.
- ❑ If the medicine is kept for certain period on a **temperature higher than specified limits**, the medicine is **not recommended** to be used.
- ❑ During transportation from production units to distributors/retailers etc. and the consumers, chances are **always there that the temperature exceeds the specified range and may not be recommended to use**.
- ❑ As of now there is **no mechanism** to track the temperature.



# Motivation

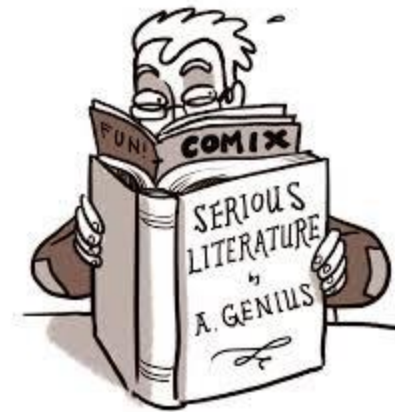
- ❖ Pune vaccine wastage at 8%
- ❖ Wastage of vaccine due to poor temperature control
- ❖ Over half of vaccine wasted globally
- ❖ 25% of vaccines wasted due to lack of cold chain
- ❖ Poor vaccine administration



# Literature survey



Sr.No	Year	Author	Title	Pros.	Cons.
1	2007	PubMed	Freezing temperatures in the vaccine cold chain:	Proper cold storage of vaccine	Poor maintenance of vaccine temperature
2	2008	WHO	Use of Vaccines Outside the Cold Chain	Essential storage inside the chain	Improper data regarding vaccine
3	2016	UNICEF	Is freezing in the vaccine cold chain an ongoing issue?	Freezers are available for an ongoing issue	Lack of management of data regarding vaccine
4	2018	International Journal of Logistics Management	Decision making in cold chain logistics using data analytics	Analysis available for cold chain	Data logger system has active device



# Problem statement

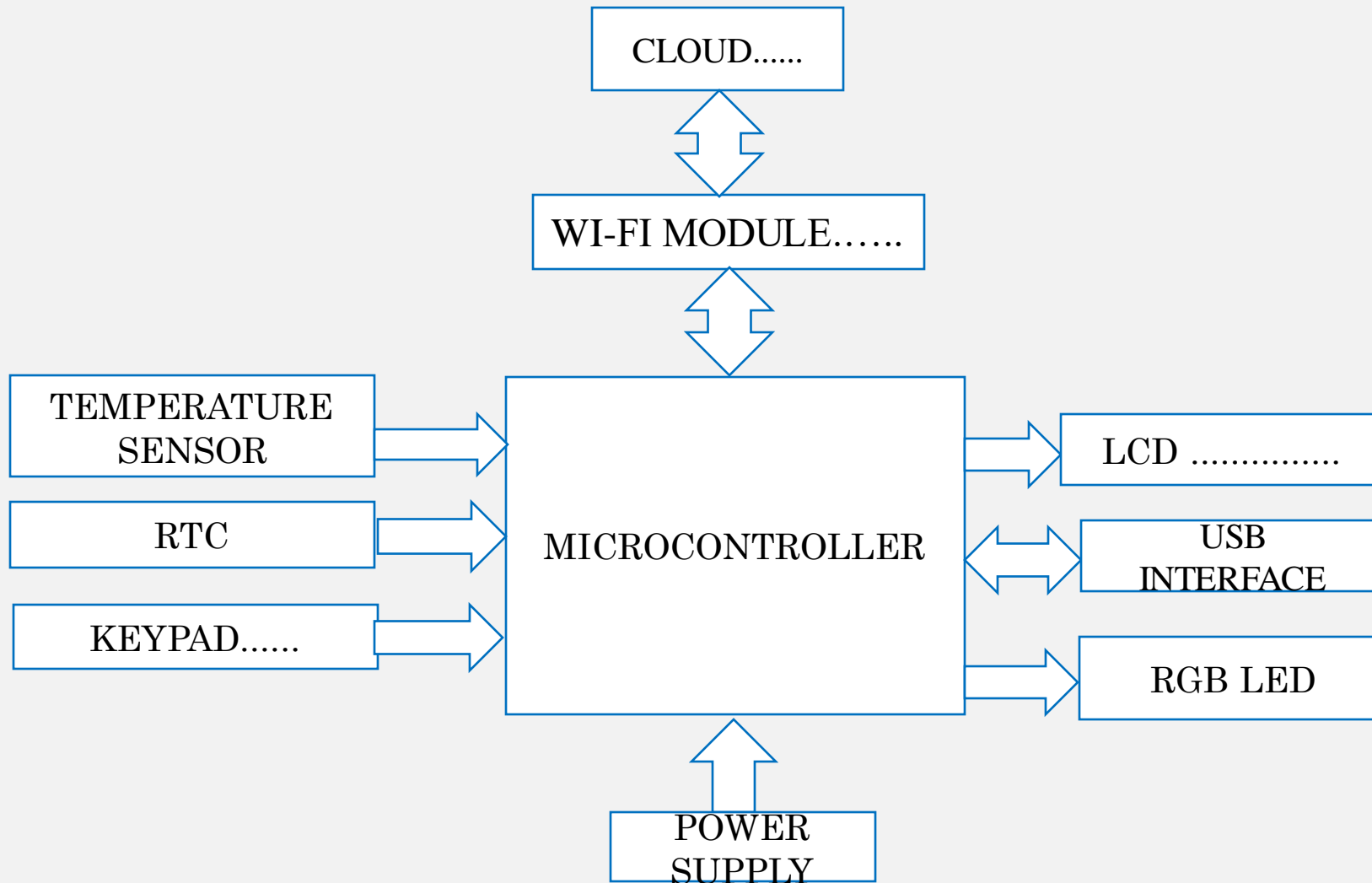
- To design an automatic temperature tracking system for COVID-19 vaccine supply chain.



# Objectives

- ❖ To design a temperature monitoring system for vaccine box
- ❖ To track the change in temperature w.r.t. real time
- ❖ Able to read data store in the system to upload on cloud
- ❖ To indicate the temperature change.

# Proposed block diagram of the system



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# List of components

Sr.No	Component name	Price
1	Microcontroller(6)(7) (STM32L1 ultra low power mcus)	₹ 800/-(max) ₹ 400/-(min)
2	Power supply (LI-ION 3000mah)	₹ 395/-
3	Rtc (8) (Pca856)	₹ 126/-
4	Temperature sensor(10) (Sht21)	₹ 367/-
5	Usb interface	₹ 100/-
6	Rgb led	₹ 4/-
7	Lcd with keypad .....(rs pro tft lcd color display, 80 x 160pixels)(9) (Optional)	₹ 1100/-
8	Cloud (aws/thinger.io) (Optional)	As per plan
9	Wi-fi module.....(Qca-4020-0-217msp-mt-0d-0). (Optional)	₹ 373/-





# Features of proposed system

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Programmable

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Real time monitoring

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Passive in terms of power

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Cost effective

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Robust

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Temper proof

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Real time interface

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Cloud storage

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User friendly

# Applications Of The System



Food  
Sector

Chemical  
Industry

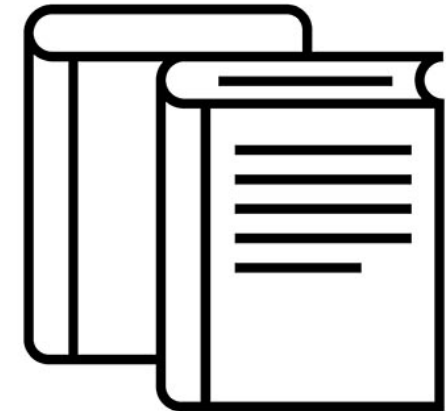
Agricultural  
Sector

Medical  
Sector

Dietary  
Products

# References

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- 2) <https://www.weforum.org/agenda/2018/07/the-biggest-hurdle-to-universal-vaccination-might-just-be-a-fridge>
- 3) <https://theconversation.com/covid-vaccine-some-waste-is-normal-but-heres-how-it-is-being-kept-to-a-minimum-152772>
- 4) <https://timesofindia.indiatimes.com/india/25-of-vaccines-go-waste-due-to-lack-of-cold-chain/articleshow/52999274.cms>
- 5) <https://economictimes.indiatimes.com/industry/healthcare/biotech/pharmaceuticals/the-long-and-short-of-how-coronavirus-vaccine-might-reach-you/articleshow/79698770.cms?from=mdr>
- 6) <https://www.st.com/en/microcontrollers-microprocessors/stm3211-series.html>
- 7) <https://www.arrow.com/en/products/stm321152cct6/stmicroelectronics>
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- 10) <https://www.evelta.com/sht21-digital-humidity-and-temperature-sensor-rh-amp-t-sensirion/>



Reference Data

**THANK YOU**