

Indian Institute of Technology, Delhi

Design Practices in Computer Science
COP290

Public Distribution System Design



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ABSTRACT

I am going to design and present a model for a Public Distribution System for India. In this document, I'll talk about many vital and essential issues that have to be taken into account while designing a Digital Voting system for India.

The Model will satisfy many properties which make it a good model. Then I will argue that why is it a very good model to be implemented.

In this design project, I shall work as observer, developer and algorithm enthusiast to understand the ways and finding different means to approach and tackle the objectives in a more well defined mathematical way.

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Chapter 1

Rough Ideas

These are some rough ideas thought, meant to be put cleanly in the final draft, remove this section after. Other Ideas are in Research papers.

1.1 Raw Ideas

- Issues :-
 1. Classification of families above/below poverty line .
 2. Outgoing grains ; Incoming grains .
 3. Mixing of grains, Adulteration of grains.
 4. Whom can we trust in system .(Taking assumption that, shop-keepers are Rational ?).
 5. Identification where are is the fault and all data available to general public. (On Blockchain?).
 6. Fingerprint like authentication doesn't actually match .
 7. Network infrastructure is not so good in these parts of India.
- If (Incoming + Adulteration == Outgoing) then how checking for Adulteration at each step .
- A govt certified machine in every PDS shop, like an electric meter, Keep the grains, inside it ? Or on it, that'd weight the grains, but how about large quantity and duplicacy ? That machine will check for quality .

- Right now shops are assigned to different people . De-centralized PDS shops, (Rating + Review system) for each shop
- Understanding actual PDS — Cost of (Computer+Person) \leq (Person) if this outweighs, the other cost. Many overheads cost will make price/kg will increase — \leq eq to cost of normally In rural areas, literacy is low , so to keep digital checkpoints simple . Keeping both quality and quantity labels and checks .
- Irrerisable openable containers, (like LPG cylinders), Once opened/tampered with , then everyone knows, (package for every person?)
- Have some random machines outside the shop (diff for grains / oil etc) and every/any random person can test the food . Enter the food and id of shop .
- Incentivising the middlemen .
- Propose a system and defend it . Only report ? No. Include UML diagrams/ Flowcharts for clarity . Simple and succinct.
- Directly use FedEx / Postal system's / Amazon's thing , (just cite) or explain ?
- Prof. Retika mam's paper recommendations ? Smart card for everybody ? Pros and Cons of that system. Suppose we rely on Aadhar, then acknowledge the assumptions. How much of it'll work ? How much rely on Aadhar ? For acknowledgement about APL/BPL
- Policy is important or technology important ?
- What about feasibility of model ?

Chapter 2

Introduction

The problem of a reliable Public Distribution is one that is not limited to India, but a very prominent problem for developing countries. Using the cutting edge technology I hope to present a solution to this problem which will save us plants, workforce and sheer administrative manpower by a once effective and efficient investment by the governing body.

The following objectives are aimed to be discussed in this paper:

- Defining the problem.
- Desirable properties
- Technical and Political Aspects
- Helpful Systems / Learning from other countries .
- Model
- Correctness , scaling , feasibility and Implementation
- Epilogue/Conclusion

Chapter 3

Defining the problem

3.1 Introduction

3.1.1 Why do we need a PDS ?

3.2 How do we Currently Distribute ?

What are the shortfalls of current system, among other description Who can we trust in the syststem ?

Chapter 4

Desirable Properties

4.1 Introduction

What should be some properties of an PDS ? And how should we decide them ?

4.2 Properties

Now let's formally list the ideally desirable properties of Distribution System.

Chapter 5

Technical and Political Aspects

Can a model like this really be implemented ? Who has the power to do this ? Who will conduct this ? Social aspects ? Proof of authenticity at every step ?

5.1 Key Aspects

Chapter 6

Useful Systems

6.1 System in Other Countries ?

How do Japan, USA (developed/developing countries) manage deliveries of food and alike products in case of natural disasters, like draughts, crop failure etc ?

Directly packaging the products in tamper proof boxes ? Like LPG cylinders ?

Chapter 7

Model

7.1 Software Aspect

7.2 Hardware Aspect

7.3 Social Aspect

How will people play a role ? How to incentivize/dis-incentivize them ?

7.4 Correctness

How many desirable properties does it satisfy ? How is it feasible for Implementation in the whole country ?

7.5 Scalability

7.6 Implementational feasibility

Chapter 8

Epilogue

8.1 What does it accomplish ?

What changes does it bring in the Elections that weren't there previously ?

8.2 Applications

Where else can this system be applied ?

8.3 Future Scope

Chapter 9

Conclusion

What are some key learnings through this exercise? The power of the system is in its being fully open source, by the random checks and balances of the people so no middlemen / govt. employees can break it.