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# Literature survey

In May 1988: Resolution WHA 41.16 requesting WHO "to initiate programs for the prevention and detection of export, import and smuggling of falsely labelled, spurious, counterfeited or substandard pharmaceutical preparations, and to cooperate with the Secretary-General of the UN in case provisions of the international drug treaties are violated.

Since then, there have been many amendments such as assigning special task forces globally to fight for the same. Many countries are collectively putting effort to if not eradicate at least reduce the scale in which these trades occur but there has been no impact. The World Health Organization (WHO) estimates that counterfeit medicines worth [73 billion euros](https://www.bayer.com/en/background-information-on-counterfeit-drugs.aspx) are traded annually. Dubious online pharmacies that conceal their true location deliver globally – reaching countries such as Germany, UK, Italy, Spain etc. or the USA. Supplies from illegal Internet pharmacies – those without appropriate certification – are up to 50 percent counterfeits.

According to Outsourcing Pharma in 2012, [75%](https://en.wikipedia.org/wiki/Counterfeit_medications) of counterfeit drugs supplied worldwide had some origins in India, followed by 7% from Egypt and 6% from China.

The problem areas being:

1. National reputation at stake.
2. Brand protection.
3. Export barriers.
4. Patient protection.

Counterfeit [drug prevention measures](https://www.researchgate.net/publication/49620095_COUNTERFEIT_DRUGS_PROBLEMS_AND_SOLUTIONS) taken so far are:

1. Effective packing
2. Radio-frequency identification (RFID)
3. Mass encryption technology

The methods have not been able to be quite effective as they are either expensive or made complex. Thus, we can conclude that there is necessity for a new kind of system for supply and distribution.

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# Objective Re-establishment:

The objectives of our project were reconsidered and we finalized with what was meant to be, and they are as follows:

1. Develop a supply management system where the data can be accessed globally.
2. Track the supply details which will be embedded in the packing.
3. User able to check validity of the drug and should be able to distinguish between counterfeit and authentic drugs.
4. Ensure brand safety.
5. Alert the authorities if activity is found to be malicious.

# Method of approach:

* Various approaches were considered and evaluated with their advantages and disadvantages along with ease of their implementation.
* A method was chosen and it has the following approach to tackle the problem.
  1. The drugs’ packages are labelled with QR code.
  2. The QR code holds a unique ID which is pseudo-random generated.
  3. The same ID is pushed to block-chain.
  4. Once the drug is scanned by the pharmacist the application checks its fidelity.
  5. If not present in block-chain then it alerts it as a fake.
  6. If present it alerts as valid and flags the item.
  7. If the same item is scanned again it no longer alerts it as valid.
  8. This way we will be ensuring even if a counterfeit is generated it can only be generated once.

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# Requirements Analysis

* Need an API as QR code generator which embeds pseudo-random number.
* MySQL Database as RDBMS.
* ReactJS for User Interface.
* Apache as Server.
* BigchainDB as database to hold the IDs in blockchain style.
* Docker for containing BigchainDB.

The required applications and frameworks were installed and configured on personal computers.