**Assisted or Automated Diagnosis & Prescription using AI**

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*Abstract*

In this report, I have proposed the idea of using AI technique to create an Assisted or Automated Diagnosis & Prescription using AI/ML to provide faster and more accurate diagnosis and prescriptions and we can build an application which can be integrated with previous patient data and public medical records and use Machine learning techniques and AI to generate proper prescriptions and suggest diagnosis which can help them in requesting for a proper treatment for the patient. Also we can use Recommendation Systems as well to provide suggestions such as supplements and necessary Diets as well.

# Problem Statement

The problem statement is to apply the automated diagnosis and prescription using

AI/ML. Normally patients or customers need to go through a lot of medical

Procedures and the doctors also need to go through all the data to come up with a Proper diagnosis for the patient, but it takes a lot of time constraint and can cause a lot of problems for the Patients and increase the risk of more health problems. With this app/Interface we can help doctors in teaching them the use of AI/ML in coming with diagnosis, solutions for Prescriptions in a quick manner.

# Diagnostic Assistance

Given the rise in various health issues in modern times, there is a need for automation and streamlined process in the medical industries to come up with quick diagnosis or solutions to various medical related issues and given the medical industry is a high pressure field there is a room for a lot of human errors which can cause significant risks to patients and sometimes the wrong diagnosis or prescriptions can be given to the patient. In this situation the use of AI/ML can reduce human error and can come with efficient solutions to the problems in real time.

# Target Specification

The proposed system/service will help healthcare workers/ Doctors, Pharmacists

with the support of virtual AI assistance to provide customized real-time recommendations to patients in a quick manner. Instead of having to repeat patient information and constantly check upon a patients all the time, an automated healthcare system integrated with AI can provide patients with a AI powered virtual assistant that could provide recommendations based on Patient medical records, personal requirement, previous medical conditions and preferences.

# External Search

The sources I have used as reference for analyzing the need of such a system forAutomated Diagnosis have mentioned below :

* + https://www.ibm.com/in-en/topics/artificial-intelligence-medicine
  + https://research.aimultiple.com/healthcare-ai/
  + https://intellipaat.com/blog/artificial-intelligence-in-healthcare/
  + [Increasing Sales and Improving ROI](https://martechseries.com/analytics/market-basket-analysis-increasing-sales-improving-roi-optimizing-campaigns-promotions/)
  + [A study on Understanding Changing Trends of Customer Behaviour and hence](https://www.researchgate.net/publication/303746064_Market_Basket_Analysis_Identify_the_Changing_Trends_of_Market_Data_Using_Association_Rule_Mining) [the Market](https://www.researchgate.net/publication/303746064_Market_Basket_Analysis_Identify_the_Changing_Trends_of_Market_Data_Using_Association_Rule_Mining)

# Benchmarking

E-commerce giants like Amazon,Flipkart have been using affinity analysis to perform Market Basket Analysis,which identifies purchasing habits of customers and uses this information to cross-sell and up-sell relevant items. But this technique would also be beneficial when applied to the small businesses since most of the daily needs and other essentials are still being bought from these shopkeepers and vendors.

# Applicable Patents

## [Patent 1 - System for researching product dynamics in market baskets](https://patents.google.com/patent/US6976000)

* + - [**Patent 2 - Enhanced Market Basket Analysis Model**](https://patents.google.com/patent/US20140156347A1/en?q=Market%2Bbasket%2Banalysis&oq=Market%2Bbasket%2Banalysis%2B)

There are a lot of patents that can be looked upon, but since these two relate the most to the application of Association Rule Mining mentioned above,I have mentioned them.

The first patent describes in detail the Association Rule Mining Technique and how it has been used for generating baskets of items based on the customer purchase behaviour identified from the applicable dataset, according to predetermined attributes. It also describes the rules generated by the algorithm to group the items together.

The second patent describes an enhanced model for Market Basket Analysis. This model can generate baskets(items grouped together) based on historical purchase data, which are causal and predictive,and the output(baskets) can then be fed as input to another output generator which generates the final product groups, along with a score that characterizes the likelihood of purchase for the predicted group.

These two will be significantly considered while developing and implementing a similar system for small scale businesses.

# Applicable Constraints

* Data Collection from shopkeepers and vendors
* Continuous data collection and maintenance
* Lack of technical knowledge for the user(vendors)
* Taking care of rarely bought products
* Convincing the shopkeepers to implement the system in their shops.

# Applicable Regulations

* Data protection and privacy regulations(Customers)
* Govt Regulations for small businesses
* Employment Laws
* Antitrust Regulations
* Regulations against false advertising

# Business Opportunity

Since the above technique has only been used by large companies, this can be

extended for small businesses, not only shopkeepers or vendors, but also food businesses and takeaways.Therefore, there is a fair chance of this service being a great business opportunity. Every small business that depends on sales can and would want to opt for using this service in order to always know what their customers want. The emergence of

every small business is thus a fairly great business opportunity for the service provided by us.

# Final Product Prototype

The final product is a service that provides small businesses with detailed information on what products to be sold together and other similar useful insights into how to increase the sales of their business.

The service implements the Market Basket Analysis, i.e Association Rule Mining technique on the dataset of transactions collected from the shopkeepers/vendors

* + Each transaction represents a group of items brought together(itemset)
  + These are then analysed to identify rules of association
  + These rules are implemented/executed considering the metrics: confidence,support and lift for the rule
  + **Support :** the percentage of transactions that contain all of the items in an itemset(suggested group) Rules with high support are preferred.
* **Confidence :** the probability that a transaction that contains the items on the LHS of the rule also contains the item on the RHS.Greater the confidence, greater the return rate expected for a given rule
* **Lift :** lift summarises the strength of association between the products on the left and right hand side of the rule; the larger the lift the greater the link between the two products.

## Apriori Algorithm will be used to find the rules of association between products.

Generating frequent itemset is the computationally expensive step, which can be improved using hash-based itemset counting,transaction reduction,partitioning, sampling and dynamic itemset counting.

# Conclusion

More and more organizations are discovering ways of using market basket analysis to gain useful insights into associations and hidden relationships. But this extension for

small businesses is a great opportunity to improve sales and help these businesses grow.

I have hence proposed the application of this technique for small businesses. This is not a full fledged plan, but with a considerable amount of work and effort, it seems achievable.