AI based skin care recommendation system

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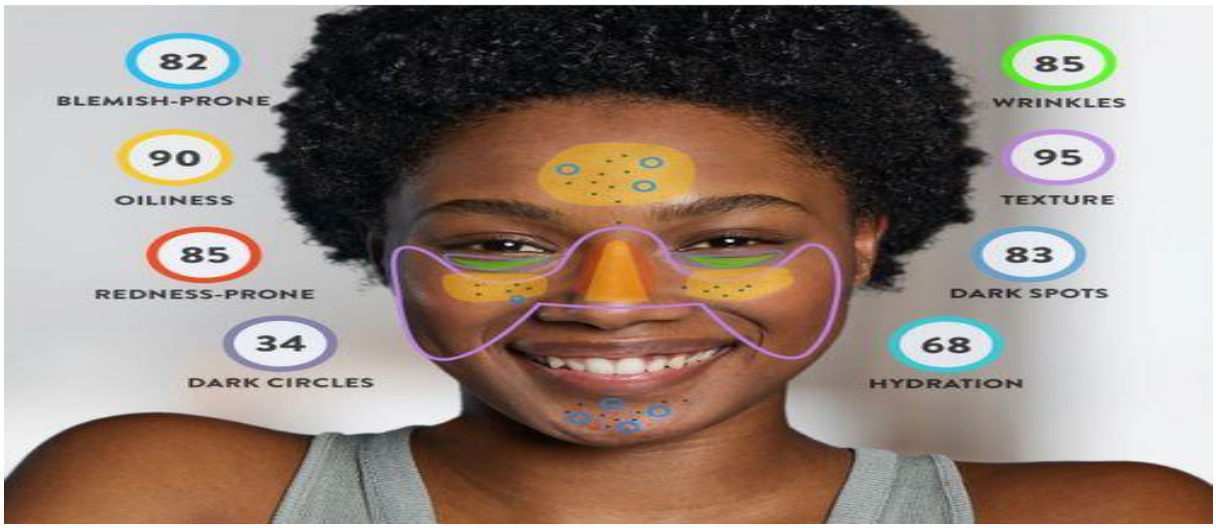
Abstract

Today in our modern lives our skin have to deal with problems like growing pollution, dirt, UV rays etc. on daily basis. Especially people living in mega cities are at major risk, only pollution is responsible for 30 percent raise in skin problems. Even in normal conditions also we have care for skin problem such as wrinkles, fine lines, and age spots. But in market there are so much options available out there which creates confusion as to which product suits us. Even after spending lot of our precious time on web in searching for the required products we end up selecting the wrong product which in end harms or have no effect due to difference in skin characteristics mentioned for.

But with exponential rise in computer vision capabilities with deep learning, examining skin characteristics with a higher probabilities is possible now days. AI based solutions can be effective enough to provide us with suitable recommendation's which would not only save our time but also help in selecting the product brands without any confusion.

1. Problem statement

Designing an app such that it takes images of customer's skin (i.e. face, arm etc.) and return certain product recommendations based on its feature. Developing it either as a Business to business or software as service for multiple e-commerce vendors like myntra, nykaa, etc. or providing services to customer on app. Also providing simulations of after usage of products.



2. Market/Customer Assessment

As skin care and cosmetics is a booming industry now a days and customer base increasing day by day. Use of AI tools can help to leverage to growing demands with better recommendations. With the use AI we can give more personalised solutions.

App to customer model (SaaS)

With parallel growth of AI with Big Data and computer vision models, and with software dependent visual analysis the users will know better about skin tone .This provides the consumer to make better choice of skin products based feature analysis of the model.

B2B

Various large and small business also want cope up with the changing customer needs so that they can use it in R&D and come up with better products in line with the existing preferences selected by customers in mean order.

3. Target Specification and characterization

To educate younger customers on the importance of skincare. Teenagers and people in their twenties tend to neglect adequate skincare, feeling they do not benefit from products as much as the mature group.

App simulation allows younger consumers to project different trajectories of their skin's futures and realize the long-term benefits of personalized product usage.

Older customers also gain specific info about their skin and manage it well.

4. External Search

https://github.com/topics/skincare-recommendation

An application that recommends personalised skincare and makeup products based on the skin metrics inferred from user's selfie using computer vision algorithms.

https://www.analyticssteps.com/blogs/how-ai-used-world-skincare

5. Benchmarking

The most important ecommerce benchmarks for beauty brands the report covers:

- conversion rate
- customer retention rate
- customer lifetime value (CLV)
- orders per customer
- time between orders
- Cart abandonment rate

Category	AVG Retention rate
Haircare	13.2%
Deodorant	16.6%
Fragrance	16.7%
Men's cosmetics	18.7%
Makeup	20.4%
Skincare	21.8%
Retailer	21.9%
Full range	30.0%
Specialized cosmetics	36.1%
Grand Total	**23.0%**

6. Applicable Regulations and Patents

- International skin care major **Beiersdorf** has developed a method to profile skin based on moisture levels and geographical location, providing an accurate picture of overall skin condition and enabling personalised product recommendations.

- Personalized expert cosmetics recommendation system using **hyperspectral imaging** (https://patents.google.com/patent/US20170178220A1/en)

- Proven, received a patent allowing the company to manufacture personalized products using geographic, environmental and seasonal data, according to a

7. Business Opportunity

The above concept can monetise in following manners

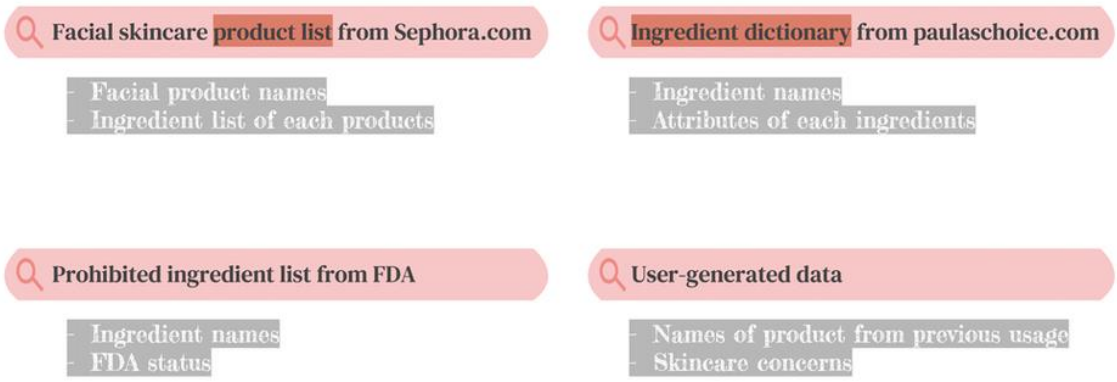
1. **Subscription based membership** membership plans can be created based on product services provided.(recommendation ,clustering,simulation)
2. **Service charge for a service**
3. **Client based model for b2b clients**

8. Concept Generation

we get data from user using their images and various features can be developed using different ml and deep learning techniques such convolution that specifically carve out different distinguished feature of our skin.

We need datasets that include at least most of the skincare products on the market and the ingredients of these products that can be procured from retailers as well as product companies.

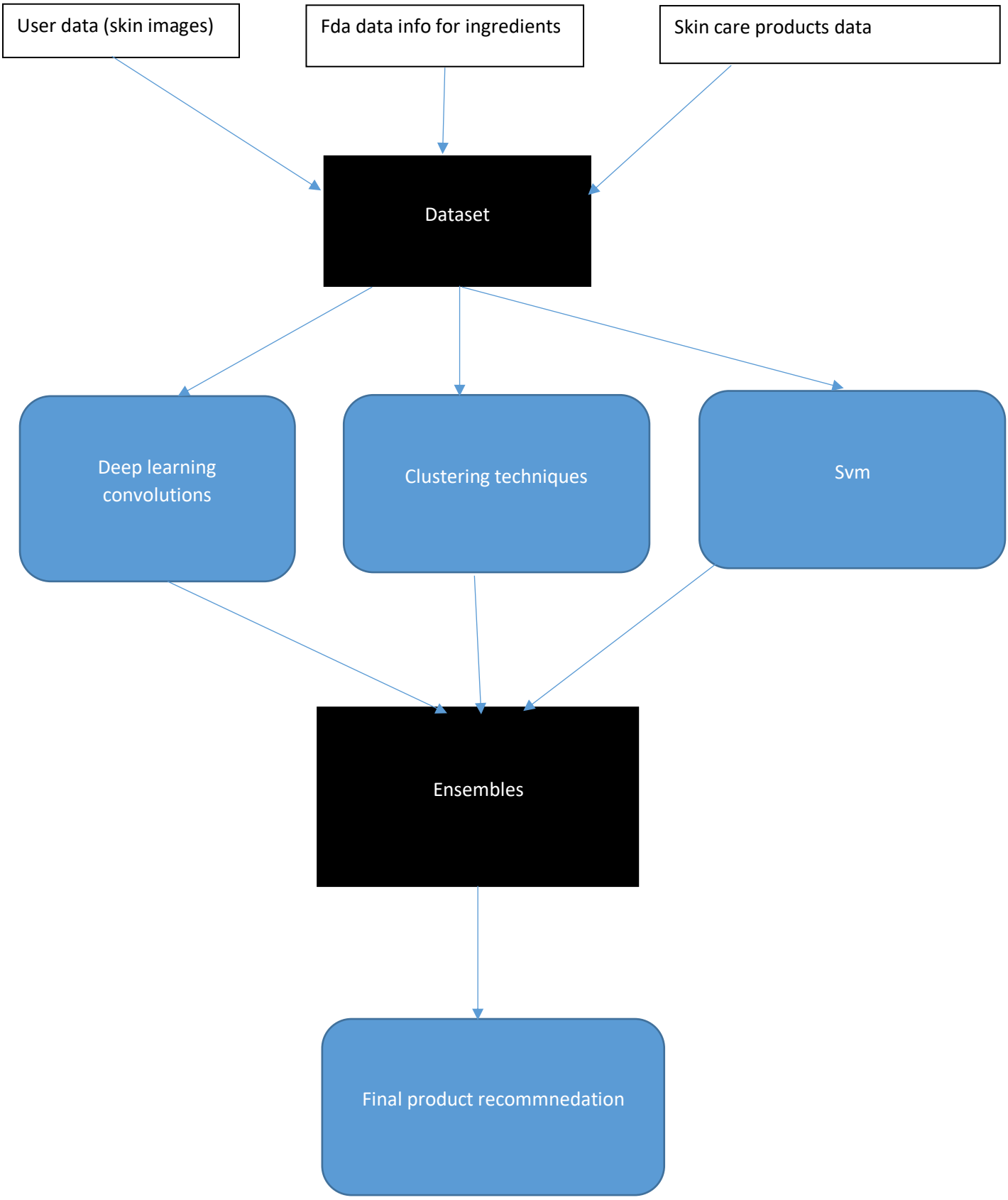
Also, we need data of what each ingredient does (attributes) as well as data from FDA informing the status of each ingredient (whether it is harmful or not).



9. Concept Development

Development phase requires the data and model to be fed in API using e.g. Flask framework

That can be further deployed on to front end websites for interaction with end user.


User data (skin images)
Fda data info for ingredients
Skin care products data
Dataset
Deep learning convolutions
Clustering techniques
Svm
Ensembles
Final product recommnedation

10. Final Report Prototype

The product data set and predefined data gathered from sources.

For interactive app development

At Back-end:

- Eda on dataset to gain insights
- Model development i.e training phase
- Optimization
- Taking input in real time using Flask framework

Front End:

- Using heruko framework
- Stream lit for interactive visualization bassed on eda and realtime parameters
- Customer ratings
- Link with retailers

11.Conclusion

An interactive user system will take inputs regarding the skin features from the user and the user will get to know about the recommended products that he wanted in real time considering the skin factors in mind in the user interactive UI.