

Design and Fabrication Project

Problem pitches

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Automated Pill Crusher and Dispenser

1

Context

Crushing pills into a fine powder facilitates easier swallowing, particularly beneficial for individuals with **dysphagia** or other swallowing disorders.

It also aids in administration through **enteral feeding tubes** and the preparation of **capsules**.

Automated systems require **minimal physical effort** to operate, making them ideal for individuals with limited mobility or dexterity.

Market

Electric Pill Crusher Grinder - \$29.99

- wastes too much medicine
- cloud of medicine when opened
- residue under the blades

Electric Pill Crusher Grinder - \$19.89

- low end quality, cheap build

Silent Knight Pill Crusher - \$95.00

- tutorial video
- solves most problems, but extremely costly
- not automated

Manual Pill Mill Pill Crusher - \$19.99

Scope

Electric grinders can be optimized for **efficiency** and **cost**, while incorporating easy **cleaning mechanisms** to avoid cross-contamination. Furthermore, **supplementary features** requested by users can be integrated into the product.

Wearable Hydration Monitor

2

Context

Wearable hydration monitors help **athletes** track fluid intake, prevent dehydration, and optimize performance. **Medical conditions** such as kidney stones or heart failure require accurate fluid monitoring. Some **medications** affect fluid balance, necessitating close monitoring of hydration level.

Market

- Hydration Biosensor - Rs. 11,000.00
- patch attached to skin, tracks on app
- Vivoo Hydration Test Strips - \$13.99
- Urine test, like pH, but has an app tracker
- Wearable Hydration Tracker Smart Sweat Fitness Tracker - \$249.99
- Smart Watch, connects to app

Scope

Wearable hydration monitors can be optimized for **cost-efficiency**. It can also be **integrated** with everyday devices, for easy accessibility. Necessary **features and modes** can be added as per user requirement.

Glucose monitoring system and Insulin patches

3

Context

Individuals experiencing **dexterity challenges** may need help with insulin injections. Developing a product solution to **monitor and control** insulin levels in the patient's body could be advantageous.

Market

FreeStyle Libre Glucose Monitoring System - Rs. 5249

Medtronic Devices

- separate product with a pump + tracker
- insulin pen for dexterity issues
- phone app tracker for glucose
- injection port

Scope

Products of a similar nature are available, but their usage in India is not widespread unless deemed essential. This particular gap can be filled with a custom-tailored solution for the **Indian context**.

Home STD Testing Kits

4

Context

STD testing is often **stigmatized** in India, and we have not witnessed individuals undergoing testing here. It is advisable to undergo STD tests whenever there is a change in partners or when initiating a new relationship, for the well-being of both individuals.

Market

My Diagnostics - Rs.3500

- blood sample, ELISA testing

Life Cell (Female) - Rs.4490

- genital swab

Let's Get Checked Complete 8 - \$249

- Finger prick, Urine sample
- [Link](#)

Scope

Home STD testing kits are available, although their accuracy may be limited. Despite this, they provide individuals with some insight and assurance. Redesigning the **dispensing system and kits** could help alleviate people's anxieties related to testing.

Medicine Administering for the Elderly

5

Context

Senior citizens, individuals with mobility or **dexterity challenges**, and those with **memory disorders** encounter difficulties in adhering to medication schedules efficiently.

Market

Multiple apps exist, which require manual input.

Easy Pill Tracker and Reminder System (pack of 5) - ₹4,248.76

Monthly Pill Organizer System - \$64.95

Sagely Smart Extra Large Pill Organizer - \$34.99

e-Pill - \$69.95

Scope

A product solution can be developed to **read and analyze** patients' medicine intake times. This solution offers benefits such as medication reminders, emergency notifications to caregivers, and more.

Back Support for Two-wheelers.

6

Context

Extended periods of riding two-wheelers can cause back **discomfort** due to maintaining a **fixed posture**. Women and elderly individuals who need to travel on two-wheelers for an extended time may also experience **back pain**.

Market

Alpinestars Nucleon KR-2i Back Protector Insert - ₹5,871–₹6,262

- Lightweight, flexible PU injected impact foam
- Contoured for anatomical and adaptive fit
- Perforated for breath-ability and comfort
- Channel ventilation system for optimized airflow

Scott D3o Viper Pro Back Protector - ₹4,132–₹4,184

RIDBIKER Motorcycle Bicycle Back & Spine Protector - ₹8,474.00

Scope

Products designed for professional racing are not always suitable for the **general public**. While they may not effectively address **back pain** in some instances, there is potential to develop a product focused on improving comfort and alleviating back pain for everyday individuals who are more prone to experiencing such discomfort.

Vitals Monitoring

7

Context

Senior citizens or patients in critical condition who live alone or stay **alone** may not be able to reach out to their caregivers during **emergencies**.

Market

Wearable devices - integrated into clothing/ accessories - reduces perception of being observed

The Apple Watch - 71% positive predictive value compared to a medical ECG patch

Scope

A product solution capable of **monitoring and transmitting** a patient's vital signs to a remote caregiver can be developed.