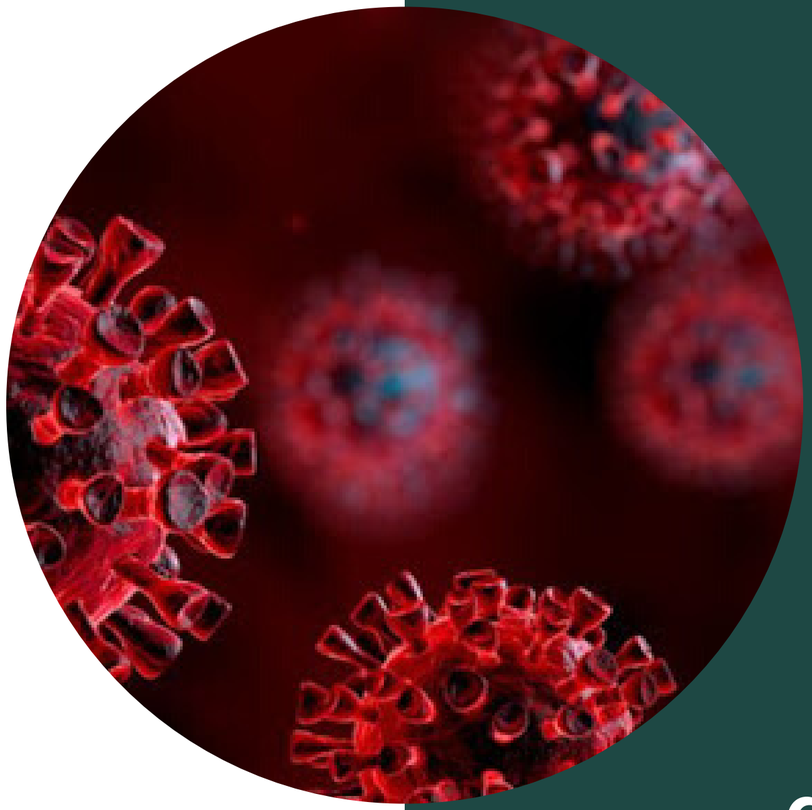
Team Autonom



Samhar-COVID 19 Hack

Pandemic Regulation and Tracking Intelligent Kit (PRATIK)

Problem Statement

INSPIRATION TO SOLVE THE PROBLEM

- There is no standard tool for Pandemic Tracking and Regulation after the lockdown ends.
- Data- collected by- Asha workers, Healthcare professionals, Lab tests- not capitalized to full extent- for analysis and prediction of the extent of spread of pandemic
- Lack of involvement of Technology in Check posts to track high risk citizens to quarantine center
- Method of containment- different for different people. Standardized method needed at entry points of public place- allow low risk citizens

TARGET AUDIENCE FOR THE SOLUTION

- People in COVID containment zones.
- Can be extended to entire India depending on data made available- when more people are lab tested or availability of health data.

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OUR SOLUTION

- Modular end to end solution for identifying people with different risk factor

- Preventing spread at the source (risk factor analysis before expensive resources like RT-PCR tests are used)
- Centralized platform for the country with common standard operating procedure

- Identification of quarantine violators at the source of the problem- city check posts

IMPACT OF THE SOLUTION IN INDIA

- Extensive utilization of the Aadhaar data and existing citizen information
- High level of scalability to entire Indian population (Database used- Firebase)
- District level implementation (decentralize and scaling horizontally)

ABOUT OUR TEAM

A team of Technology Enthusiasts from Vellore Institute of Technology, Vellore. Working on diverse problems in Autonomous Vehicles, Blockchain, Professional Electronics and many more.

PROBLEM STATEMENT

3 EXISTING / PRE-EXISTING WORK

- Apps developed by CDAC to track quarantined citizens under NAADI platform.
- Arogya Setu- uses data from people to recommend COVID diagnosis and tracking of people who have come in contact with affected patients

- Evidencio Community- ML based Prognostic Model To predict mortality rate of patient using three clinical features. (Yan et al. Prediction of criticality in patients with severe Covid-19 infection using three clinical features: a machine learning-based prognostic model with clinical data in Wuhan. (Preprint).)- used decision trees

IMPLEMENTATION STRATEGY

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Data collected by
Asha
Test Labs
Doctor
Consultation

Citizens' Survey

Health Officer Interface

Probability of citizen getting infected

Upload Relational Database

Pandemic Regulation and Tracking Intelligent Kit (PRATIK)

Intelligent COVID Predict Probability of Infection module (CPPI)

Checkpost Quarantine Monitor (CQM)

Retrieves citizen info

Probability of citizen getting infected

Entry Point Infection Check (EPIC) module- QR based risk factor check in public places before entry

IMPLEMENTATION STRATEGY

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Police-Officer Interface

YES

NO

Has citizen reached Quarantine?

Home lat long

Home Location details from UIDAI

AADHAAR

Checkpost Quarantine Monitor (CQM)

AADHAAR

Booking services
MoA- Ministry of Aviation
(Ticketing Services like cleartrip)
Indian Railways
(IRCTC etc)
Road Transport Dept

IRCTC

redBus.in

Association of State Road Transport Undertakings

Triggers when to start tracking

Device lat long

User Location Details from mobile GPS sensor

Methodology:

DATASET DETAILS:

Dataset collectively taken from ASHA, Doctors, Medical Lab and User (Aadhar):

Dataset details

Asha worker collected details

Unique Id, Name , Age, Occupation, Mode of Transport, Active Cases in that region, Active Cases per 1 million.

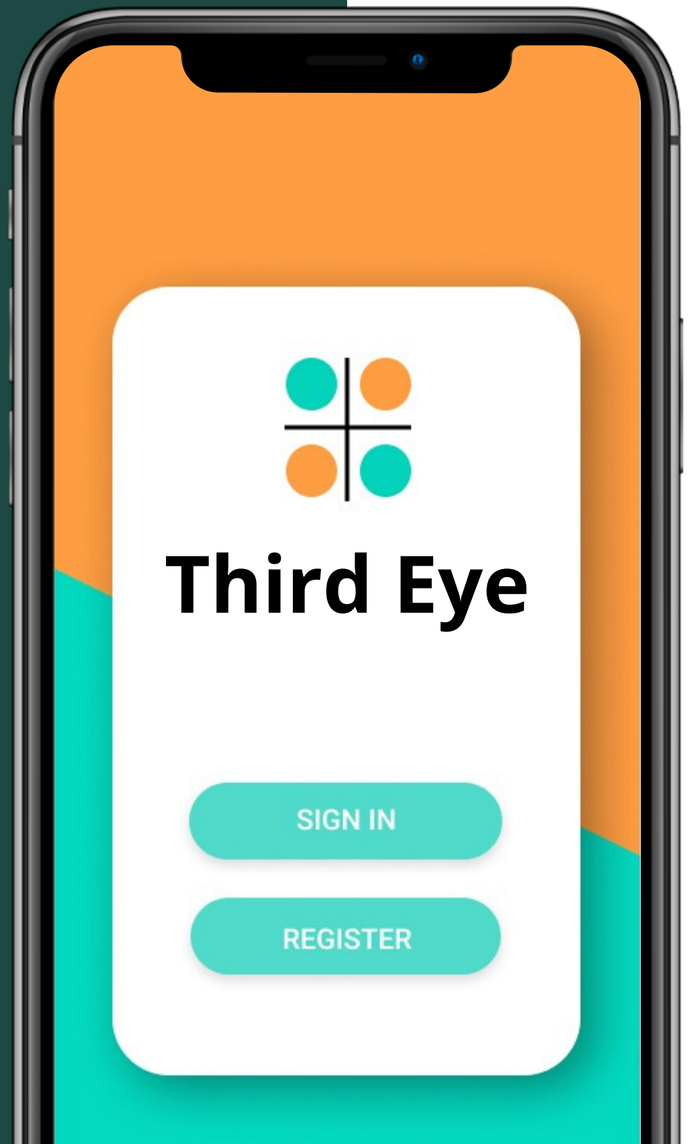
Medical data collected after basic lab tests (Blood and urine samples) - Non COVID test.

Coma score, Pulmonary score cardiological pressure Diuresis, Platelets, HBB, d-dimer, Heart rate, HDL cholesterol Charlson Index, Blood Glucose

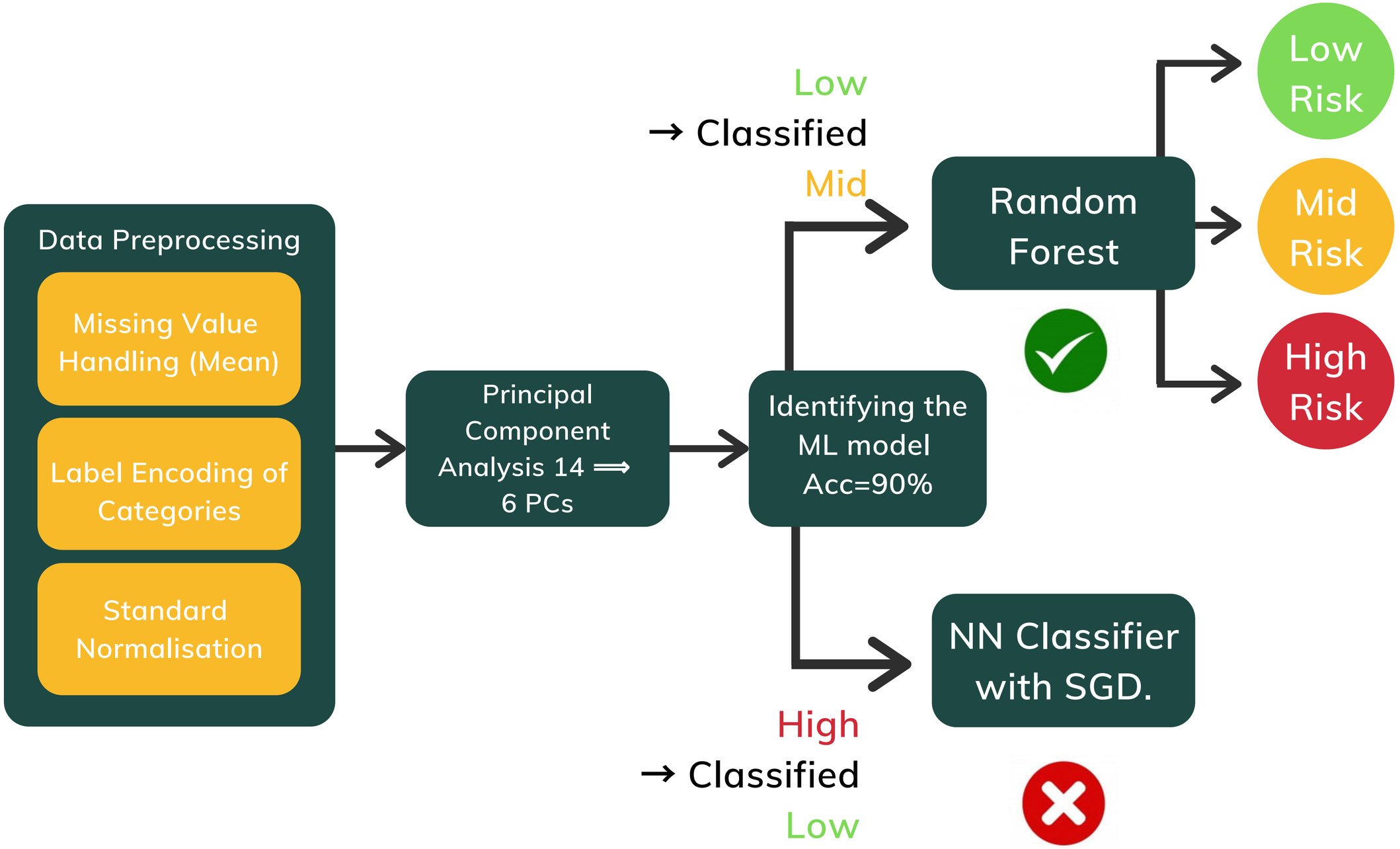
Data given by doctors on basic health checkup for comorbidity.

Comorbidity condition (Hypertension, Diabetes, Coronary Heart Disease), Pulse Rate,Presence of Influenza Like Symptoms and SARI

EXPERIMENT RESULTS



Model Details



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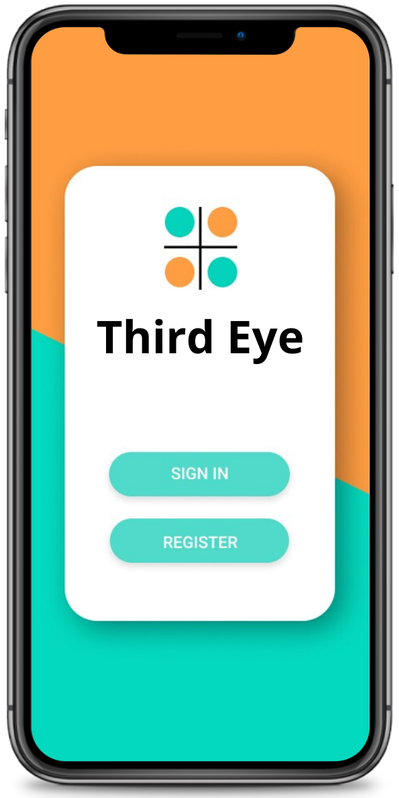
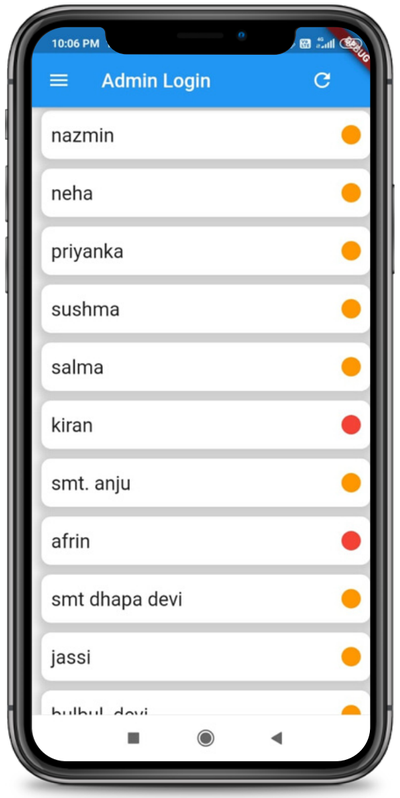
FINAL SOLUTION

USER INTERFACE





ACCURACY & Performance Numbers:

Random Forest (Accuracy)= 90% SGD
(Accuracy)= 90% SVR Model (R_score)= 0.05
Keras sequential (R_score)= 0.3

Performance Numbers: (GPU/CPU Details)
Training – Tesla V100 Testing- Intel Xeon CPU @ 2.20GHz;
RAM=0.88GB, Google Colab

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WHAT NEXT?

Future Scope

Health Officer App features

Include contact tracing

Method proposed: Broadcasting location history of infected patient to all devices in a locality. Use time synchronized distance metric to find if contact has occurred at any interval.

Comprehensive analytics

To help decide comorbidity and other factors influencing infection and take preventive action.

Method Proposed: Use of algorithms like K-Means clustering to group data according to comorbidity condition.

Quarantine Monitoring App

Tracking citizens in quarantine with automated alerts (Improvements on existing apps such as n-COV Satark. Improved location capturing by bypassing android power saving options

Usage of Crawlers to keep check of twitter and various reputed media reports for Quarantine violation and Mass gatherings. (Notify if there are such incidents to take action).

User app features

Enhanced dashboard features-

Verified (non-fake) COVID related local news using BERT optimized for mobile phone using tensorrt

Information relay system

For local administration authorities to communicate emergency decisions and pandemic related updates

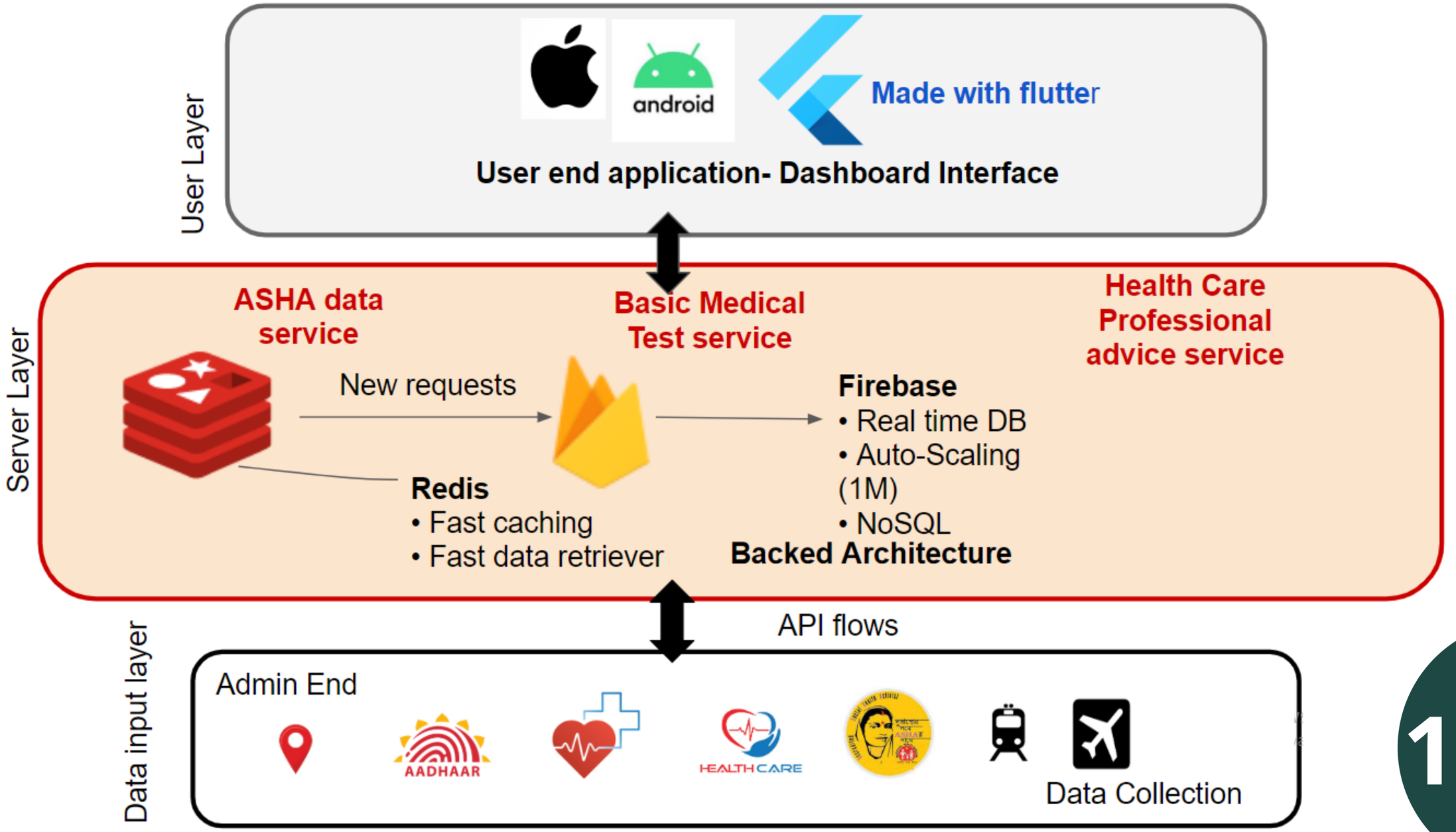
DOWNLOAD THIRD EYE TODAY!

QUESTIONS?
COMMENTS?
LET US KNOW!

APPENDIX

Stack Architecture

STACK


User Layer
android
Made with flutter
User end application- Dashboard Interface
Server Layer
ASHA data service
Basic Medical Test service
Health Care Professional advice service
New requests
Redis
• Fast caching
• Fast data retriever
Firebase
• Real time DB
• Auto-Scaling (1M)
• NoSQL
Backed Architecture
API flows
Data input layer
Admin End
AADHAAR
HEALTH CARE
Data Collection

ARCHITECTURE