



COLLEGE OF ENGINEERING ADOR

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Guided By:

Prof. Ajeesh S
Assistant Professor
Dept. of CSE

Submitted By:

Ahammed Basim
Joseph Pious
Navneeth Chandran
Nivya Sara Reji

27 June 2022

Care'S



PREGNANCY ASSISTANT Care'S



Introduction

- Pregnancy/gestation- time at which one or more offspring develops inside a woman's womb.
- Time when she is to be taken care of.
- Apart from an obstetrician's help - self care must be taken to have a healthy pregnancy.
- The health of the unborn-specially the weight is of due importance.
- Recently, there are many mobile application that act as a personal health assistant.
- But an application with special interests to particular users are few.



System Analysis

Existing System

- Variety of health assistants -
 - ◆ HealthifyMe, MyFitnessPal, Health Pal Fitness.
- There are brand health assistants too -
 - ◆ Samsung Health, Huawei Health, OnePlus Health, LG Health.
- All these are concerned with the general society.
- None is concerned with the category of pregnant women with special interests.



System Analysis

Proposed System

- To help pregnant woman, with the aid of mobile technology and machine learning ,our project develops an android application which consist of an ML Model.
- The android application is named as “Care’S”
- Care’S - abbreviation of Care’She



System Analysis

Proposed System

→ **Care'S consist of :**

◆ **Android Application**

- Base of our project.
- The ML model is integrated here.
- Contains food and exercise recommendations for the mother.
- Also notifies her about the check-ups.



System Analysis

Proposed System

→ **Care'S consist of :**

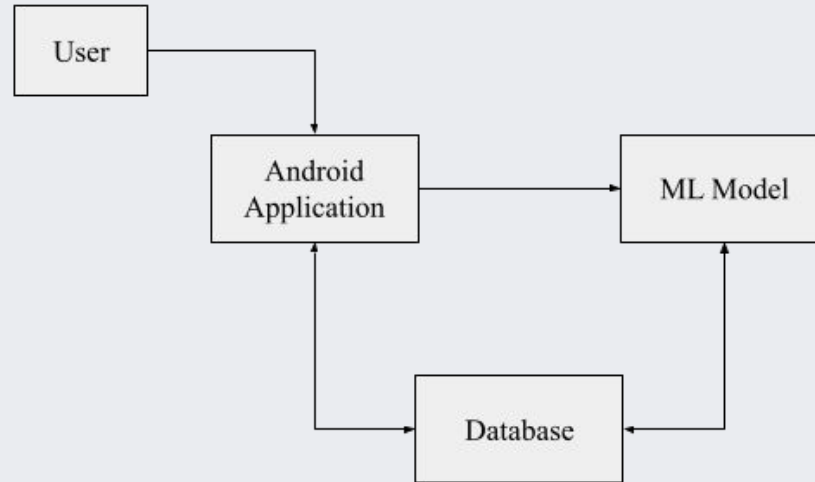
◆ **Low Birth Weight (LBW) Model**

- LBW babies (<2.5 kg) are more likely to have health problems than babies with normal weight.
- Predicting birth weight before the birth of the baby is the best way to help the baby get special care as early as possible.
- It helps doctors to arrange special facilities before the baby is born.



System Overview

System Structure



System Overview

Android Application

- Product
- Presenting the Prediction Result
 - ◆ User Friendly
- Android Application with Database



System Overview

Random Forest

- Classification and Regression.
- Better Accuracy.
- Predict output by analyzing random features.

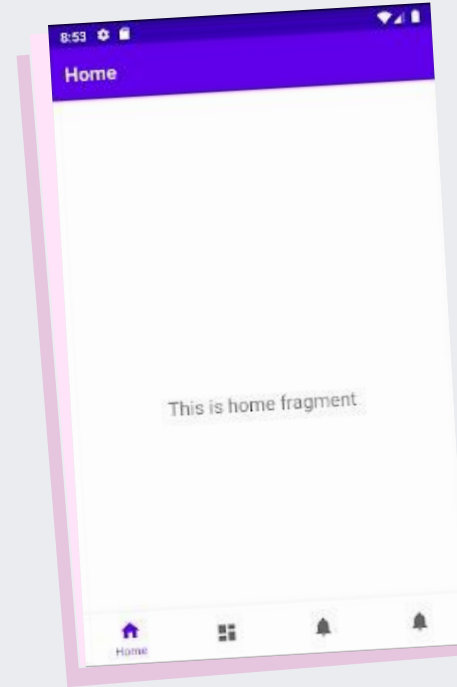


System Design

Module 1

1.1 Skeleton Design

- Bottom Navigation bar is used.
 - ◆ Implemented using Fragments.
 - ◆ Various Fragments used -
 - Home
 - Activity
 - Profile
 - More Actions



System Design

Module 1

1.2 Connecting Database

→ Table created in MySQL Database with features:

- ◆ Id (Primary Key)
- ◆ Username
- ◆ Email
- ◆ Password

→ APIs written in PHP.

id	username	email	password
1	nivya	nivya@gmail.com	202cb962ac59075b964b07152d234b70
18	hello	hello@gmail.com	202cb962ac59075b964b07152d234b70
19	abc	abcd@gmail.com	202cb962ac59075b964b07152d234b70
21	Alice	alice@gmail.com	202cb962ac59075b964b07152d234b70
23	grace	gracehopper@gmail.com	81dc9bdb52d04dc20036dbd8313ed055
38	Akku	akku@gmail.com	202cb962ac59075b964b07152d234b70



27 June 2022

Care's



System Design

The screenshot displays the phpMyAdmin web interface. On the left, a sidebar shows the database structure with 'cares' expanded, listing 'exercises', 'food', and 'users'. The main panel shows the 'Structure' tab for the 'cares' database. It includes a 'Filters' section with a search box. Below is a table listing the database tables:

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> exercises	★ Browse Structure Search Insert Empty Drop	41	InnoDB	utf8mb4_general_ci	16.0 KiB	-
<input type="checkbox"/> food	★ Browse Structure Search Insert Empty Drop	40	InnoDB	utf8mb4_general_ci	48.0 KiB	-
<input type="checkbox"/> users	★ Browse Structure Search Insert Empty Drop	6	InnoDB	utf8mb4_general_ci	16.0 KiB	-
3 tables Sum		87	InnoDB	utf8mb4_general_ci	80.0 KiB	0 B

Below the table, there is a 'Check all' checkbox and a 'With selected:' dropdown menu. At the bottom, there are links for 'Print' and 'Data dictionary'.



System Design

Module 2

2.1 Data Collection of Pregnancy Period

→ Gathered information from various sources like internet sources, health magazines to study about the food and exercise requirement.

Meats**Lean cuts of:*

[beef](#)
ham
lamb
[pork](#)
veal

Game meats:

bison
rabbit
venison

Lean ground meats:

beef
pork
lamb

*[Lean luncheon meats](#)**Organ meats:*

liver
giblets

Poultry*

[chicken](#)
duck
goose
turkey
ground chicken and turkey

Eggs*

chicken eggs
duck eggs

Dry beans and peas:

[black beans](#)
black-eyed peas
chickpeas (garbanzo beans)
falafel
[kidney beans](#)
lentils
lima beans (mature)
navy beans
[pinto beans](#)
soy beans
split peas
tofu (bean curd made from soy beans)
white beans

bean burgers:
garden burgers
veggie burgers

tempeh
texturized vegetable protein (TVP)

Nuts & seeds*

[almonds](#)
[cashews](#)
hazelnuts (filberts)
[mixed nuts](#)
peanuts
peanut butter
pecans
pistachios

Fish**Finfish such as:*

catfish
cod
flounder
haddock
halibut
herring
mackerel
pollock
porgy
[salmon](#)
sea bass
snapper
swordfish
trout
tuna

Shellfish such as:

clams
crab
crayfish
lobster
mussels
octopus
oysters
scallops
squid (calamari)
[shrimp](#)

Canned fish such as:

anchovies
clams



27 June 2022

Care's



System Design

Module 2

→ Database stored with food and exercise information

Week	Items
1	Dairy Products : Milk, curd, and yogurt Whole Gra...
2	Whole Grains : buckwheat, bulgur wheat Fruits : G...
3	Whole Grains : millets, oatmeal Fruits : apple, s...
4	Boiled eggs Fruits : Sweet lime, strawberry Whol...
5	Boiled eggs Green Leafy Vegetables :spinach ,broc...
6	Green Leafy Vegetables : Egg yolk Fruits
7	Green Leafy Vegetables :Cabbage Nuts and seeds : ...

Week	items
1	Pelvic curl Pelvic brace Kneeling push Bicep cu...
2	Pelvic curl Pelvic brace Kneeling push Bicep cu...
3	Pelvic curl Pelvic brace Kneeling push Bicep cu...
4	Pelvic curl Pelvic brace Kneeling push Bicep cu...



System Design

Module 3

3.1 Adding Functionalities

- User Registration
- Food Recommendation
- Exercise Recommendation
- Setting Notification



System Design

Module 4

4.1 Dataset Creation

- Dataset initially had 666 rows and 75 columns .
- Through dataset preprocessing, these 75 columns have been refined to 22.
- Some of those features include :
 - ◆ Parity
 - ◆ Bad obstetric history
 - ◆ Bleed etc.



System Design

Module 4

4.2 Model Developing

→ Analysis with Different algorithms

- ◆ Random Forest
- ◆ Logistic Regression
- ◆ K Nearest Neighbour
- ◆ Support Vector Classifier
- ◆ Decision Tree Classifier
- ◆ Gradient Boosting Classifier

	Model	Accuracy	Precision	Sensitivity	Specificity
0	Random Forest	0.862275	0.868056	0.968992	0.500000
1	logistic	0.772455	0.775758	0.992248	0.026316
2	KNN	0.754491	0.793333	0.922481	0.184211
3	SVC	0.772455	0.772455	1.000000	0.000000
4	CART	0.848679	0.921260	0.906977	0.736842
5	GBM	0.856287	0.862069	0.968992	0.473684



System Design

Module 5

5.1 Training and Testing of Model

- Random Forest Algorithm.
- Accuracy - 86%



System Design

Module 6

6.1 Create API of LBW

→ API created using FLASK.



System Design

Module 7

7.1 Generate Output

- Output displayed at the home page.
- User inputs the features which are stored at the database.
- ML Model predicts whether the fetus is having a LBW or not.



System Workflow

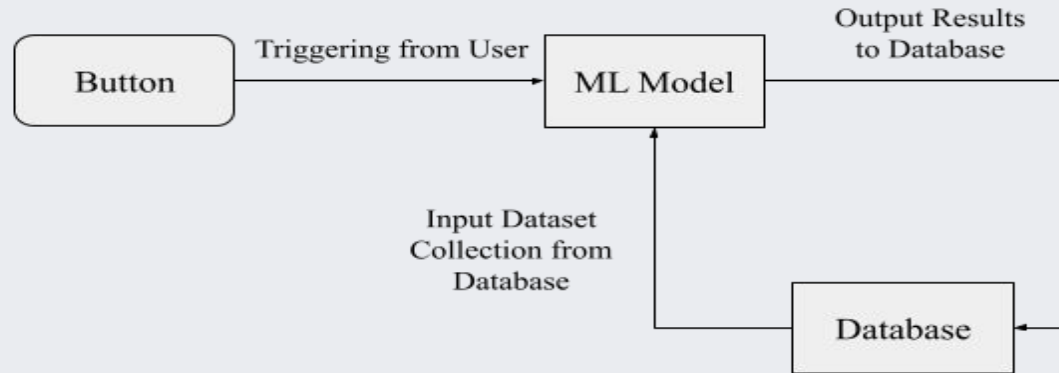
ML Model Workflow

ML Model Working Procedure

- Triggering from User
- Input Collection from Database
- Output Results to Database



ML Model Workflow



System Workflow

Android Workflow

User Accessing Steps

- Condition Statement with Login
 - ◆ Yes - Home
 - ◆ No - Checking Registration
- Condition Statement with Registration
 - ◆ No - Register - Week Activity - Home
 - ◆ Yes - Login - Home



System Workflow

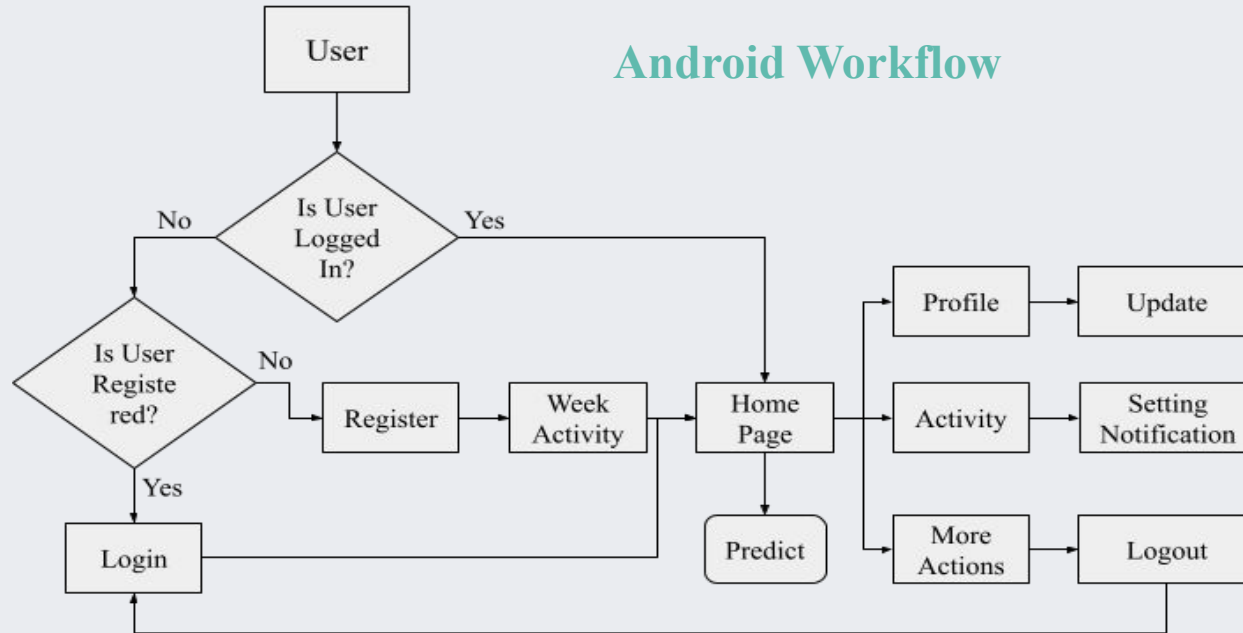
Android Workflow

Main Page with Bottom Navigation Bar

- Home - Predict
- Profile - Update
- Activity - Setting Notification
- More Actions - Logout



Android Workflow



27 June 2022

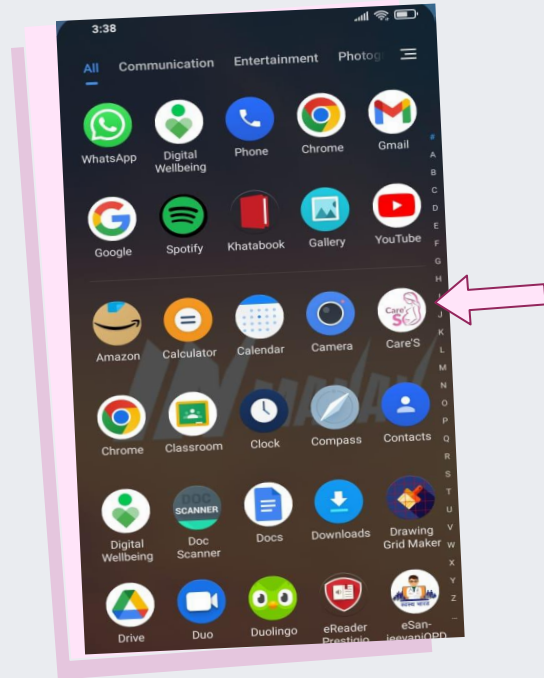
Care'S



UI Design

Device Home Screen

Care'S App Icon with other app Icons



27 June 2022

Care'S

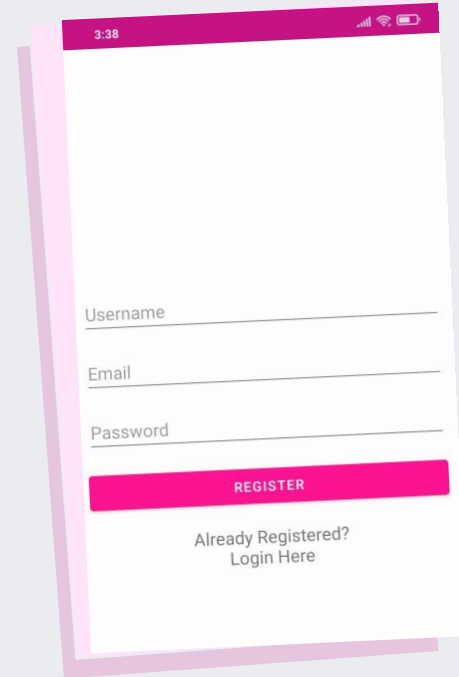


UI Design

Register Page

User Registration Page with Login Page Access

- Username
- Email
- Password



27 June 2022

Care'S

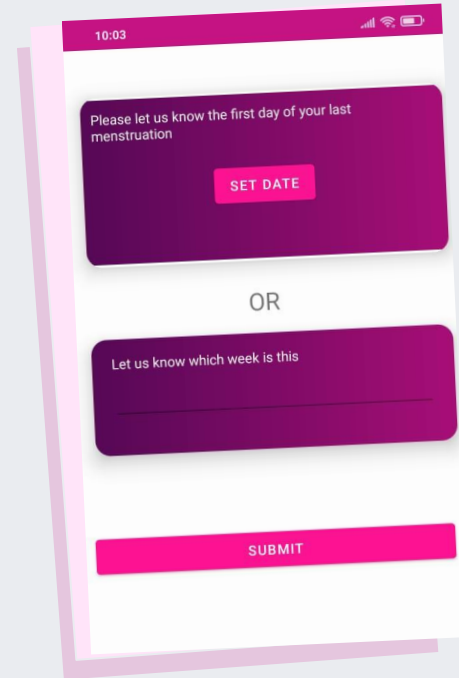


UI Design

Week Activity Page

Week Details Collection after Registration

- Calculation By Date
- Direct Week Input



27 June 2022

Care'S

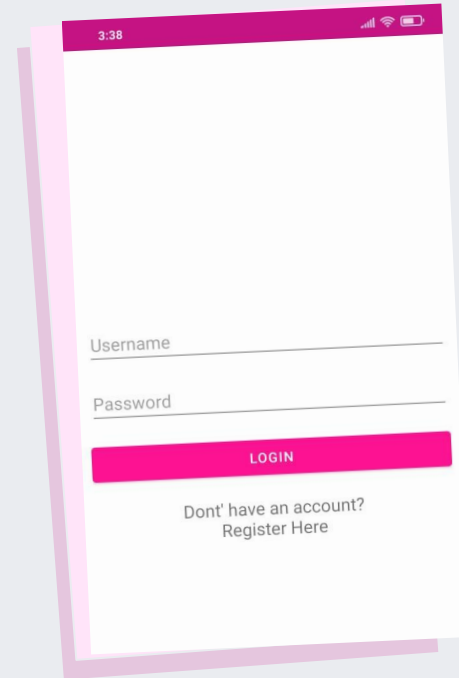


UI Design

Login Page

User Login Page with Registration page Access

- Username
- Password



27 June 2022

Care'S

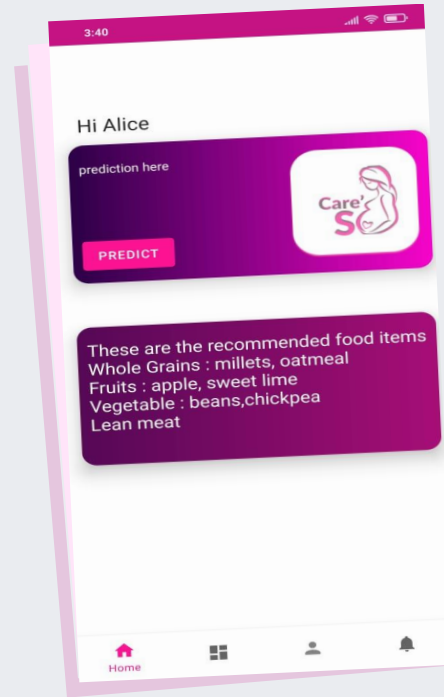


UI Design

Home Page

Home Page with Bottom Navigation Bar

- “Hi <username>”
- Care'S Symbol
- Recommended Food
- Prediction



27 June 2022

Care'S

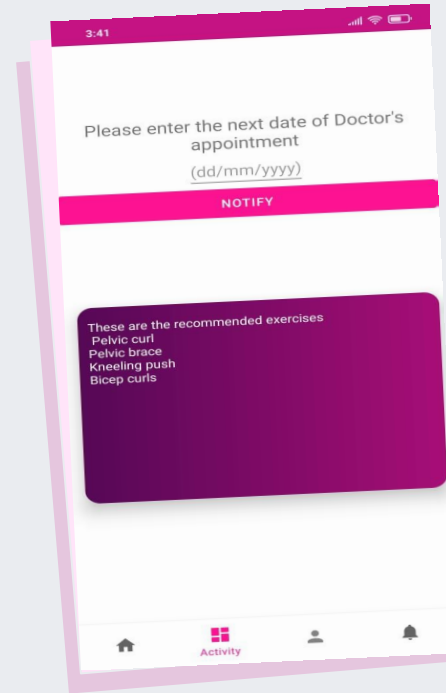


UI Design

Activity Page

Activity Page with Bottom Navigation Bar

- ➔ Setting Notification
- ➔ Recommended Exercises



27 June 2022

Care'S

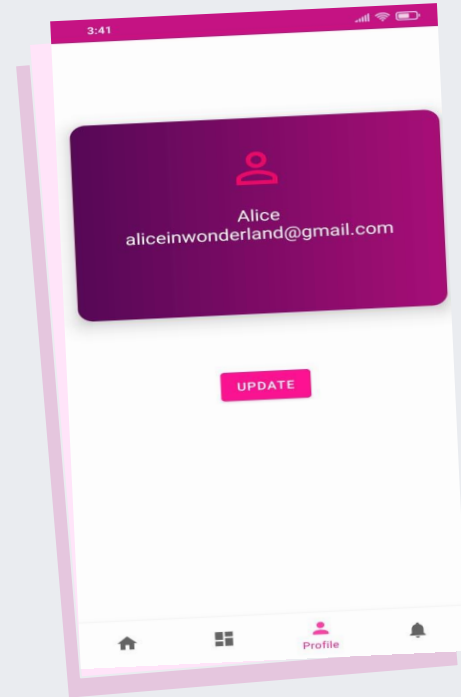


UI Design

Profile Page

Profile Page with Bottom Navigation Bar

- ➔ Username
- ➔ Email
- ➔ User Features Updation



27 June 2022

Care's



UI Design

Feature Updation Page

Inputting 22 Features

→ Scrolling Down Option

3:41

Hello...

Order of Gravida (Enter in numeric form)

Age

Height in meters

Weight in kg

Mid arm circumference in meters

Workload

☐ yes ☐ no

Anemia

☐ yes ☐ no

Asthma

☐ yes ☐ no

Bad obstetric history

☐ yes ☐ no

Injection

☐ yes ☐ no

Diabetic

☐ yes ☐ no

Iron intake

3:41

Second Workload

☐ yes ☐ no

Convulsion

☐ yes ☐ no

Bleed

☐ yes ☐ no

Second Asthma

☐ yes ☐ no

Second Injection

☐ yes ☐ no

Second Iron

☐ yes ☐ no

Second Convulsion

☐ yes ☐ no

Second Bleed

☐ yes ☐ no

Fever

☐ yes ☐ no

SUBMIT

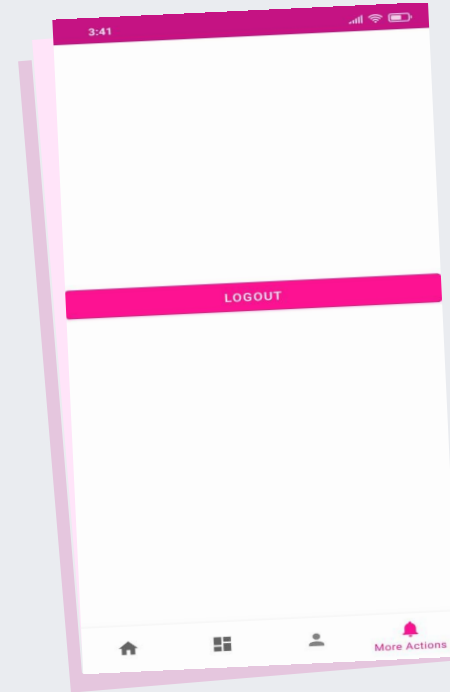


UI Design

More Actions Page

More Actions Page with Bottom Navigation Bar

➔ Logout Option



27 June 2022

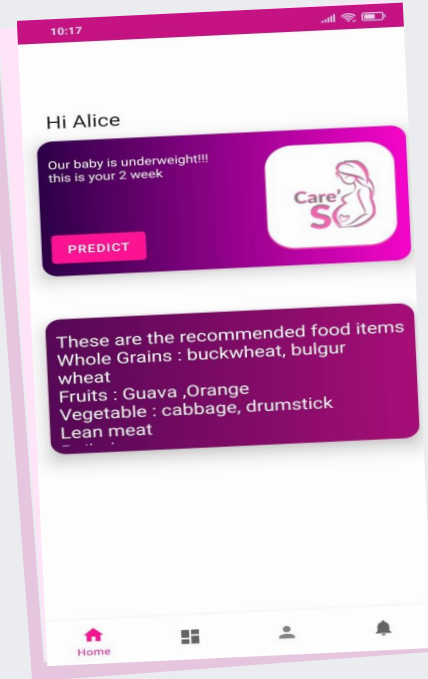
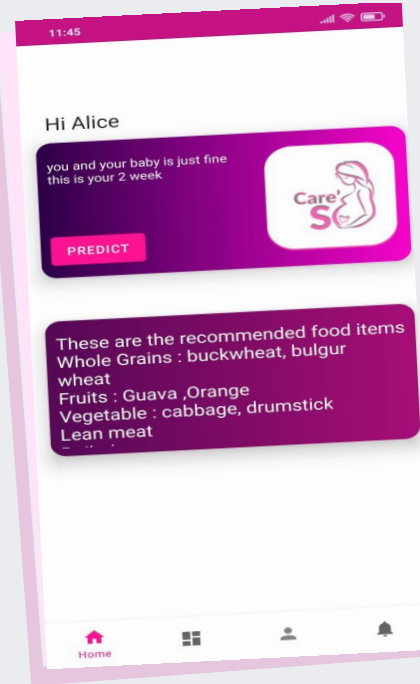
Care'S



Screenshots of Outputs

Prediction is here.. !

Positive and Negative Output



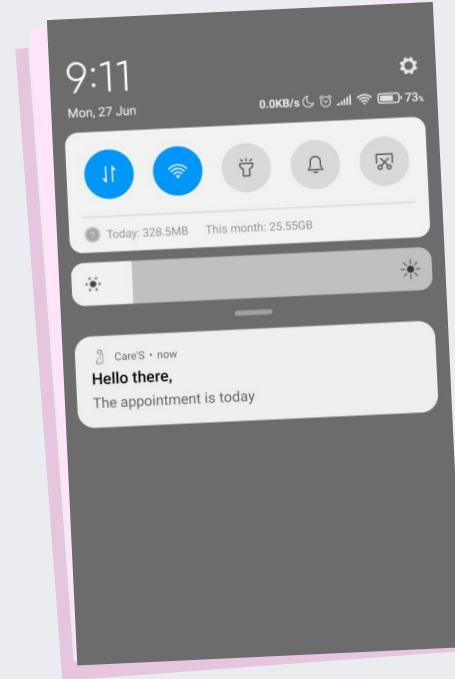
27 June 2022

Care'S



Screenshots of Outputs

Notification is here.. !



Future Scope

Care'S can be extended to:

- Predict very low birth weight and extremely low birth weight of the unborn.
- Provide guidelines for the baby upto the age of two.
- By monitoring health conditions, early disease prediction of the pregnant woman can be done.

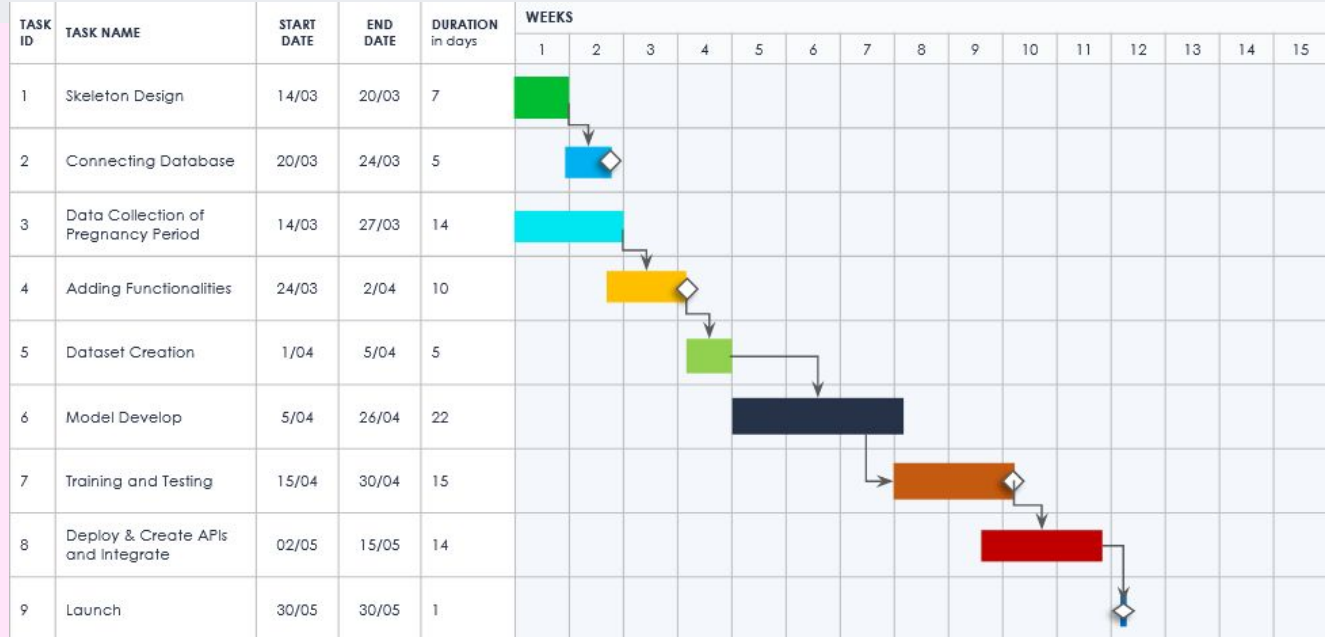


27 June 2022

Care's



Gantt Chart



Conclusion

In a nutshell, Care'S is an android application consisting of :

- A LBW Model which predicts whether the foetus has a low birth weight or not.
- Assists pregnant woman in terms of her
 - ◆ Diet,
 - ◆ Exercise to be followed,
 - ◆ Reminders for her check ups.



References

- “Prediction and Classification of Low Birth Weight Data Using Machine Learning Techniques”
Indonesian Journal of Science & Technology : Alfensi Faruk, Endro Setyo
- Machine Learning mastery with Python - Jason Brownlee
- Niti Aayog Annual Report 2021-22 (Published Date: 22/02/2022)
- “Personal Health Assistant On Android Mobile Device: Sleeping, Nutrition and Exercise”
Kiatateeti, Sangsuree Vasupongayya and Sinchai, Center of Network Research, Prince of Songkla University



- “Random Forest and Decision Trees”, IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 5, No 3, September 2012, Sarhad University of Science and Information Technology, Peshawar.
- “Android Application Development using Android Studio and PHP Framework”, International Journal Of Computer Application: Recent Trends in Future Prospective in Engineering & Management Technology 2016 Akshay Singh, Sakshi Sharma, Shashwat Singh, IMS Engineering College.



27 June 2022

Care'S



THANK YOU...

