



SSIP-2022

# Student Dropout Analysis

Team ID: TM000112

Problem Statement: PID048

# Team Details



**Team ID :** TM000112

**Department/Office/Industry Name :** Education Department

**Problem ID :** PID048

**Problem Statement :** Student dropout analysis for school education

**Team Leader Details :** Dhruvkumar Rakeshbhai Patel, iamdhruv1563@gmail.com, 9328132446

**Faculty Details :** Himani Trivedi, himani\_ce@ldrp.ac.in, 7359817031

Sr. no.	Name	Email	Mobile	Institute/school Name	Semester	Branch	Role
1	Dhruvkumar Rakeshbhai Patel	iamdhruv1563@gmail.com	9328132446	LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH	5th semester	Information Technology	Team Leader
2	Patel Jay Ravindrakumar	jay411978@gmail.com	7359924335	LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH	5th semester	Information Technology	Team Member
3	Malani Prince Hiteshbhai	malaniprince55@gmail.com	7016116319	LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH	5th semester	Information Technology	Team Member
4	Savaj Kovil Hashmukhbhai	kovilsavaj01@gmail.com	9913961701	LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH	5th semester	Information Technology	Team Member
5	Gangwal Kushagra Atulkumar	kushagragangwal@gmail.com	9426819715	LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH	5th semester	Information Technology	Team Member
6	Maurya Aakash Dineshbhai	aakashmaurya.me@gmail.com	9408810735	LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH	5th semester	Information Technology	Team Member

# Abstract

Education is one of the basic needs as well as a human right. But, dropout is one of the most serious problems in INDIA. Therefore, We have come up with a solution to examine the causes of school dropouts.

The solution is using the capabilities of machine learning to help us resolve the problem. It includes independent variables: Age, gender, academic achievement, teaching support, family income, family members, motivation, parent-child relationship, school environment, and neighbors.

While the dependent variable was: (reasons for dropout). The collected data were analyzed by using a descriptive method. (contd.)

# Abstract (contd.)

The result showed that there is a significant relationship between the dropout and student, family, school, and community-related factors.

Based on the findings of the study, more girls dropped out of school. At the same time, lack of parents' education, poverty, home environment, early marriage, and lack of interest in education like so many reasons take a more important place in dropping out problems. Though the school pays more attention, many students are dropping out of school in this rural village. Not only school but also family, and community all try to save the students from this problem with more suitable action and activities.

# Literature review & Innovations

UNESCO's (2012) Global Report on education stated that there was an urgent need to address the high number of children leaving school before completing primary education.

## ***Reasons for School Dropouts:***

A recent survey by the National Statistical Office (NSO)[1] has revealed that around 12.6% of students drop out of school in India, 19.8% discontinued education at the secondary level, and 17.5% drop out at the upper primary level. As per the survey, a dropout is an "ever-enrolled person" who does not complete the last level of education for which he/she has enrolled and is currently not attending any educational institution. The Government's Right to Education Act and National Policy on Education may have been motivating to provide education to all but it is equally important to analyze the sustainability and efficiency of the education system. Dropout rates are considered to be a great waste of the education system, not only do many students leave school without acquiring basic skills, but their premature departure represents a significant waste of scarce education resources.

# Different factors causing dropouts

## (1) Student-Related Factors

- No interest in education
- Getting poor marks in examinations
- They have to help their parents and their families
- Individual problems
- Lack of facilities for education

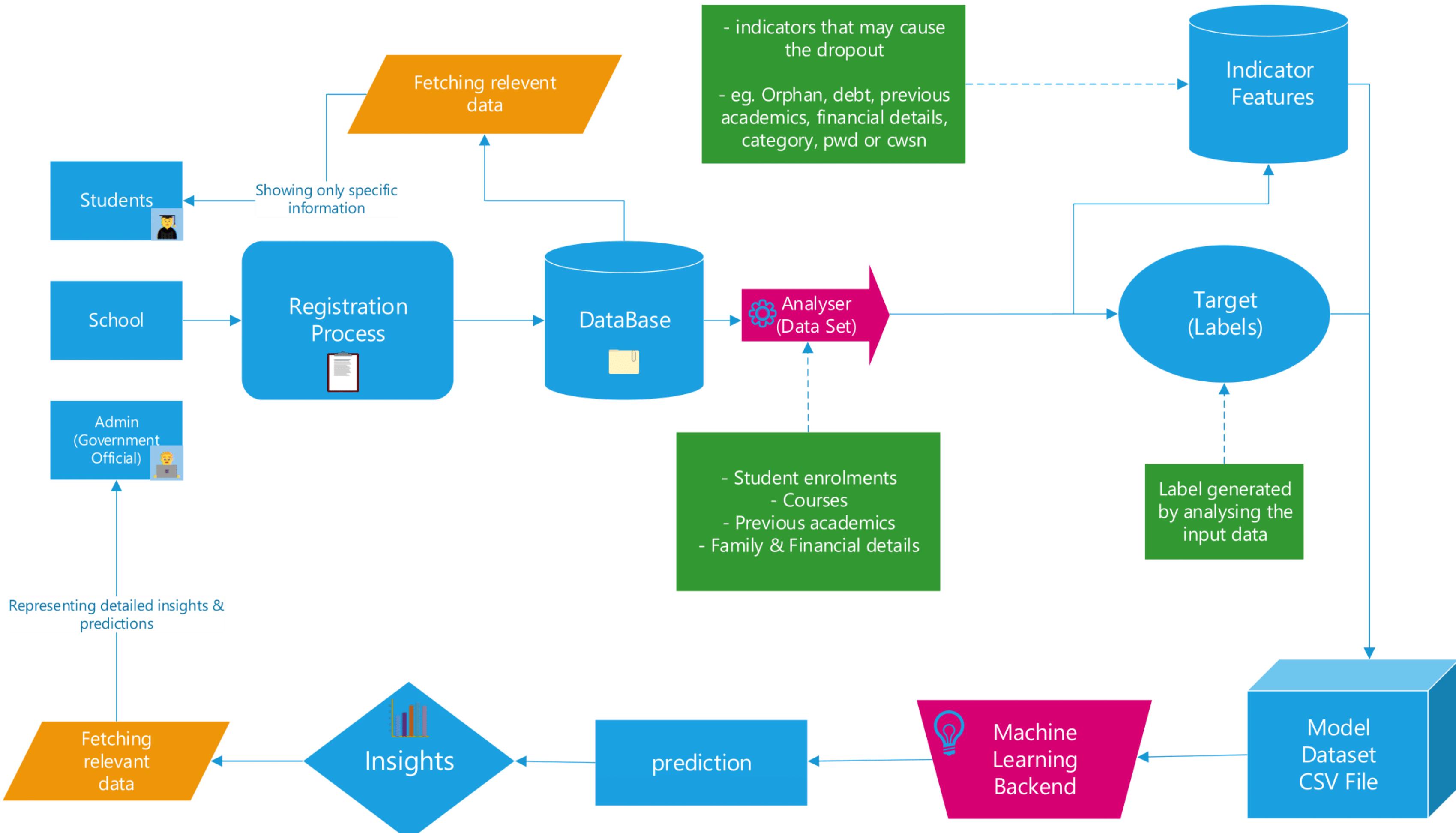
## (2) Family-Related Factors

- Impact of family size and siblings.
- Parents' occupational level
- Poverty
- Environment of home
- Lack of parents' education

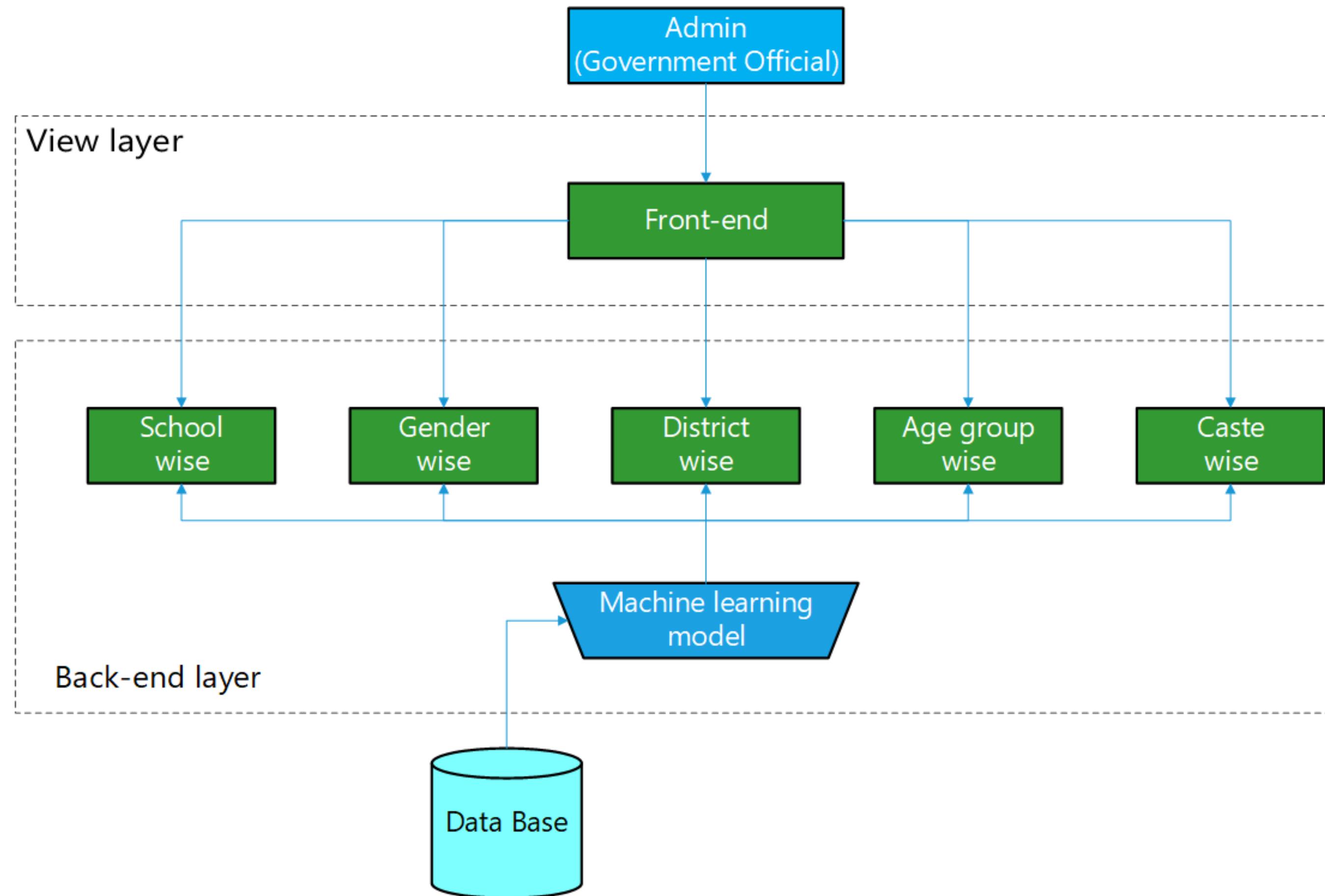
## (3) Infrastructure-Related Factors

- Poor classrooms/facilities
- Lack of faculties
- High education fees
- Less support from govt

# Architecture



# Different layers of Admin dashboard



# STRATEGIC ANALYSIS

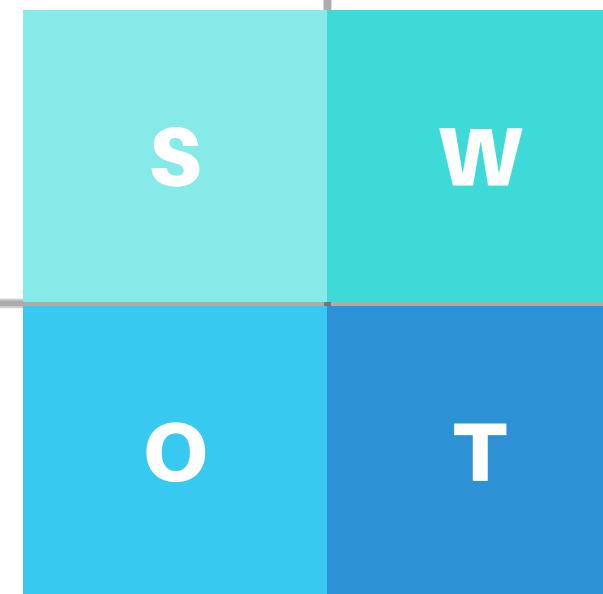
SWOT analysis for the project

## Strengths

- The system can predict the causes of dropout
- Weaken the social inequalities & improvise education
- **To increase the literacy rate** by reducing the dropout rate
- Provide the GUI-based software
- Provide detailed insights into the dropout-students

## Opportunities

- Such detailed insights into the dropout students can cure existing problems
- To educate every student - by reducing dropout rates
- Increase the literacy rates & improvising upon the causes of the dropouts



## Weaknesses

- Wrong information can be shared
- Lack of accurate information
- Dependency upon the stakeholders  
(Entering wrong details may cause wrong insights data)

## Threats

- Any data breach or unauthorized attack

# Tools & Technologies used

- Python
- React, SQL
- Figma, Photoshop
- MS Excel
- Python machine learning libraries - Pandas, Sklearn, Matplotlib

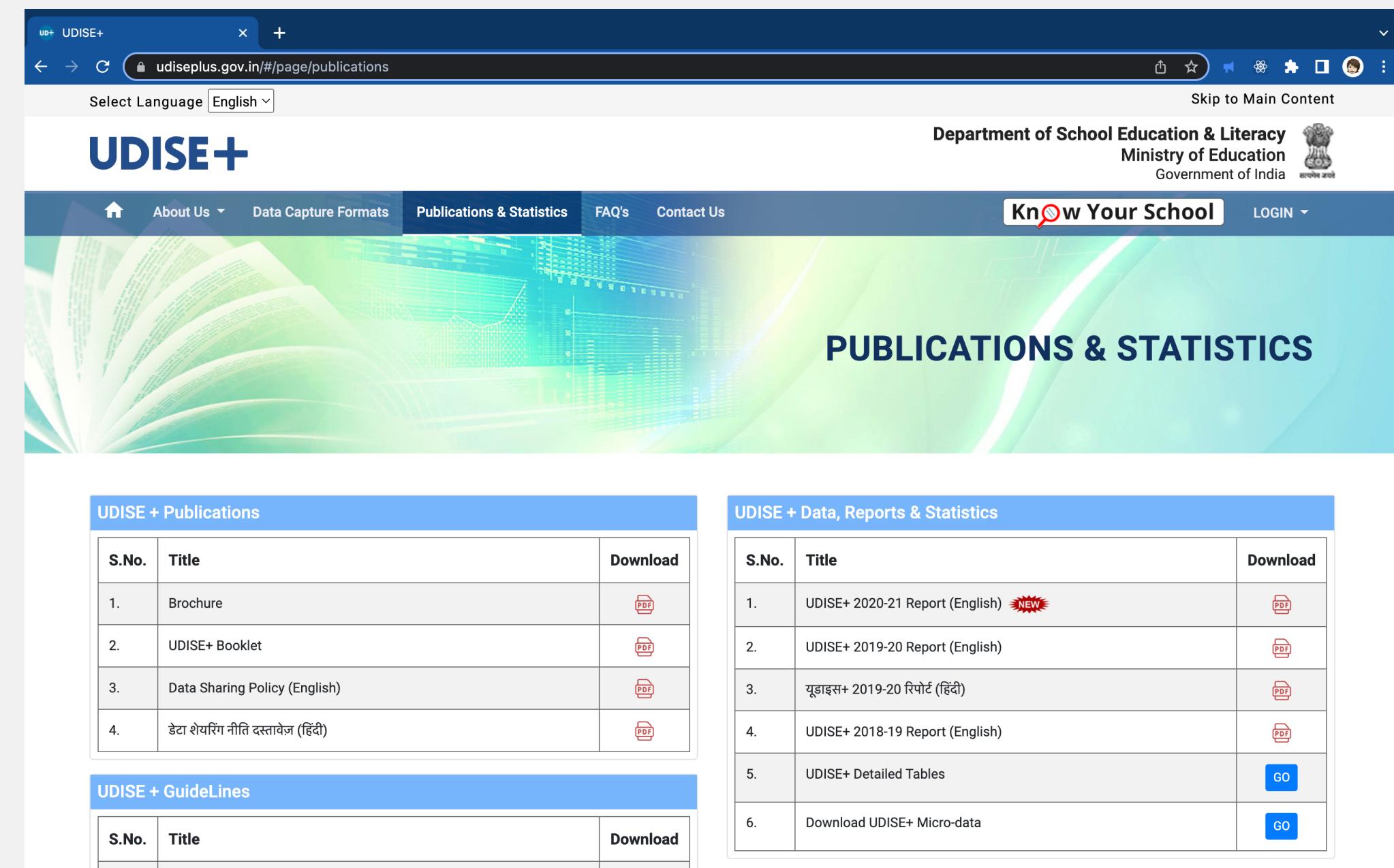
## Machine Learning algorithms implemented:

- Linear regression
- Polynomial regression
- ensemble
- Scilab
- cross-sectional regression

*Pandas, Sklearn, Matplotlib. Pandas library is used for reading the CSV files, and data pulled from the database. Numpy library is used for working with arrays efficiently in python. Sklearn library contains the machine learning models and Matplotlib is used for data visualization. Standard machine learning algorithms used - linear regression, polynomial regression, ensemble, and cross-sectional regression. The front-end/view layer is created using the react javascript, and a standard SQL database is utilized for storing and retrieving the data.*

# Loopholes in existing system

- No prior focus on the tracking of dropout rates.
- There isn't any dedicated solution that can provide detailed insight into dropouts of students.
- Lack of a centralized database to process and analyze the information/insights.
- To analyze the reason for the dropout, no previously innovative methods or machine learning modules exist.



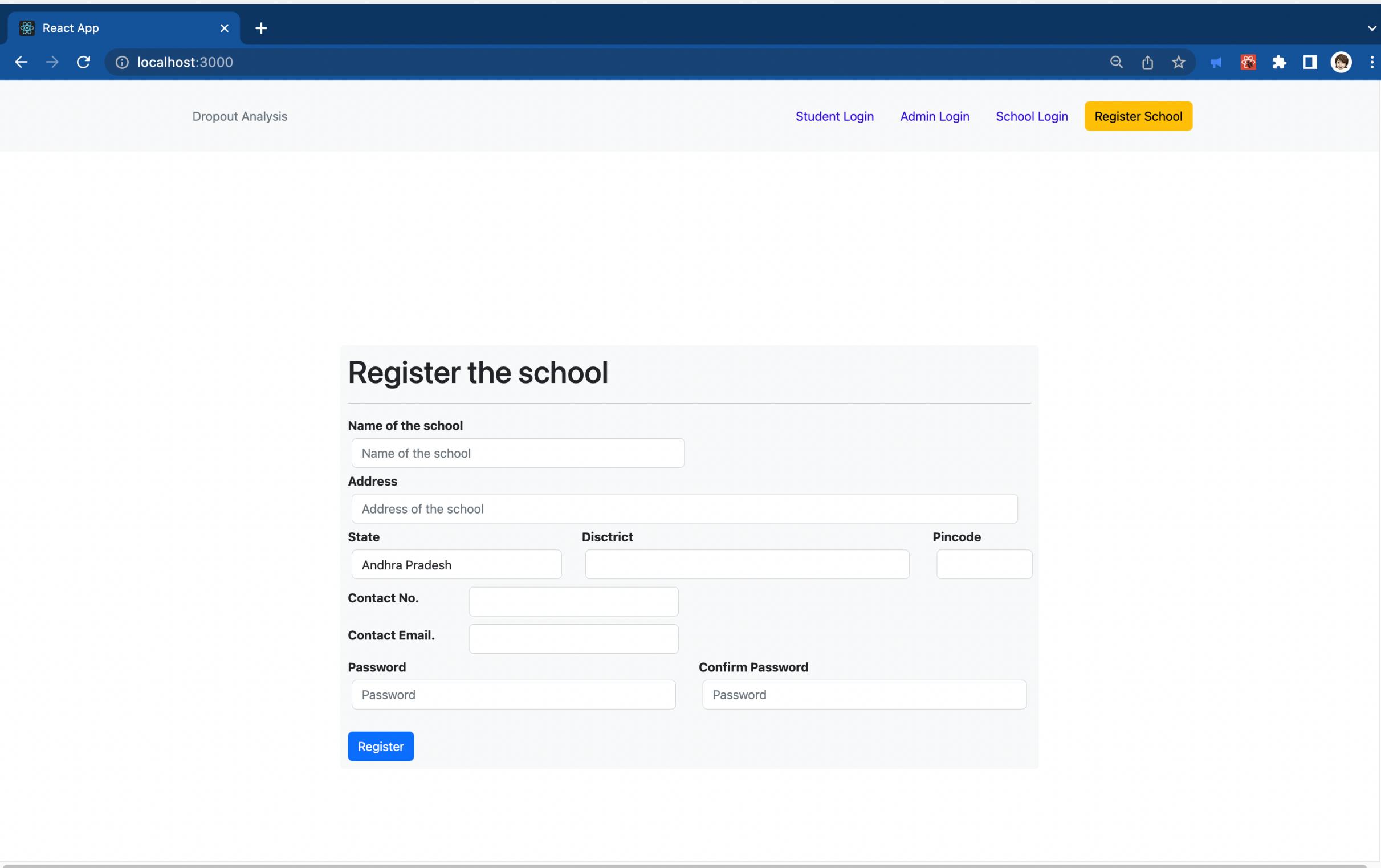
The screenshot shows the 'Publications & Statistics' section of the UDISE+ website. The top navigation bar includes links for Home, About Us, Data Capture Formats, Publications & Statistics (which is the active tab), FAQ's, and Contact Us. A sub-navigation menu for 'Publications & Statistics' has options for UDISE+ Publications, UDISE+ Data, Reports & Statistics, and UDISE+ GuideLines. The main content area features a large banner with the text 'PUBLICATIONS & STATISTICS'. Below the banner are three tables: 'UDISE + Publications', 'UDISE + Data, Reports & Statistics', and 'UDISE + GuideLines'. Each table lists documents with their titles, download links, and PDF icons.

S.No.	Title	Download
1.	Brochure	<a href="#">PDF</a>
2.	UDISE+ Booklet	<a href="#">PDF</a>
3.	Data Sharing Policy (English)	<a href="#">PDF</a>
4.	डेटा शेयरिंग नीति दस्तावेज़ (हिंदी)	<a href="#">PDF</a>

S.No.	Title	Download
1.	UDISE+ 2020-21 Report (English) <small>NEW</small>	<a href="#">PDF</a>
2.	UDISE+ 2019-20 Report (English)	<a href="#">PDF</a>
3.	यूडाइस+ 2019-20 रिपोर्ट (हिंदी)	<a href="#">PDF</a>
4.	UDISE+ 2018-19 Report (English)	<a href="#">PDF</a>
5.	UDISE+ Detailed Tables	<a href="#">GO</a>
6.	Download UDISE+ Micro-data	<a href="#">GO</a>

# Graphical User Interface

## 1- Register page



The screenshot shows a web browser window titled "React App" with the URL "localhost:3000". The page content is titled "Dropout Analysis" and includes navigation links for "Student Login", "Admin Login", "School Login", and a yellow-bordered "Register School" button. Below this, a large form titled "Register the school" contains fields for "Name of the school", "Address", "State" (set to "Andhra Pradesh"), "District", "Pincode", "Contact No.", "Contact Email.", "Password", and "Confirm Password". A blue "Register" button is at the bottom of the form.

Dropout Analysis

Student Login Admin Login School Login Register School

Register the school

Name of the school

Address of the school

State  
Andhra Pradesh

Disctrict

Pincode

Contact No.

Contact Email.

Password

Confirm Password

Register

## 2. School login- Admin login

The image displays two separate login forms side-by-side. The left form is titled "Sign in as an Admin" and the right form is titled "Sign in as a school". Both forms feature a "User Code" input field, a "Password" input field, and a large blue "Sign in" button at the bottom.

**Sign in as an Admin**

User Code

Password

**Sign in**

**Sign in as a school**

School Code

Password

**Sign in**

# Input forms

## 1. Student details

[Student Details](#) | [Family Details](#) | [Financial Details](#) | [Caste Details](#) | [Academic Details](#)

### Student Details

---

First name  Father's name  Last name

Date Of Birth:

Age:

Gender:  Male  Female      Orphan:  yes  no

Aadhar No.

Contact No.

Contact Mail Id.

Mother Tongue

Contact No.

CWSN:  yes  no

Nationality

No. Of Siblings:  1  2  3

Drug addiction:  yes  no

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## 2. Parent Details, Financial Details, Caste & Category Details

### Parent Details

Father's name      Mother's name      Guardian's name

Contact No. \_\_\_\_\_

Aadhar No. \_\_\_\_\_

Father's Occupation:  1 - working  0 - non-working  
Mother's Occupation:  1 - working  0 - non-working

Father's Occupation:  0 - primary  
Mother's Occupation:  0 - primary

---

### Financial Details

Family Annual Income:  0 - (0 to 2,50,000)  1 - (2,50,001 to 5,00,000)  2 - (5,00,001 to 10,00,000)  3 - (10,00,001 to 20,00,000)  4 - (20,00,001 to 50,00,000)  5 - (50,00,001 to 1,00,00,000)  6 - (More than 1,00,00,000)

Debt:  1 - yes  0 - no

BPL beneficiary:  1 - yes  0 - no

---

### Caste & Category Details

Social Category:  0 - SC  1 - ST  2 - ST (Other)  3 - OBC  4 - OBC (Other)  5 - General  6 - General (Other)  7 - Minority  8 - Non-Minority

Minority:  1 - yes  0 - no

### 3. Academic details

## Academic Details

**Admission Number**

**Admission Date**

**Academic Stream:**

**Status in previous year:**

**Grade in previous year:**

**Result in previous year type:**

**Out of the school child:**  1 - yes  0 - no

**Appeared in previous year examination:**  1 - yes  0 - no

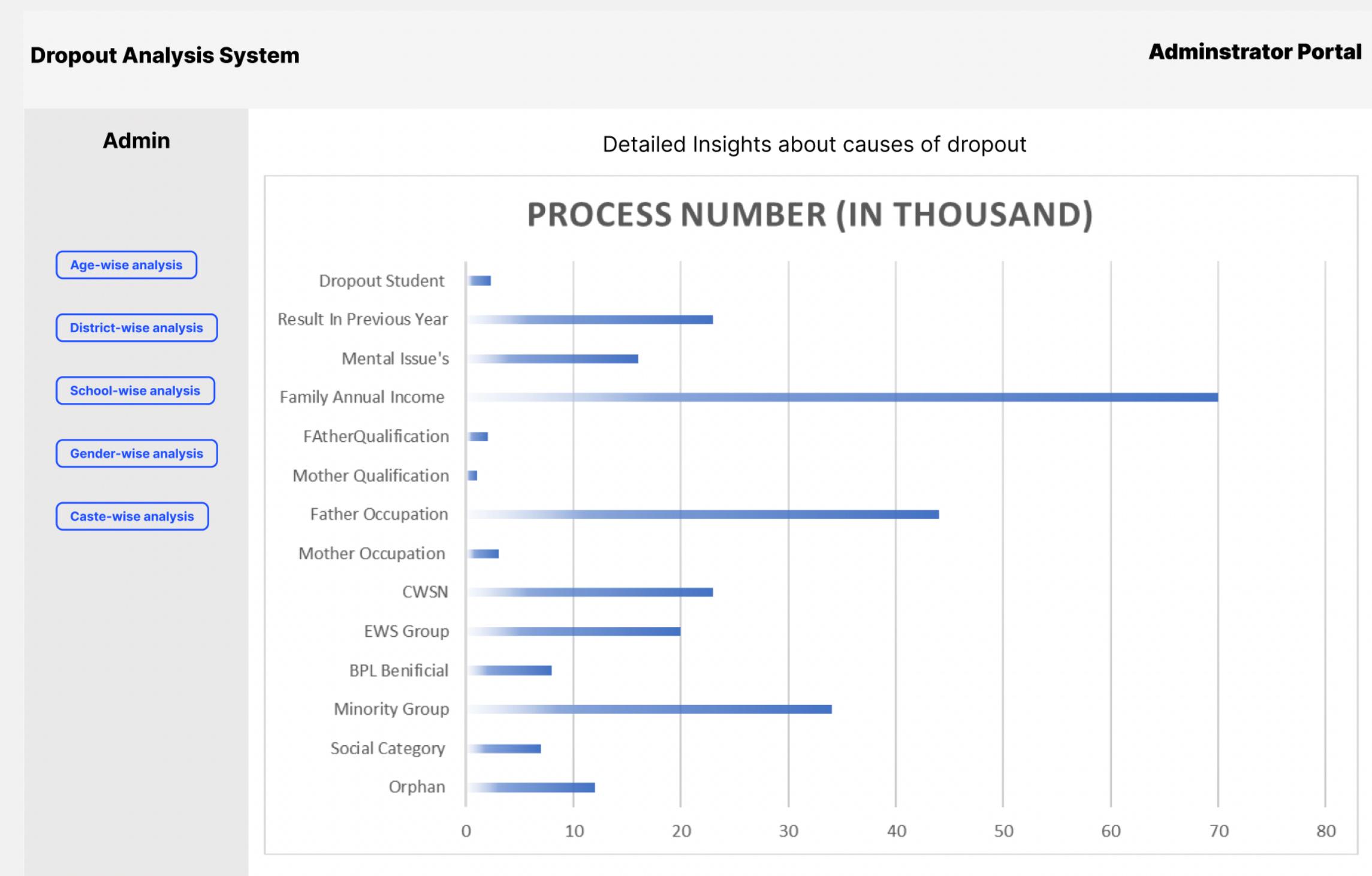
**Scholarship Holder:**  1 - yes  0 - no

**Suspension days:**

**Student is dropped or continued?:**  1 - yes  0 - no

# Graphical User Interface for Admin

*contains detailed insight of the data*



Detailed causes of dropout

## Dropout Analysis System

## Administrator Portal

**Admin**

Age-wise analysis

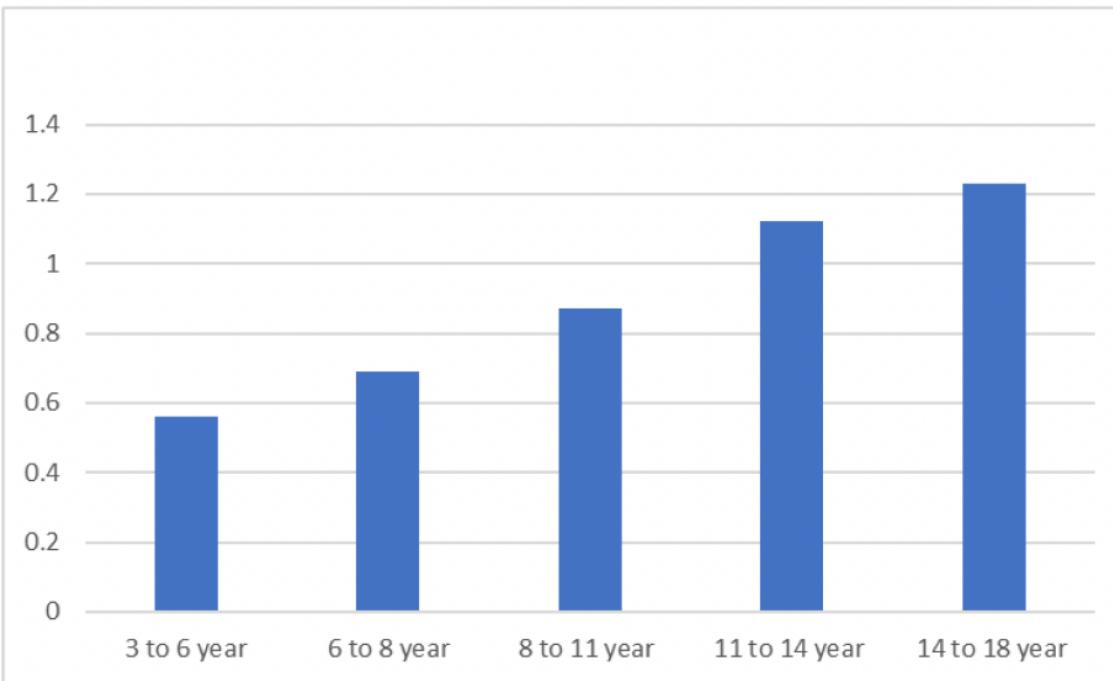
District-wise analysis

School-wise analysis

Gender-wise analysis

Caste-wise analysis

Age group/ standard wise analysis



Age group	Dropout rate
3 to 6 year	0.56
6 to 8 year	0.69
8 to 11 year	0.87
11 to 14 year	1.12
14 to 18 year	1.23

Age wise analysis

## Dropout Analysis System

## Administrator Portal

**Admin**

[Age-wise analysis](#)

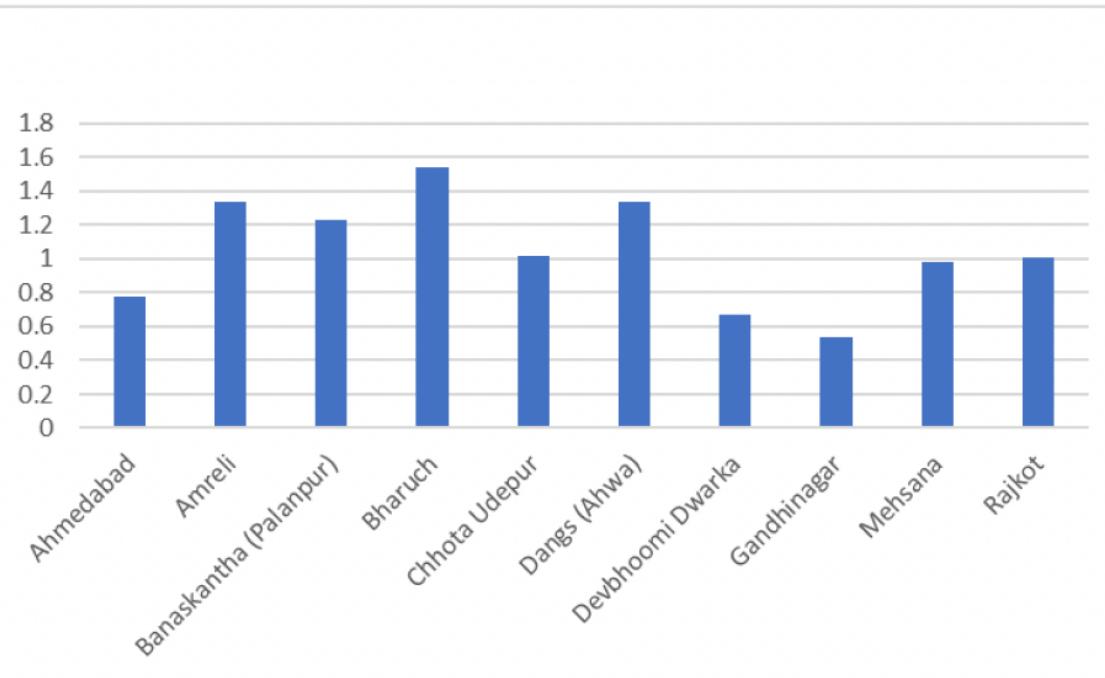
[District-wise analysis](#)

[School-wise analysis](#)

[Gender-wise analysis](#)

[Caste-wise analysis](#)

Age group/ standard wise analysis



Disctrict wise dropout rates

Disctrict group	Dropout rate
Ahmedabad	0.56
Amreli	0.69
Banaskantha	0.87
Bharuch	1.12
Chhota Udepur	1.23

[District wise analysis](#)

## Dropout Analysis System

## Administrator Portal

### Admin

Age-wise analysis

District-wise analysis

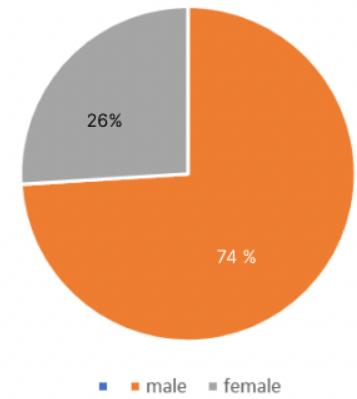
School-wise analysis

Gender-wise analysis

Caste-wise analysis

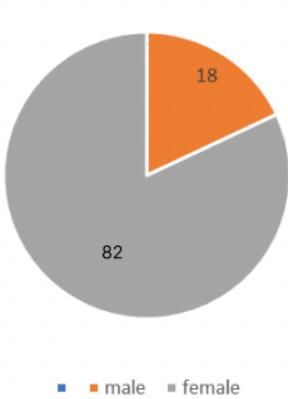
### Gender-wise analysis

Dropout Rate



Dropout rates

gender ratio



Dropout Ratio (Gender-wise)

Dropout rates

Gender	Dropout Rate
Male	74%
Female	26%

Dropout ratio

Gender	Ratio
Male	18%
Female	82%

## Gender wise analysis

## Dropout Analysis System

## Administrator Portal

### Admin

Age-wise analysis

District-wise analysis

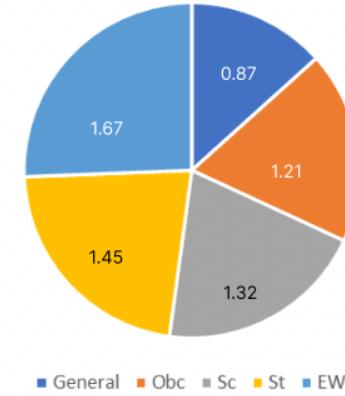
School-wise analysis

Gender-wise analysis

Caste-wise analysis

### Caste-wise analysis

Dropout Rate

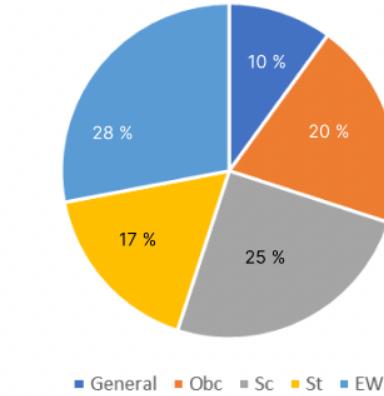


Dropout rates

Dropout rates

Caste	Rate (%)
SC	1.32
ST	1.45
GENERAL	0.87
EWS	1.67
OBC	1.21

Dropout Rate



Dropout Ratio (Caste-wise)

Dropout ratio

Caste	Ratio (%)
SC	25
ST	17
GENERAL	10
EWS	28
OBC	20

## Caste wise analysis

# Approach in solving the problem

The significant approach to solving the existing problem of not having enough data analytics and insights data of student dropouts is as follows. The approach is to train the machine learning models and gather the data based upon the different details of students & features or main causes of student dropouts. Machine learning models are trained on the pre-existing data, and analyzed using different perspectives. Prediction models are created for each new data entry and tested upon data frames. Along with predictions, detailed insight analytics are generated using different data-analytics tools & technologies.

# Possible outcomes

Having detailed analysis and insight data on the student dropout system will help the education system a lot from many different perspectives. By analyzing the data according to different aspects - official bodies can improvise upon specific areas and increase literacy rates significantly.

The different causes of student dropouts can be analyzed and published using an analytics/machine learning model. Afterward, the official bodies can provide possible solutions to resolve the causes of dropouts.

# Challenges & Risk in implementation

Prior challenges in implementing the final prototype are as follows. High dependency upon the stakeholders (who enter the details of students) - This may cause wrong/falsified data insight generation if the entered details are wrong or falsified.

Risk in the final implementation is any unauthorized (access to the database) or data breach done by an unauthorized identity or attacker. This risk can be minimized significantly by implementing the secured approach.