Optical response sheet analysis for different objective examination

Introduction

Many competitive examinations are of objective type. Manual answer sheet checking for this examination take much time and it is also cumbersome. Due to this, to declare results long time is required. This project is solution for this problem.

In this project scanner is built using web cam. The scanner will take the image of optical response sheet. Applying algorithm of image processing the correct and wrong answers will be found out. According to answer marks can be added or subtracted from the score. Total result is calculated and displayed.
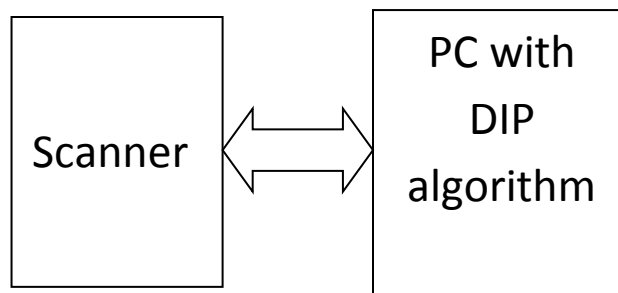
Block Diagram:

Fig 1.   Block Diagram

In this project scanner is used to take image of optical response sheet. Program to scan sheet and to find out result is developed by the concepts of digital image processing. MATLAB with digital image processing toolbox will used for it.

In this project GUI will be developed, so that user can easily operate this system. Answers are previously fed to the system. According to this answer the sheet will be checked. The user with log in id and password can use this system.

System working:

The working of the system is explain with the help of flow chart

fig2. Flow chart

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
                    ┌──────▼──────────┐
                    │ Initialize web  │
                    │ cab for Scanner │
                    └──────┬──────────┘
                           │
                    ┌──────▼──────────┐
                    │ Take Image of   │
                    │ Optical         │
                    │ Response sheet  │
                    └──────┬──────────┘
                           │
              ┌────────────▼──────────────┐
              │ Check the image pixel by  │
              │ pixel to find out answer  │
              │ bubbled                   │
              └────────────┬──────────────┘
                           │
              ┌────────────▼──────────────┐
              │ Compare the bubble        │
              │ position for already      │
              │ faded data in the system  │
              └────────────┬──────────────┘
                           │
                    ┌──────▼──────┐
  ┌──────────────┐  │   Dose it   │  ┌──────────────────────┐
  │ Increment    │◄─┤   match?    ├─►│ Reduce the score by  │
  │ the score by │  └──────┬──────┘  │ predefined           │
  │ allotted     │         │         │ percentage of marks  │
  │ marks        │         │         └──────────────────────┘
  └──────────────┘         │
                    ┌──────▼──────────┐
                    │ Check for       │
                    │ number of       │
                    │ question scanned│
                    └──────┬──────────┘
                           │
                    ┌──────▼──────┐
                    │    Dose     │   ┌──────────────────────┐
                    │  complete   ├──►│ Calculate score and  │
                    │   image?    │   │ display it.          │
                    └──────┬──────┘   └──────────┬───────────┘
                           │                     │
                    ┌──────▼──────┐              │
                    │    Stop     │◄─────────────┘
                    └─────────────┘
```
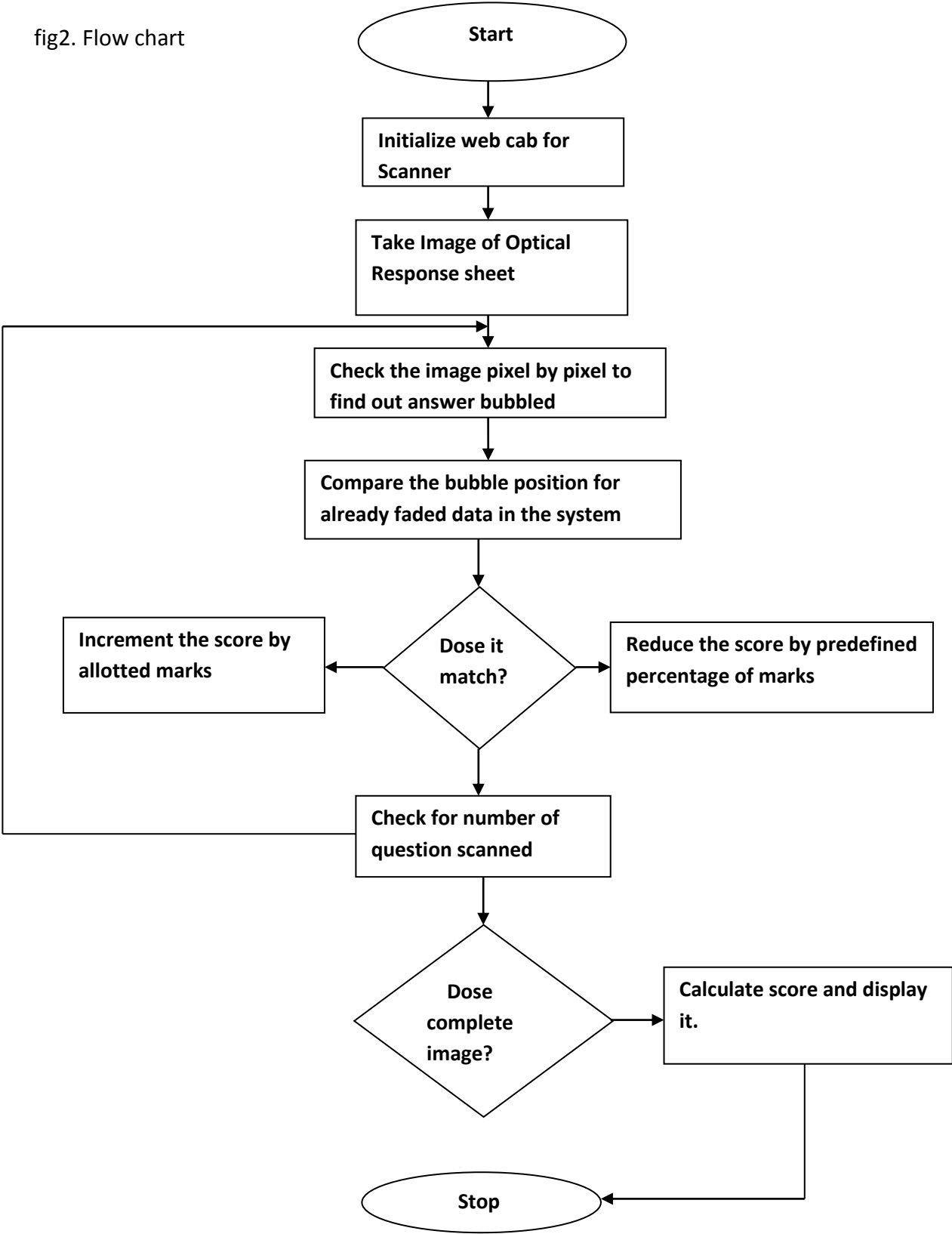
Figure shows flow chart of the system. in the system initially answer of all the questions will be faded. This answer will help in comparison phase. If comparison matches then answer is correct or wrong. For the correct answer the score will be incremented by pre decided score or reduce by pre decided score.

Image processing is used for finding the answer. The image of optical response sheet is taken by scanner developed by web cam. This image is processed by image processing algorithm developed in matlab by using image processing toolbox. Bubble position is find out and compare it with the already faded data. Depending on comparison correct or wrong answer is find out and score will be modified.

Advantage:

1. Much faster than today's manual system.
2. 100% Accuracy
3. Soft copy of answer sheet is generated.
4. Required less human effort.
5. User friendly.

Disadvantage:

1. Initial development cost required.
2. To prepare database expert opinion required.