**Solution Diagram**

**Solution Description**

The Facial Recognition System is a software solution that aims to create a stronger safeguarding system for children when being picked up from school. The system makes use of facial recognition technology to identify parents, grandparents, legal guardians etc., and pupils in the classroom to ensure that they are picked up by who they should be.

The system includes a camera that captures the parents’ face, image processing software that performs facial recognition, a database with labelled images of parents and their corresponding parent IDs, and a user-friendly interface that allows end-users to interact with the system and receive results, this include them being inform wether the verification was successful or not.

The way in which the system works is that the camera takes and sends an image of the parent’s face to the programme. The software then compares the image to the annotated photographs in the database to perform facial recognition. If there is a match, the software pulls the parent’s individual ID and name from the database and updates the a record, indicating that the child has been picked up by this person. The end-user is then shown the outcome via the user-friendly interface. If no match is detected, an error message stating "Student profile not found in database" is presented.

The solution outperforms the current system of having teachers recognise parents in various ways. For starters, it eliminates the chance of teacher error and adds an extra layer of protection because a record is kept of who picks up which child, for example this will be especially helpful is a child friends’ parent picks them up from school for a certain reason and if anything were to happen the system would contain a record of the parent who picked up that child in question. Secondly, the system provides an opportunity for other approve people to pick up a child from school, such as grandparents, siblings, trust family friends etc., as the parent responsible for the account can upload photos of the individual and this will then be able to be verified once they come to collect the child.

**Data Description**

In order to function properly, the Facial Recognition System requires numerous sorts of data. These are some examples:

* **Facial Images**: These are photographs of parents, grandparents, siblings, etc., faces used for facial recognition. These images will be labeled the with the correct ID and name.
* **ID number and name:** This information is saved in the database and linked to the matching photograph. It is used to add a new entry into the record and to display the result to the end user.
* **Record of collection:** This data is saved in the database and comprises information about which child has been picked up by which individual. The software updates the attendance record anytime a live image is verified.
* **User input:** This data, which comprises of a live image, is provided by the end-user via the user interface. The software uses this live image to do facial recognition.
* **Output:** This data is generated by the software and consists of the facial recognition process's results. The outcome could be a successful match with a parent profile in the database or an error message indicating that the parent profile could not be found in the database. The user-friendly interface displays this output data to the end-user.

**Solution Motivation**

Many schools currently do not utilise a system like ours, which can potentially present various problems, including the off chance of teacher error. To address these challenges, we intend to develop a facial recognition software solution that would serve as an extra level of safeguarding. To train and test our system, we intend to build our own database of tagged photos for supervised learning. Furthermore, we intend to develop a user-friendly interface that will enable end-users to easily test the system by submitting photographs and obtaining results based on the model's label match to the parent’s ID and name.