Gesture recognition / RPS game functional specification

1.Purpose

The purpose of the current application is to automatize gesture recognition on the example of a rock-paper-scissors game.

2. Project description

This is a desktop application game rock-paper-scissors. Users can play against the computer or against another person. Application will detect gesture shown by the user and classify it as rock, paper, scissors or none. Then, taking into account computer choise or other person's choice, the winner will be determined.

3. Project specifications

3.1 Gesture recognition specifications

3.1.1 Gesture recognition

To recognize gestures convolutional neural network will be used. Network takes as input image with gesture and gives as output number of detected class.

3.1.2 Gestures list

In current game the following gestures will be recognized:

- rock
- paper
- scissors
- none

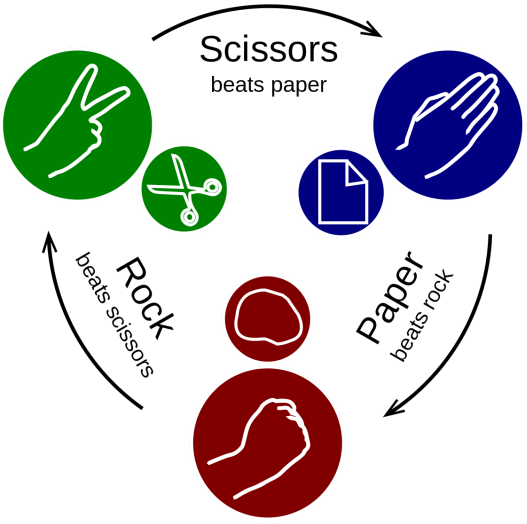
None gesture is any other gesture, that is not detected as rock paper or scissors.

3.1.3 Tools for neural network training and usage

The neural network will be trained using Tensorflow library. The trained network will be used to classify gestures as it was described in 3.1.2 paragraph. Tensorflow will be also used for running a trained network for gestures classification.

3.2 Game rules specifications

The following rules will be applied to determine the winner:



In case both players choose the same sign the result of game is a tie.

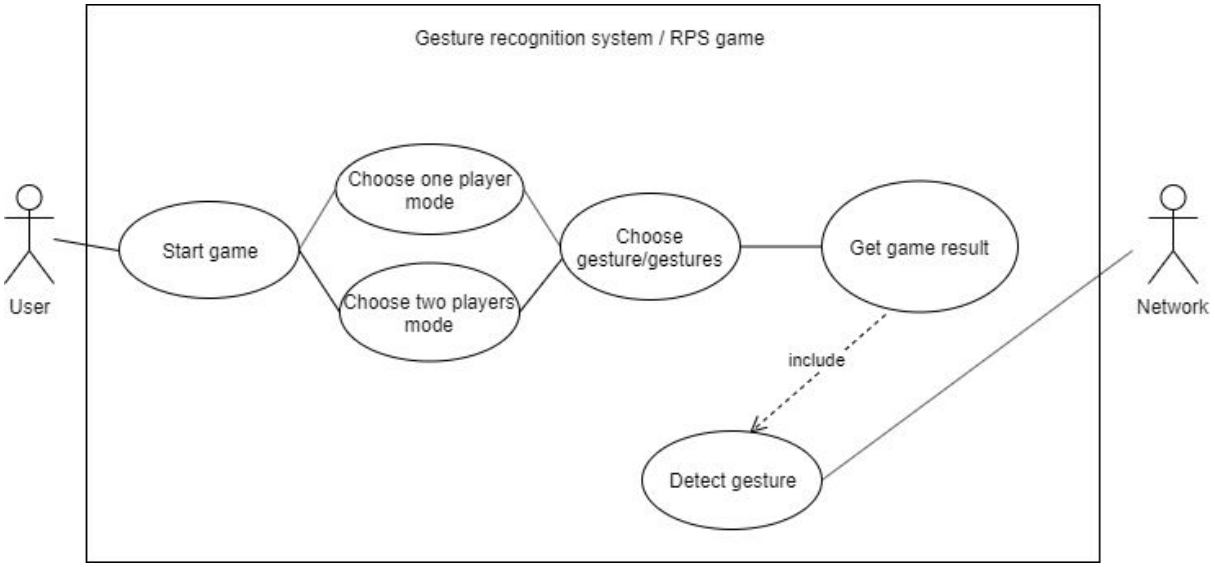
3.3 User interaction specifications

User can start game and choose one of the following modes:

- One player mode - user chooses gesture and another gesture is chosen randomly by computer
- Two players mode - two gestures that are chosen by two people are detected from camera

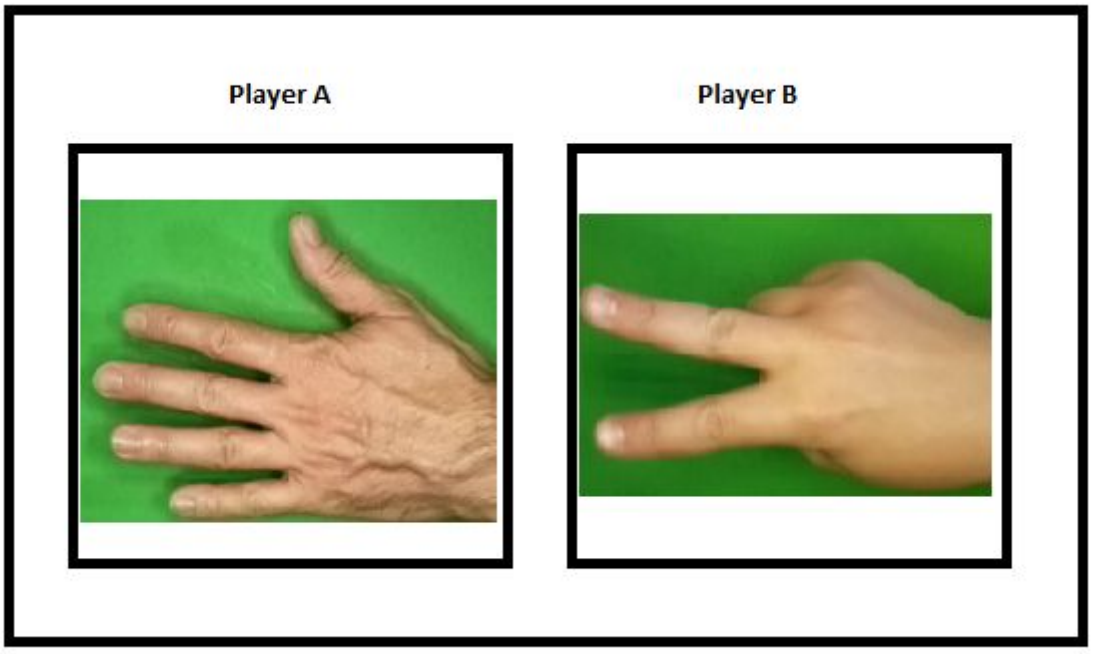
After that gesture/gestures are classified and the winner is determined
User interaction is shown in this use case diagram

Use case diagram

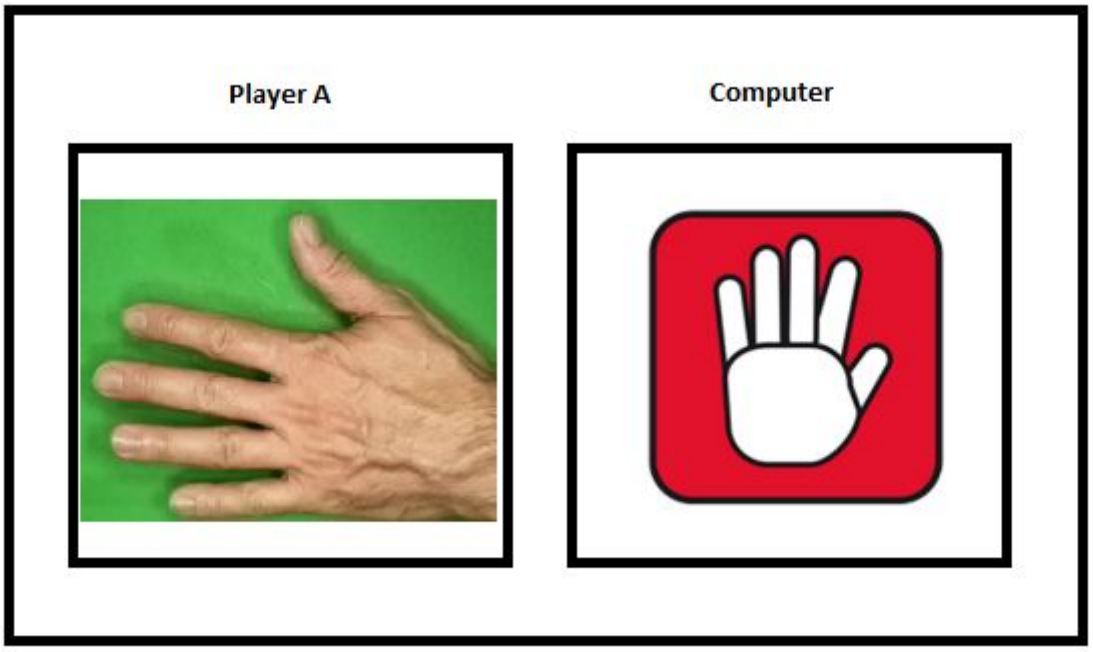


3.4 GUI specifications

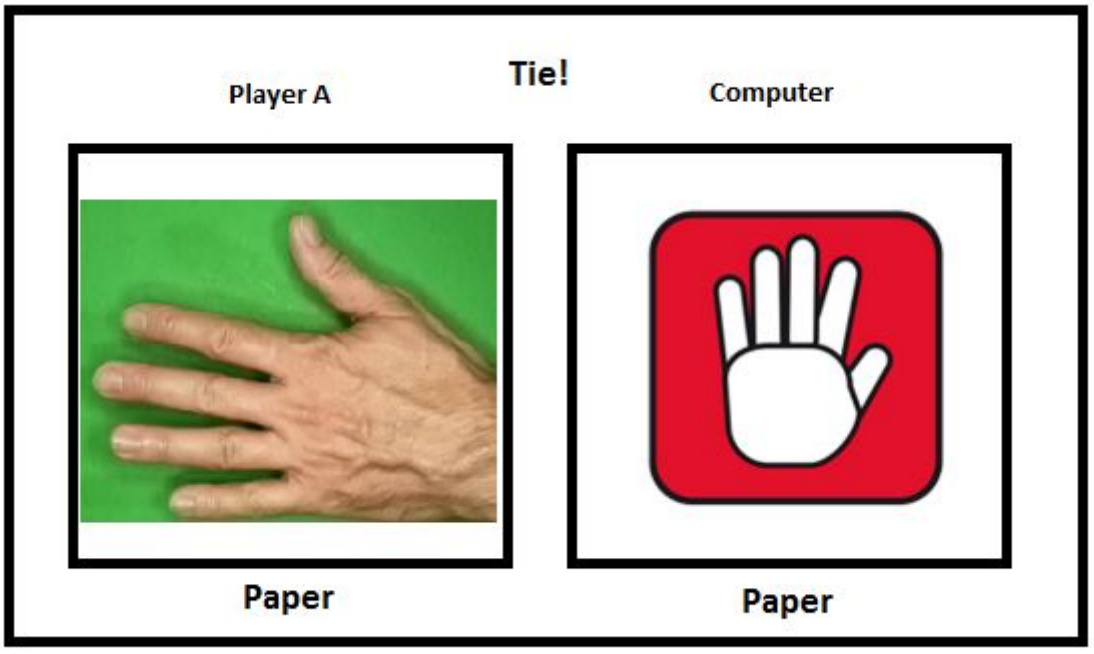
Model of GUI interface, when the two-player mode was chosen:



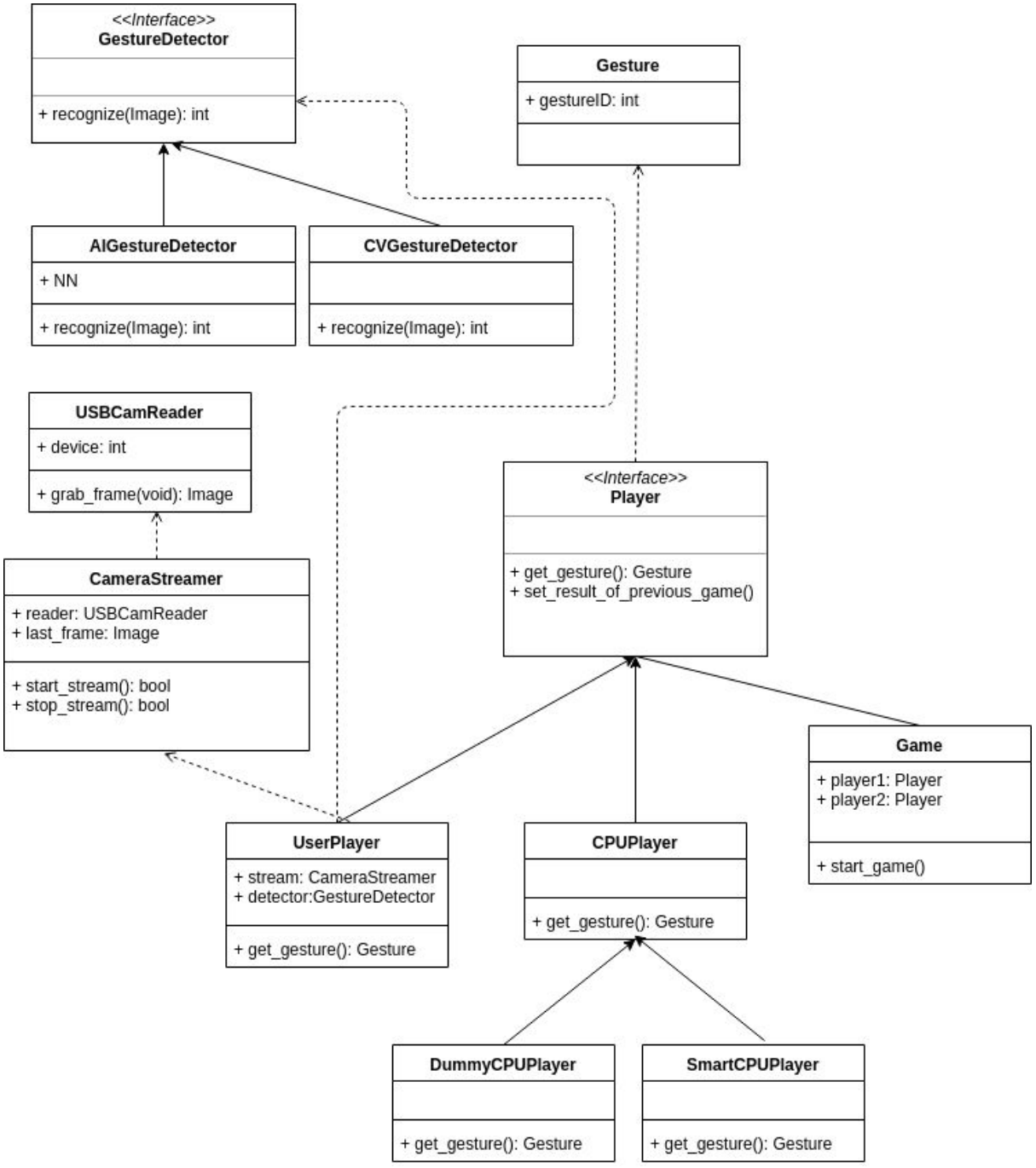
Model of gui interface, when one player mode was chosen:



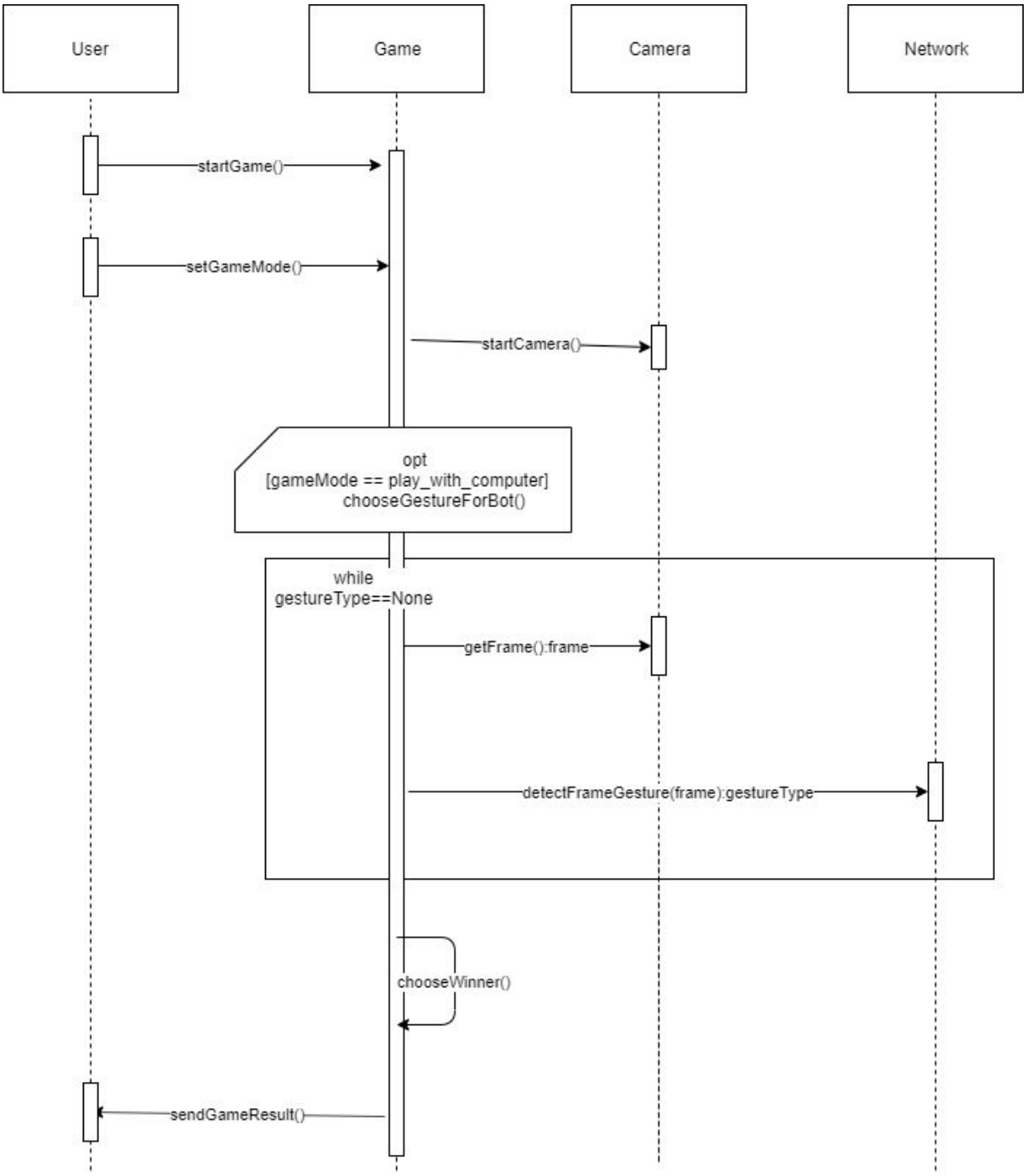
Model of gui interface while gesture classification was performed:



3.5 UML diagram



3.6 Sequence Diagram


User
Game
Camera
Network
startGame()
setGameMode()
startCamera()
opt
[gameMode == play_with_computer]
chooseGestureForBot()
while
gestureType==None
getFrame():frame
detectFrameGesture(frame):gestureType
chooseWinner()
sendGameResult()