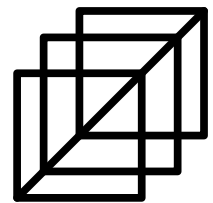


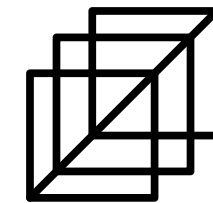
HANDREHAB

COMPUTER VISION BASED HAND REHABILITATION ASSESSMENT



GUIDED BY:

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DATE: 16 NOVEMBER 2023

AGENDA

- 1.PROBLEM STATEMENT
- 2.LITERATURE SURVEY
- 3.ABSTRACT
- 4.OBJECTIVE
- 5.REQUIREMENT ANALYSIS
- 6.DESIGN
- 7.TECHNOLOGICAL STACK
- 8.GANTT CHART



PROBLEM STATEMENT

- Hand motor problems encompass a spectrum of difficulties ranging from fine motor skills to gross motor movements.
- These challenges may arise from congenital conditions, acquired disabilities, neurological disorders, injuries, or the aging process. The objective of this project is to design and implement a handmotor assesment and rehabilitation system based on occupational therapy.
- The project provides a platform for such therapy and bridges the gap between the doctors and patients.

LITERATURE SURVEY

Paper title	Method technologies	Advantages
<p>1.Accuracy and feasibility of a novel fine hand motor skill assessment using computer vision object tracking: <u>Bokkyu Kim</u> & <u>Christopher Neville</u> <u>Scientific Reports</u> volume 13, Article number: 1813 (2023)</p>	<p>hand motor skill assessment using computer vision</p>	<p>Examine the accuracy and feasibility of this approach for detecting changes in a fine hand motor skill.</p>
<p>2.A computer-vision based handrehabilitation assessment suite- Orestis N. Zestas * , Dimitrios N. Soumis, Kyriakos D. Kyriakou, Kyriaki Seklou, Nikolaos D. Tselikas (2023)</p>	<p>Upper-limb rehabilitation</p>	<p>proposes a <u>computer vision</u> hand rehabilitation assessment suite, which stands as a virtual alternative to the real-world scenarios.</p>

<p>3.Applying Hand Gesture Recognition for User Guide Application Using MediaPipe– Proceedings of the 2nd International Seminar of Science and Applied Technology (ISSAT 2021)</p>	<p>Hand Tracking using Mediapipe</p>	<p>The MediaPipe is present as a framework built-in machine learning that has a solution for a hand gesture recognition system</p>
<p>4.Recognization of hand gestures Using mediapipe hands Volume:04/Issue:06/June-2022</p>	<p>Hand Gesture Recognition</p>	<p>Gestures of a hand can be determined using Mediapipe library</p>
<p>5.Computer vision system for tracking players in sports games</p>	<p>Human tracking</p>	<p>Tracking of players in Indoor games</p>



ABSTRACT

- Problem Focuses on upper limb deficits in patients, commonly assessed using tests like Box and Block Test (BBT) and Sollerman Hand Function Test (SHT).
- Proposes a virtual alternative using a Computer Vision Hand Rehabilitation Assessment Suite.
- Utilizes advanced technologies like MediaPipe Hands for precise hand and finger tracking.
- System requires only a mid-range PC and a camera, eliminating the need for additional peripherals or physical equipment.

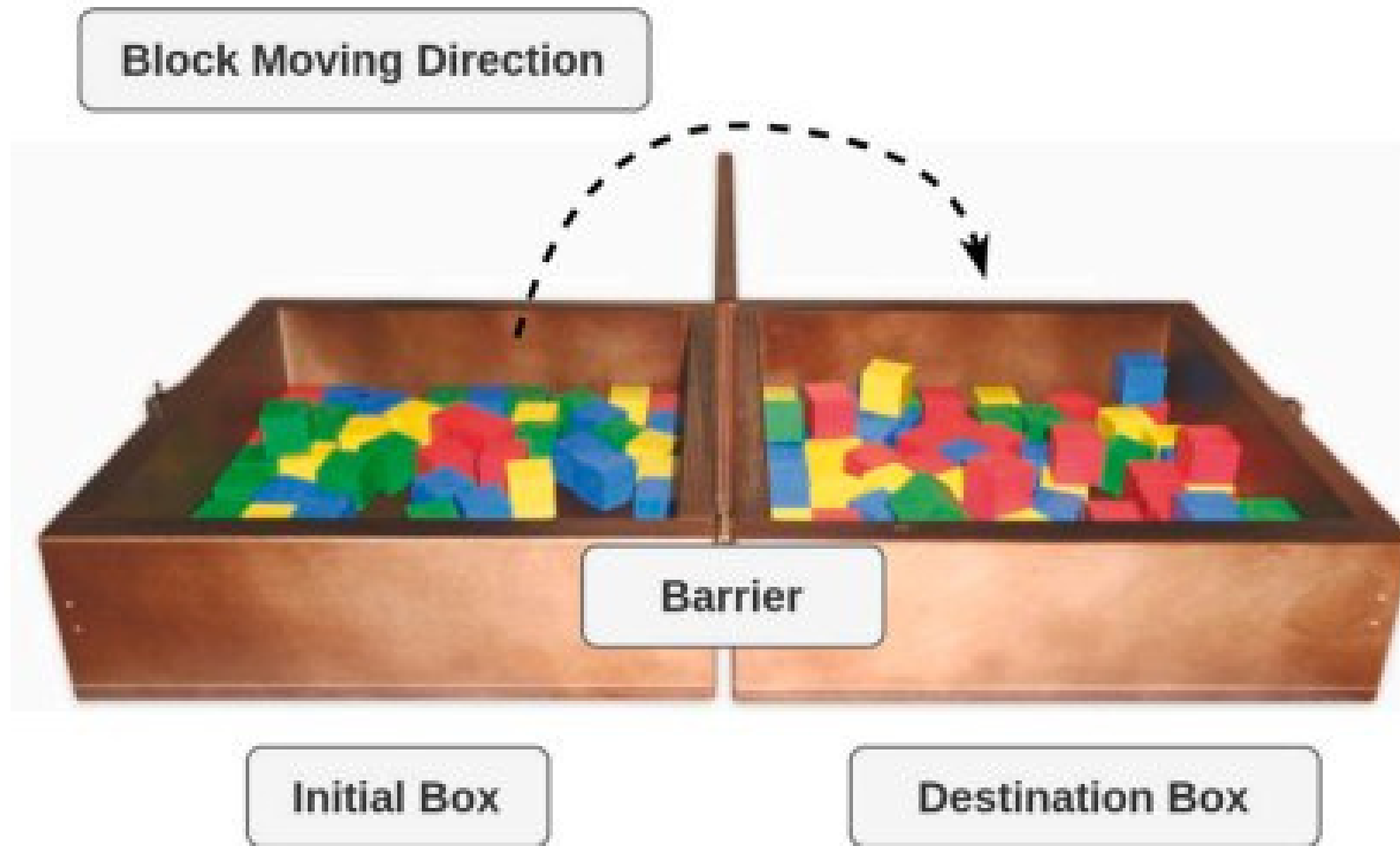


Fig. 1. Demonstration of the original BBT.

OBJECTIVES

- Our proposed system “**HANDREHAB**” is to Eliminate the need for specialized equipment and streamline the rehabilitation process for individuals with hand motor deficits.
- It utilize advanced computer vision technologies, such as MediaPipe Hands, for accurate hand and finger tracking.
- Enable remote assessments, allowing healthcare professionals to monitor and evaluate hand motor recovery progress from a distance.
- Develop a cost-effective system that requires only a mid-range PC and a camera, making it accessible to a broad range of users.

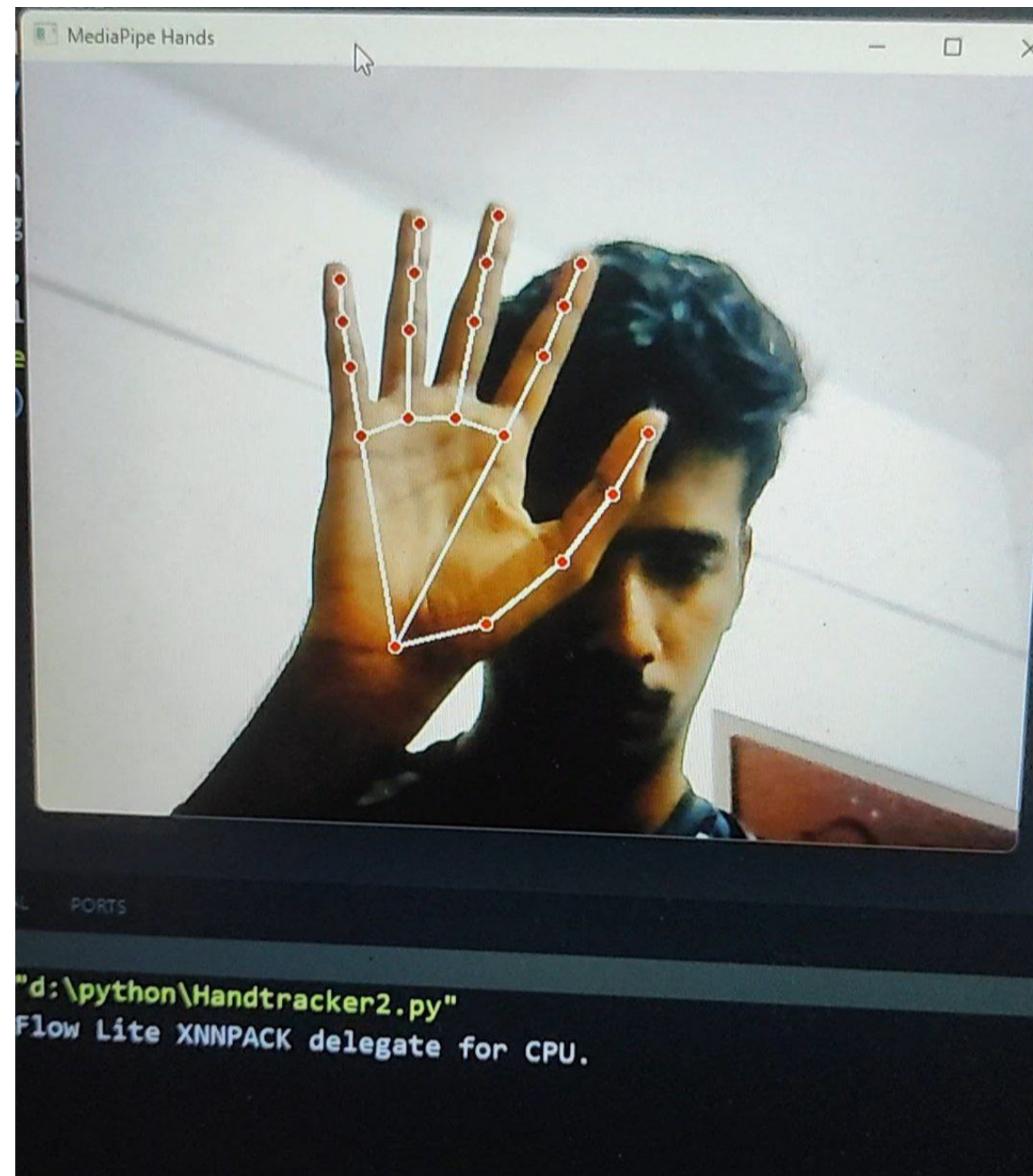
REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENTS

- HAND DETECTION
- SCORE ANALYSIS
- MOVEMENT OF OBJECTS IN VIRTUAL ENVIRONMENT
- COLLISION DETECTION ON BARRIERS
- FINGER MOVEMENT TRACING AND DETECTION
- REHABILITATION ACTIVITIES

NON - FUNCTIONAL REQUIREMENTS

- UI SHOULD BE MINIMAL AND INTUITIVE
- SYSTEM SHOULD RESPOND WITHIN 1 S AFTER CHECKING
USER INFORMATION
- WEBSITE SHOULD BE CONNECTED TO THE INTERNET
- SECURED ACCOUNTS BY USING A UNIQUE USER-ID AND
PASSWORD
- EASILY ACCESSIBLE TO ANYONE HAVING A PC

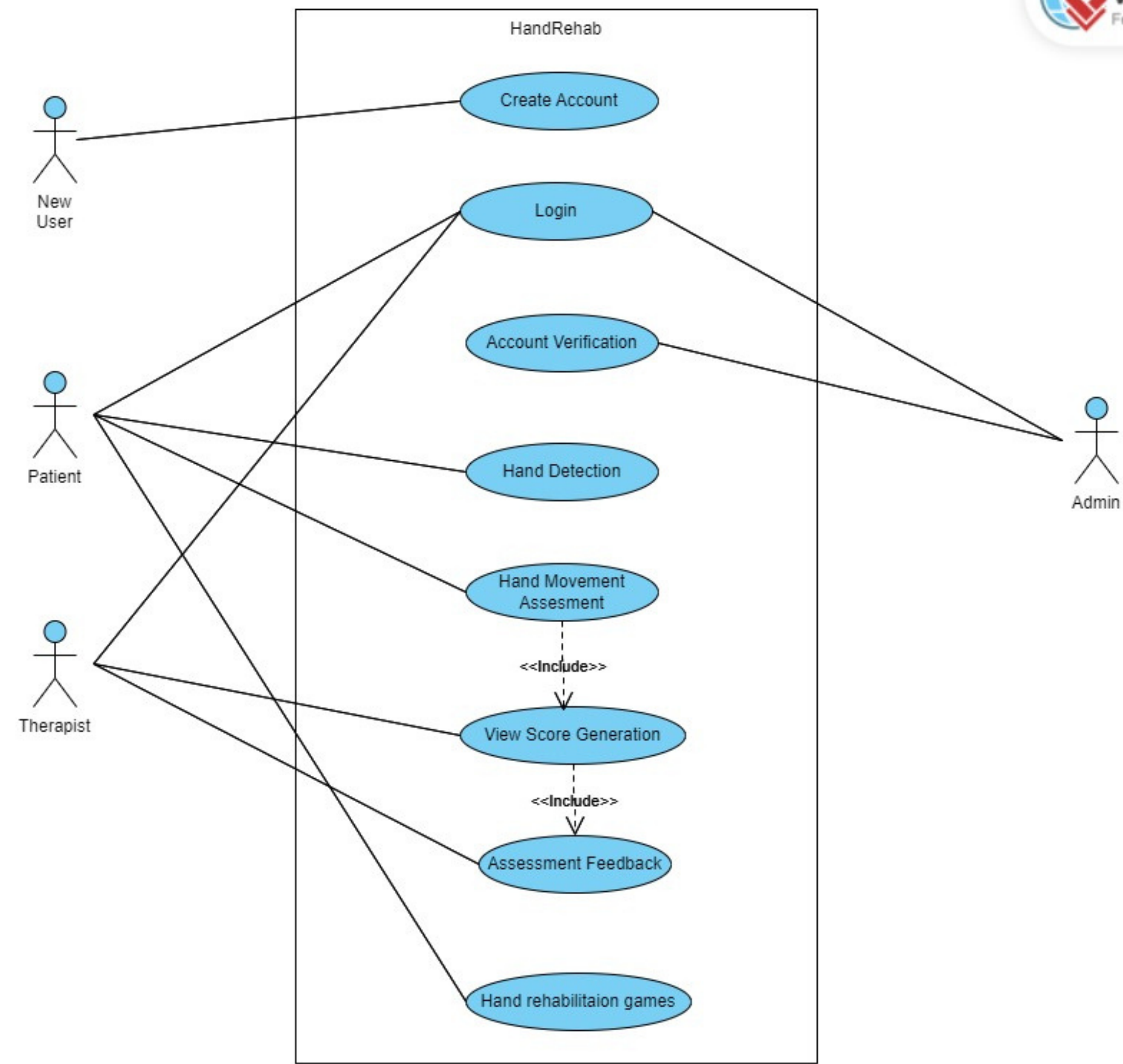


DESIGN

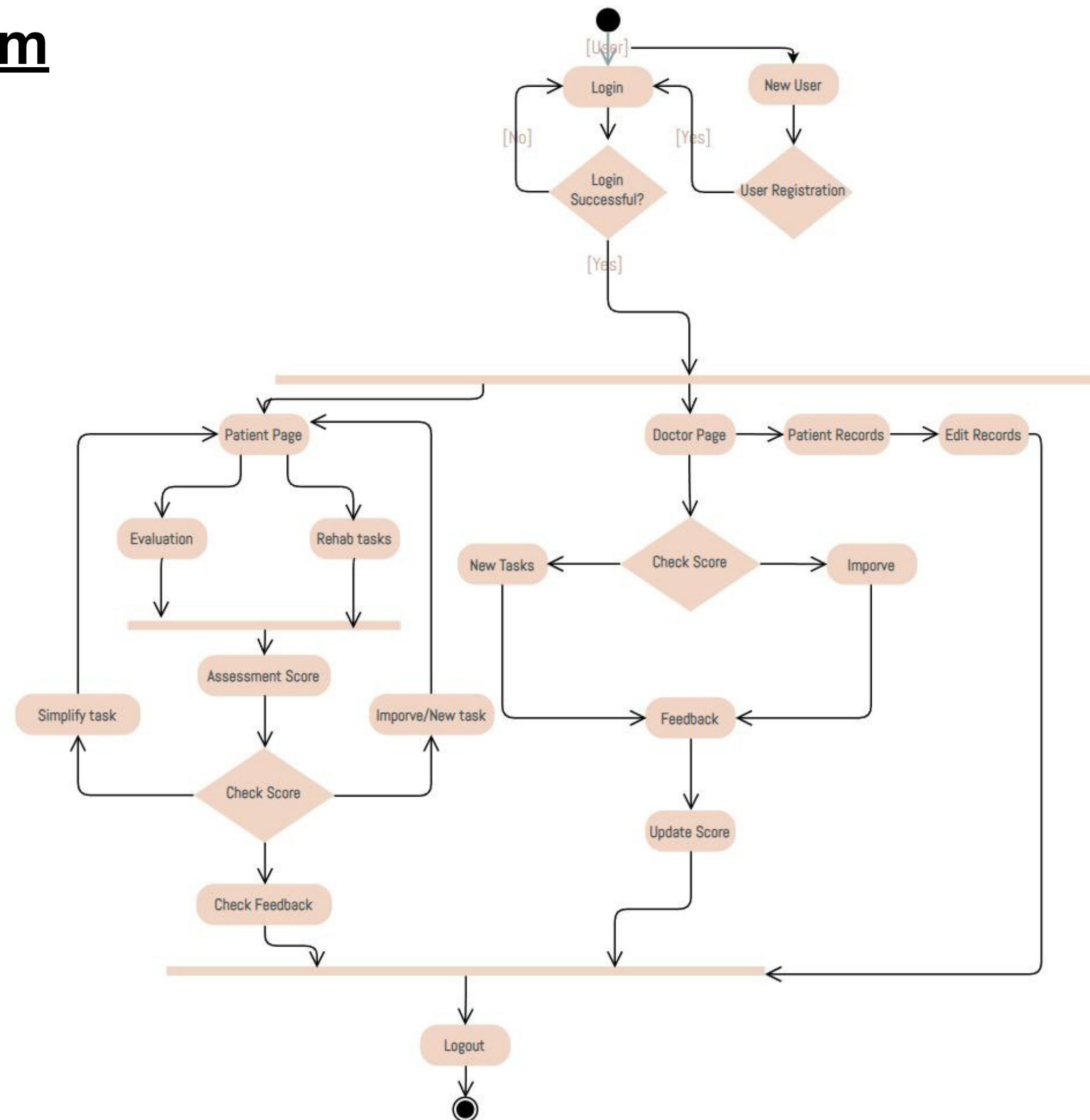
DESIGNS ADDED

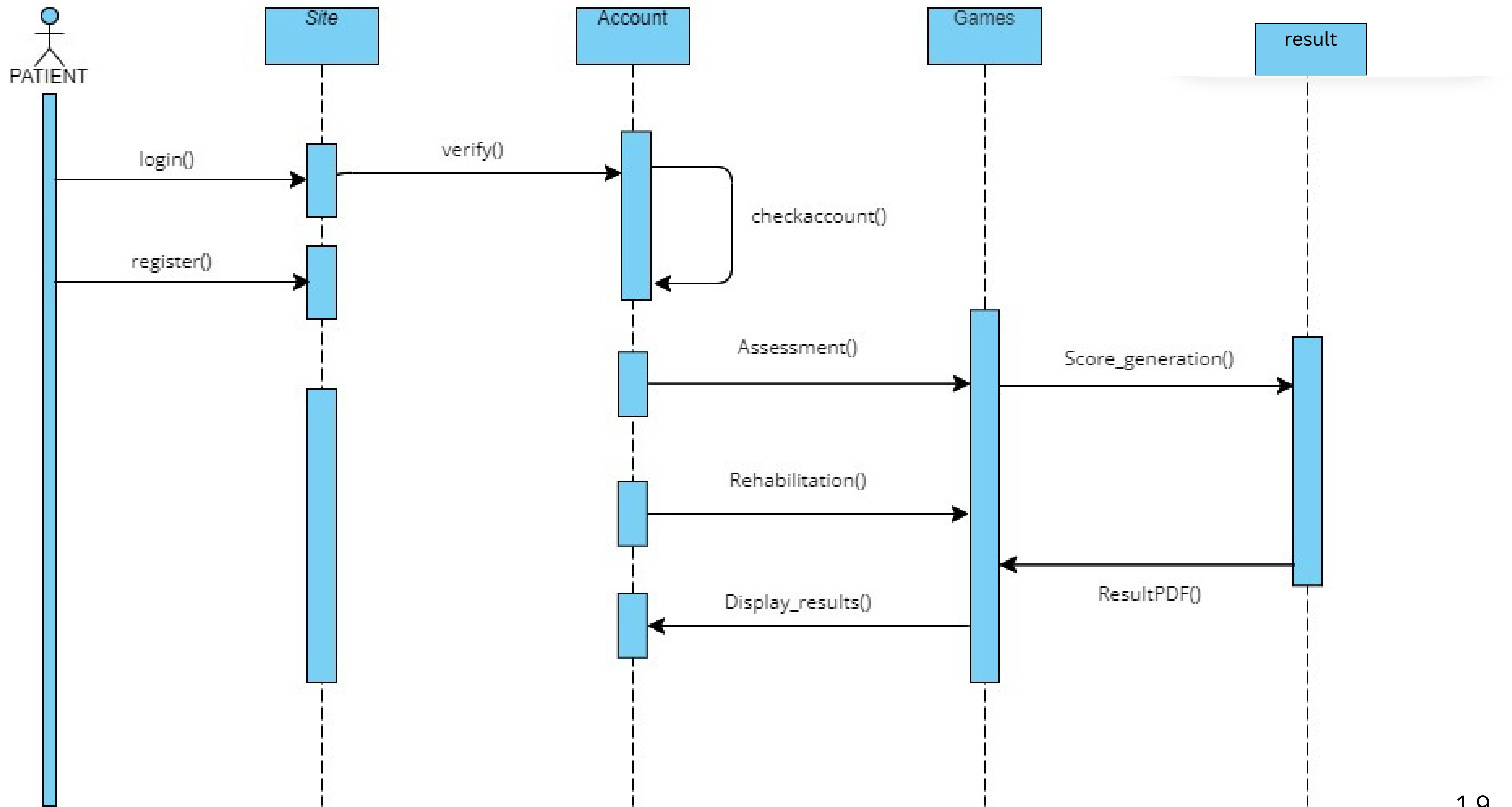
1. Use Case diagram
2. Activity diagram
3. Sequence diagram

Usecase diagram

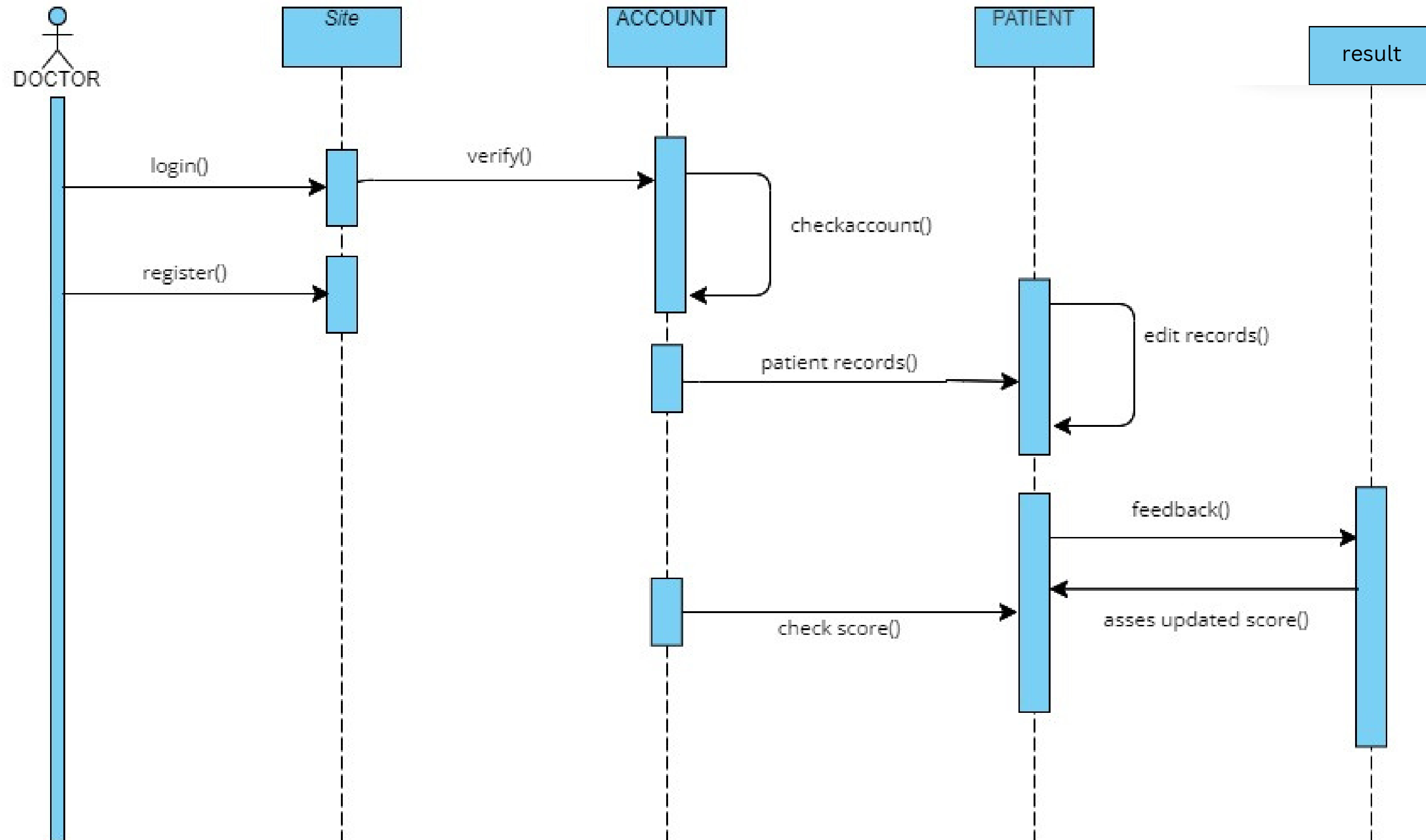


Activity diagram





Sequence diagram : Patient

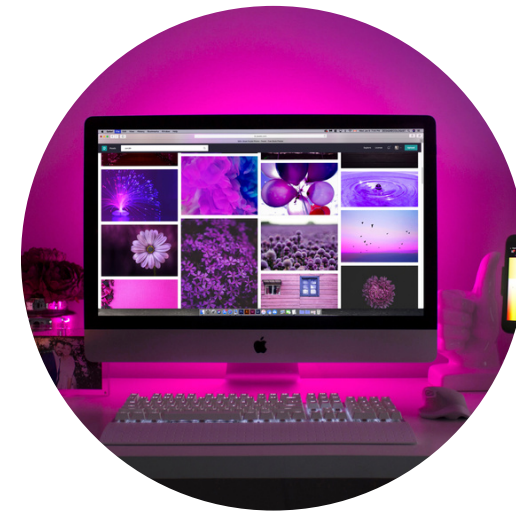


Sequence diagram : Doctor

TECHNOLOGY STACK



COMPUTER
VISION



HTML,CSS,JS

GANTT CHART

ID	Task name	Start	Finish	Duration	Complete	2023				
						Aug	Sep	Oct	Nov	Dec
1	ABSTRACT SUBMISSION	2023-08-04	2023-08-24	15.0 d.	100.0%	<div></div>				
2	ZEROth REVIEW	2023-09-19	2023-09-19	0.0 d.	100.0%		<div></div>			
3	LITERATURE SURVEY	2023-09-26	2023-11-16	37.2 d.	100.0%			<div></div>		
4	REQUIREMENTS GATHERING	2023-09-26	2023-11-16	37.2 d.	100.0%			<div></div>		
5	DESIGN DOCUMENTS	2023-10-30	2023-11-15	12.0 d.	100.0%			<div></div>		
6	REVIEW 1	2023-11-16	2023-11-16	0.0 d.	0.0%				<div></div>	
7	DOCUMENTATION	2023-11-16	2023-12-16	21.8 d.	0.0%				<div></div>	

THANK YOU