



WEB APPLICATION- PHYSIOFIX

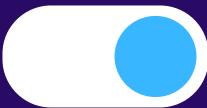
AI THERAPY ASSISTANCE

Presented By : Group 17

21 MAY 2023

19TH - 21ST MAY 2023

IMAGINEHACK
Ideate | Invent | Impact



PhysioFix
Slogan



“
**Transforming
Therapy,
Guided by Intelligence**

Problem Statement

In physiotherapy, many patients struggle with consistently performing exercises correctly, monitoring their progress effectively, and accessing personalized guidance and support.

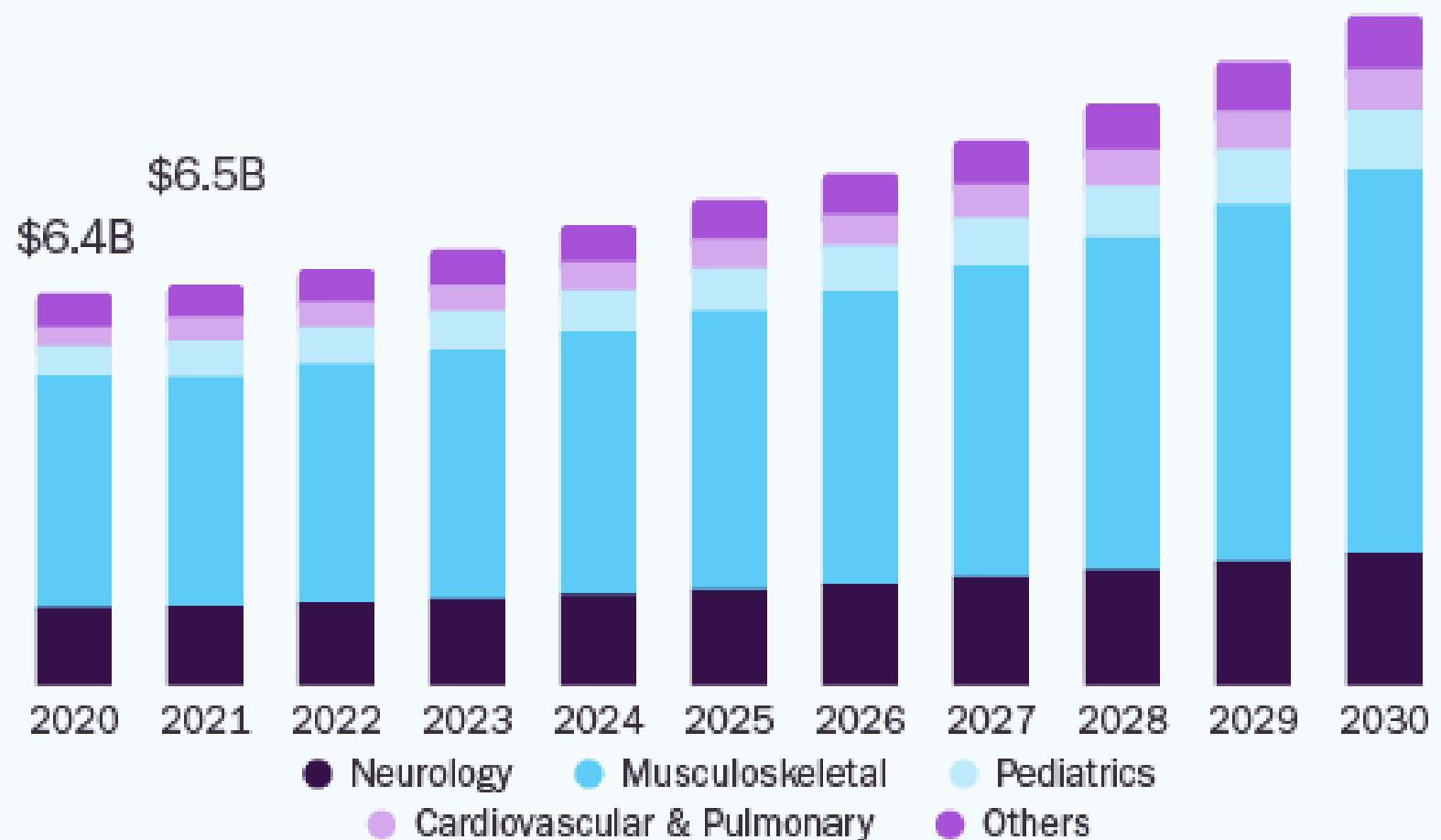
This results in hindered recovery and suboptimal patient outcomes. To overcome these obstacles and improve the effectiveness of physiotherapy treatments, there is a pressing need for a technologically advanced solution to assist them.



Market Research

U.S. Physiotherapy Equipment Market

size, by application, 2020 - 2030 (USD Billion)



Healthcare Industry

The global physiotherapy equipment market size was valued at USD 19.9 billion in 2022.

Health lifestyle trend

Changing demographics globally, the rising trend of an active lifestyle, and the uptake of sports as a profession by individuals are expected to propel the market growth during the forecast period.

Application Insights

According to the WHO, around 1.71 billion people worldwide suffer from musculoskeletal disorders.





Idea

Develop a **web application** to support:

- Remote Monitoring & Tele-rehabilitation
- Treatment plan & exercise recommendation



01

AI Pose Detection & Guidance

- Real-time video pose tracking to assist and guide patient during exercise
- Visual prompts with counts to guide patients in performing exercises correctly

Solutions

03

02

Personal Physiotherapist

- Auto-generated optimal recovery workout plan
- Based on hospital diagnosis
- AI diagnosis offering based on query

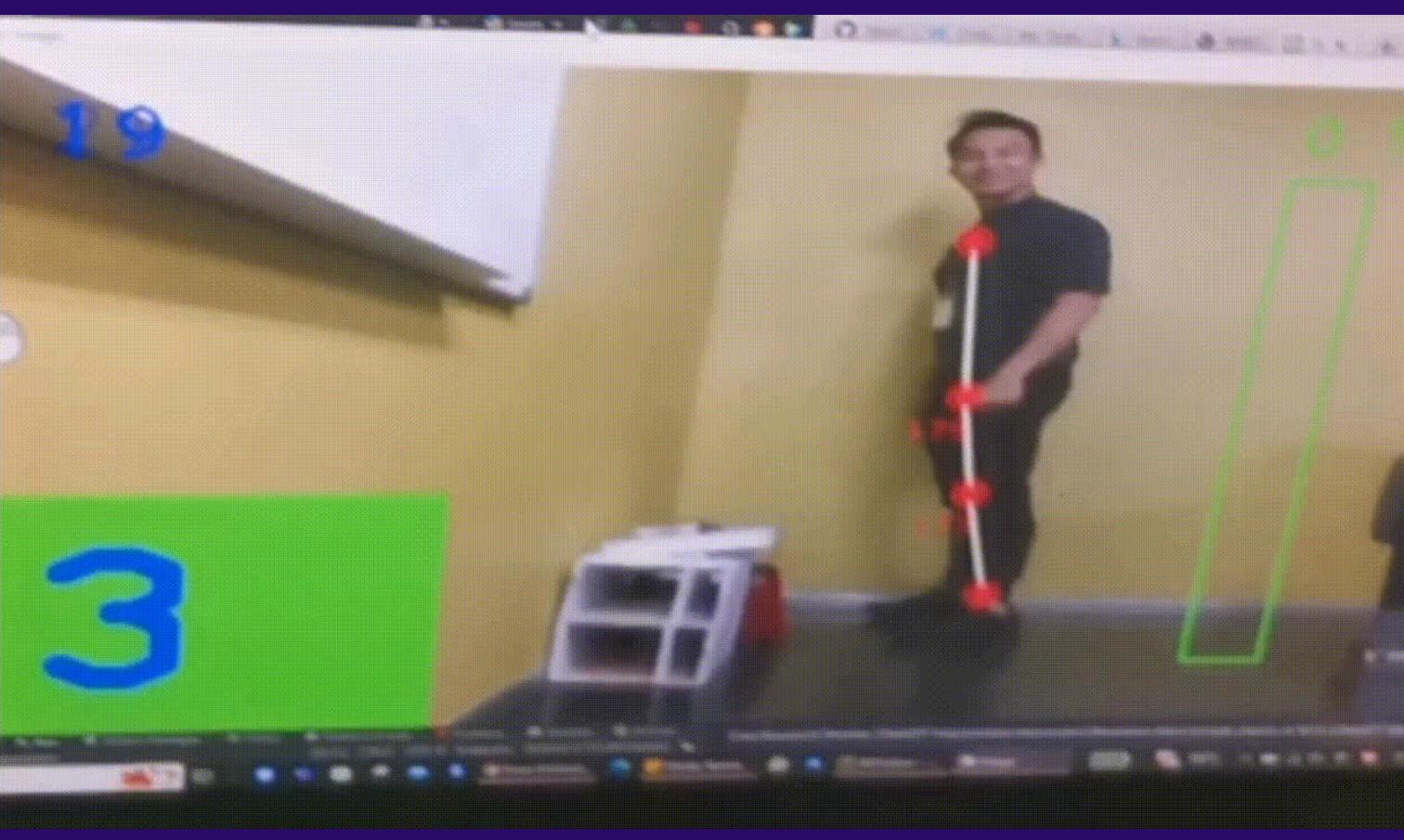
Involving Guidance

- Weekly updated physiotherapy recovery plan according to user feedback
- Workout progress visualization

SOLUTION 1:

AI Pose Detection & Guidance

- OpenCV
- Mediapipe



```

import cv2
import mediapipe as mp
    def findPose(self, img, draw=True):
        imgRGB = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
        self.results = self.pose.process(imgRGB)
        if self.results.pose_landmarks:
            if draw:
                self.mpDraw.draw_landmarks(img, self.results.pose_landmarks,
                                            self.mpPose.POSE_CONNECTIONS)
        return img

    def findPosition(self, img, draw=True):
        self.lmList = []
        if self.results.pose_landmarks:
            for id, lm in enumerate(self.results.pose_landmarks.landmark):
                h, w, c = img.shape
                # print(id, lm)
                cx, cy = int(lm.x * w), int(lm.y * h)
                self.lmList.append([id, cx, cy])
            if draw:
                cv2.circle(img, (cx, cy), 5, (255, 0, 0), cv2.FILLED)
        return self.lmList

    def findAngle(self, img, p1, p2, p3, p4, draw=True):

        # Get the landmarks
        x1, y1 = self.lmList[p1][1:]
        x2, y2 = self.lmList[p2][1:]
        x3, y3 = self.lmList[p3][1:]
        x4, y4 = self.lmList[p4][1:]

```

SOLUTION 1:

AI Pose Detection & Guidance

```

while cap.isOpened():
    ret, img = cap.read()
    img = cv2.resize(img, (1280, 720))
    img = detector.findPose(img, False)
    lmList = detector.findPosition(img, False)
    print(lmList)
    if len(lmList) != 0:
        # angles
        angles = detector.findAngle(img, 12, 24, 26, 28)

        perLeftHip = np.interp(angles[0], (230, 310), (0, 100))
        barLeftHip = np.interp(angles[0], (230, 310), (650, 100))

        perLeftKnee = np.interp(angles[1], (0, 35), (0, 100))
        barLeftKnee = np.interp(angles[1], (0, 35), (650, 100))

        per = (perLeftKnee + perLeftHip) / 2
        bar = (barLeftKnee + barLeftHip) / 2

        # Check for the dumbbell curls
        color = (240, 223, 114)
        if per == 100:
            color = (48, 239, 73)
            if dir == 0:
                count += 0.5
                dir = 1
            if per == 0:
                color = (48, 239, 73)
                if dir == 1:
                    count += 0.5
                    dir = 0
        print(count)
    
```

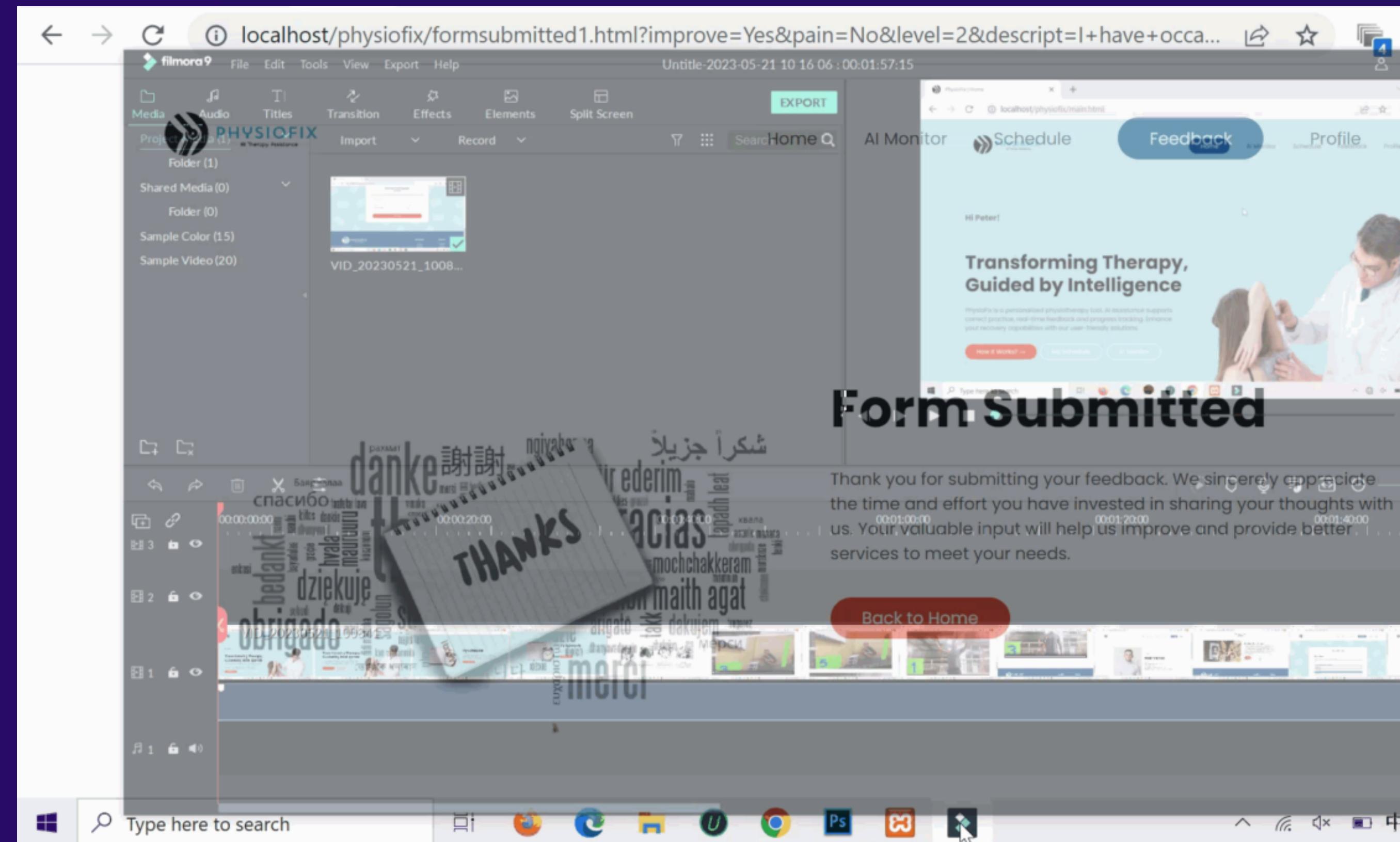
SOLUTION 2:

Personal Physiotherapist

Randomforest Machine Learning Model

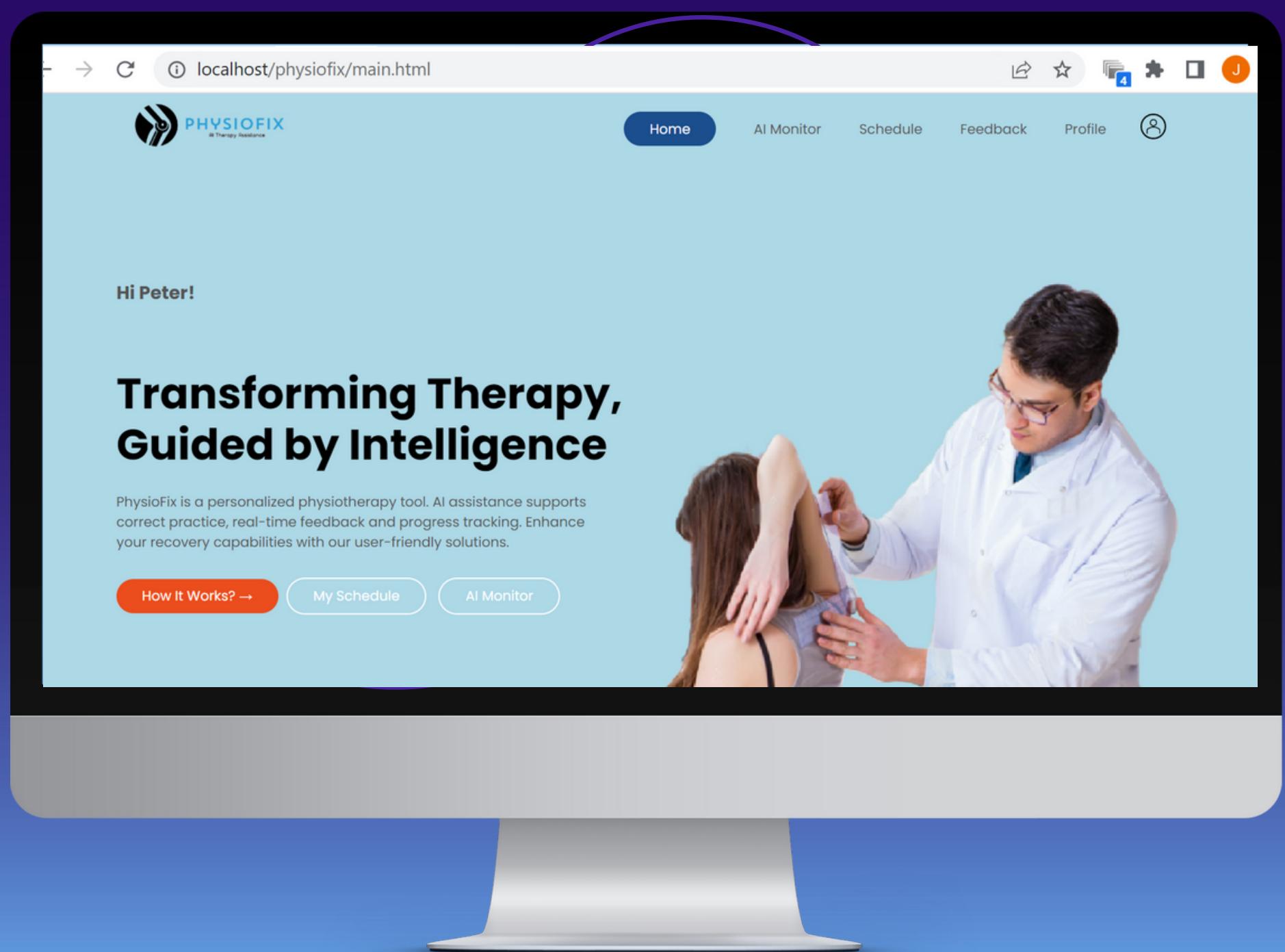
SOLUTION 3:

Involving Guidance

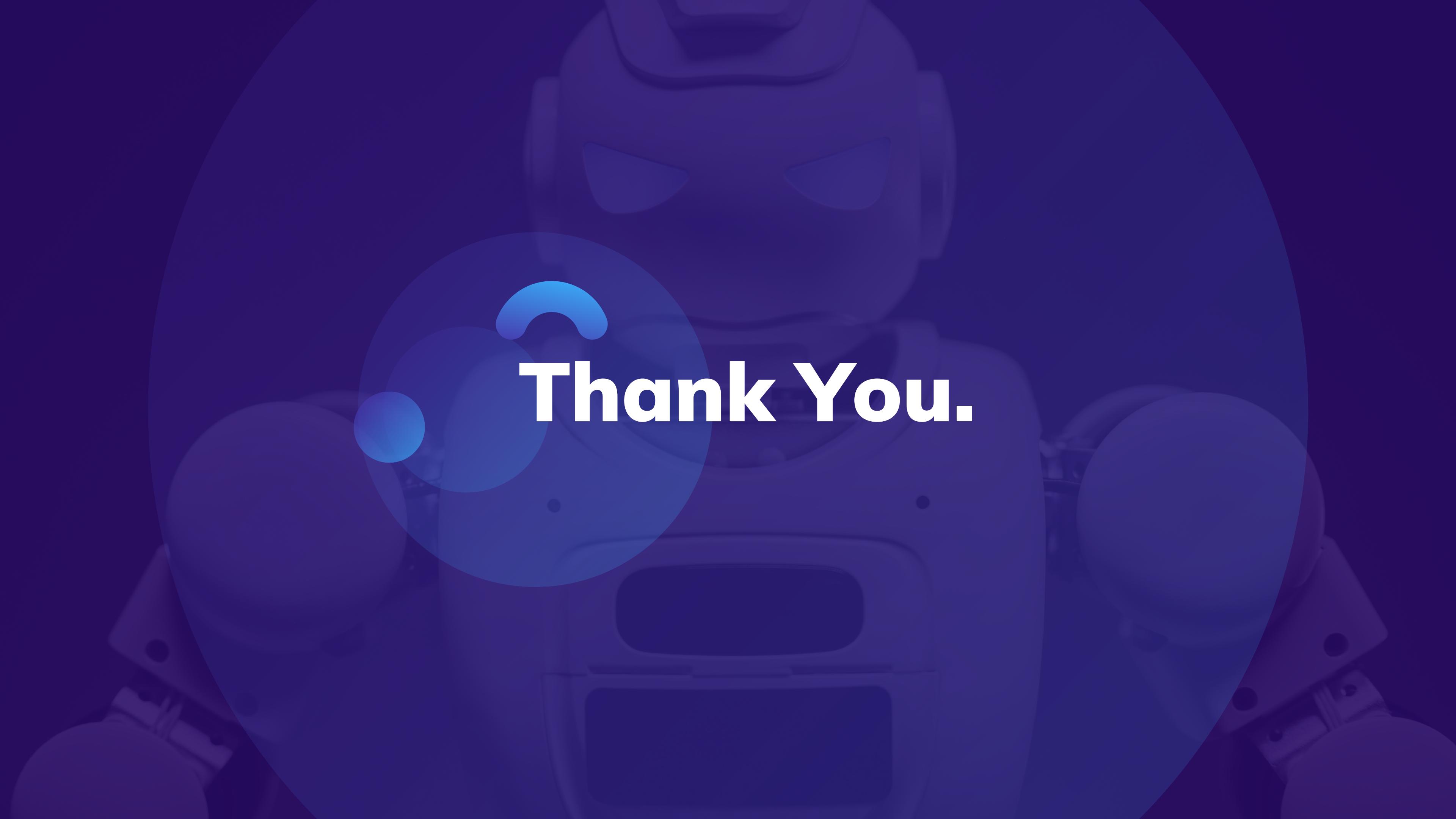


Impacts

AI-POWERED PHYSIOTHERAPY



- Patient with limited recovery time
- Cut cost for patients, as they don't have to meet physiotherapist frequently
- Allows flexibility and remote physiotherapy



Thank You.