

Anti-court rage

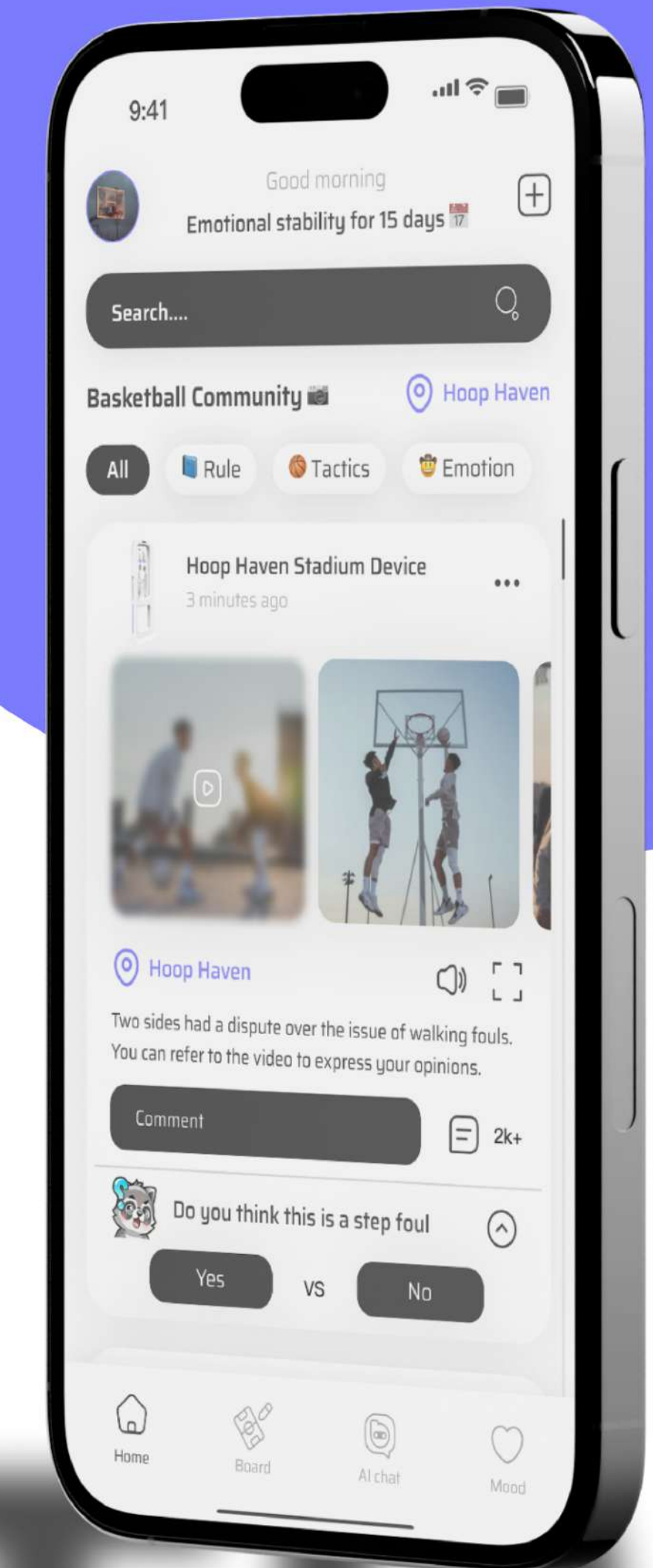
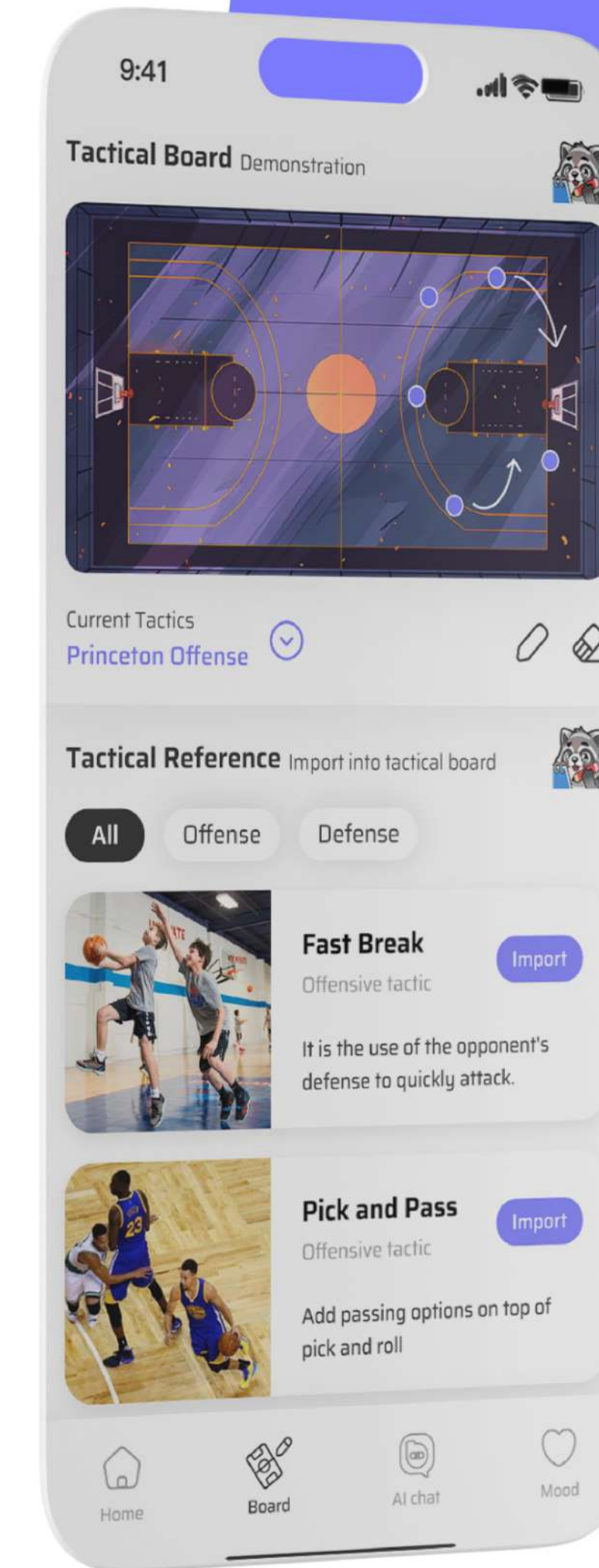
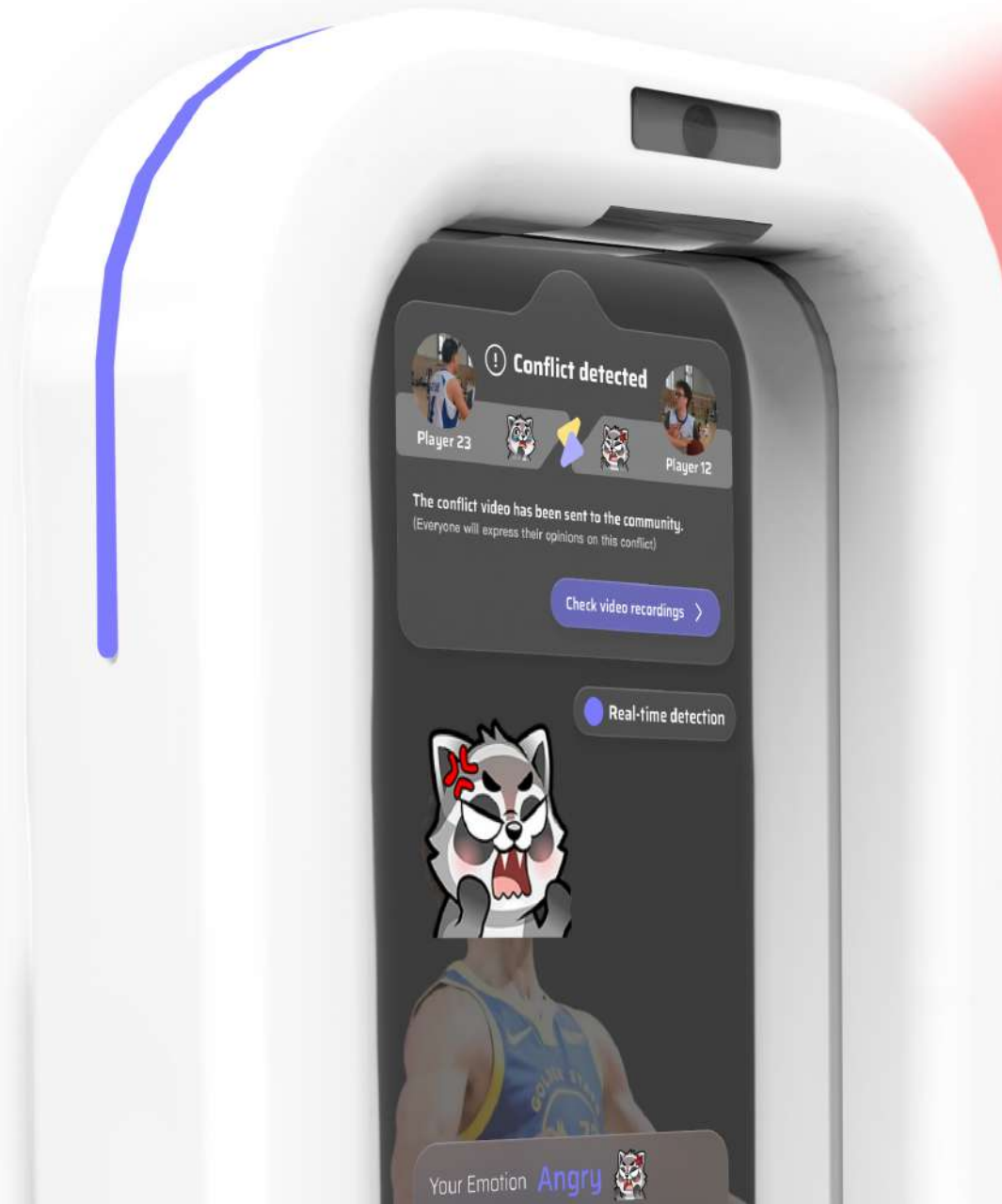
Sports AR

Affective Design

Information design

In recent years, violent incidents caused by "court rage" have been rampant on basketball courts, severely violating the original intention of using basketball to exercise, build willpower, and gain happiness, and can even lead to malicious violent incidents.

Having studied the causes of court rage using the achievement motivation theory model, I conducted user research to develop a court rage theory, and then carried out a reasonable design based on this theory, ultimately achieving successful prevention and control of court rage.

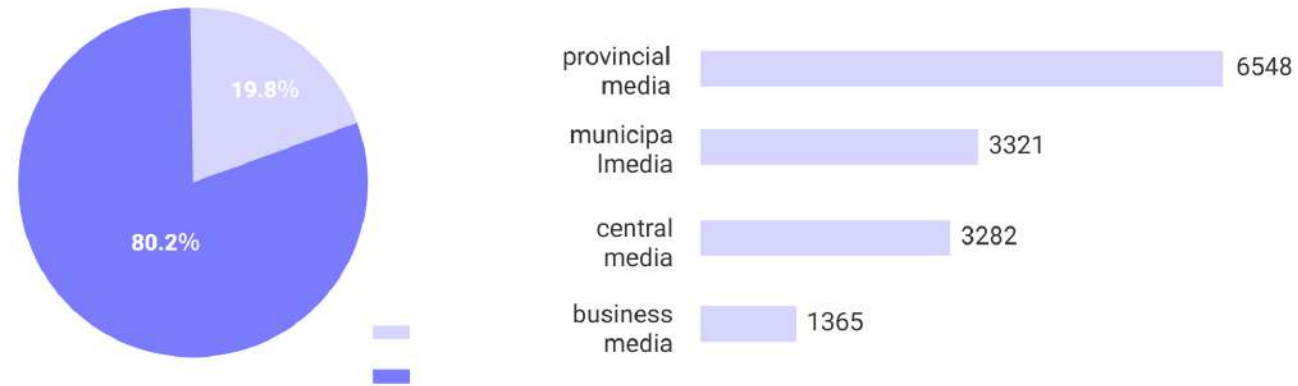


Inspiration



scripted/real street basketball conflicts occur frequently on social media.

Through observation and my personal experience, I found that street basketball is full of physical contact, which may easily escalate from dispute to curse and even into fierce tussles.



As of 2023, there are a total of 691,819 non-competition basketball courts in China, accounting for 19.8% of the overall sports venue total.

From July 20, 2022, to August 24, 2022, the total amount of information on Village BA across the entire network reached 101,531 records.

Whether in terms of the number of basketball courts or the popularity of street basketball in the community, it has become a daily part of people's lives.

Thinking

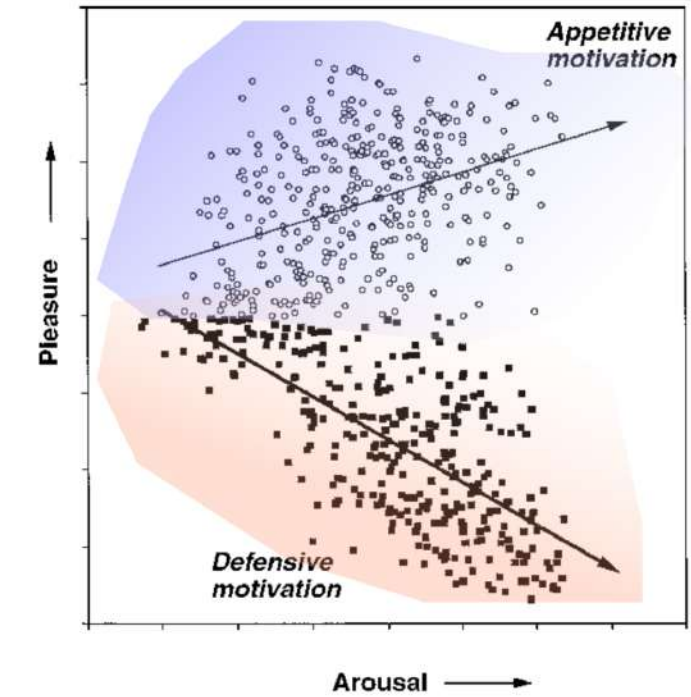
While Street Basketball Is Gaining Popularity, It Also Comes With Numerous Conflicts. Can Interactive Design Be Employed To Address These Conflict Issues?



Research

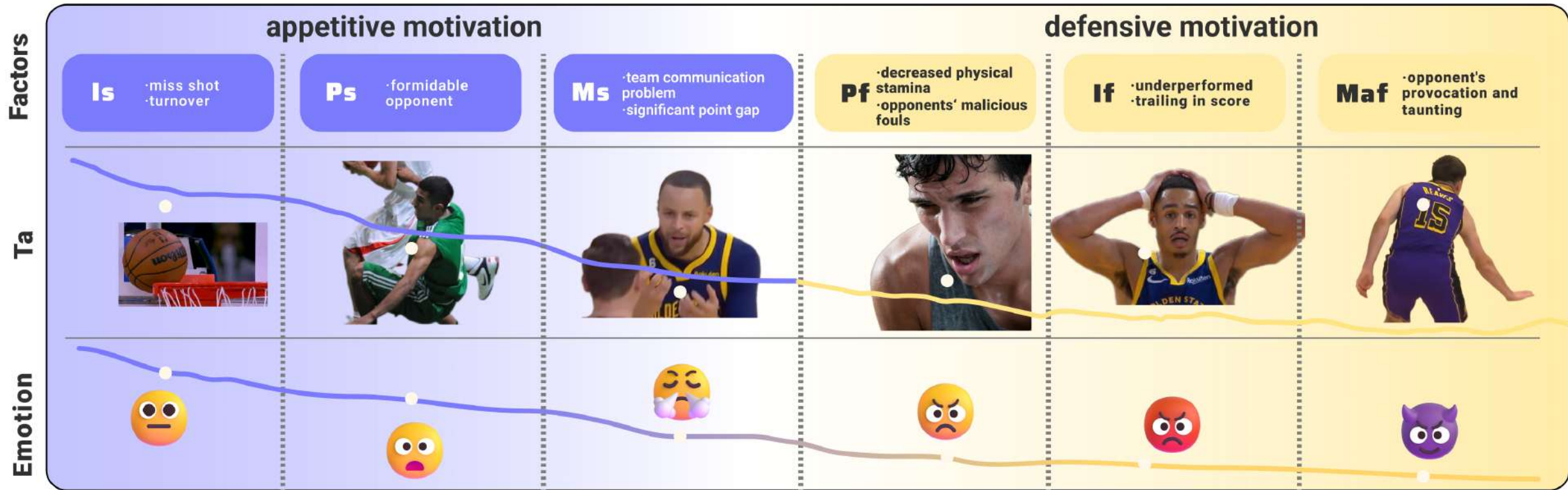
Emotion And Motivation

Conflicts are manifestations of acute emotional changes. According to Lang and Bradly's emotional motivation model theory(2005), emotions are fundamentally reflected by the desire motivation system and the defence motivation.



Two dimensions of the International Affective Picture System (Lang et al., 2005)

Emotion Change With Ta



Ta's changes depend on the variables M, P, and I, and emotions will also undergo changes along with Ta's variations

Achievement Motivation Theory

In Reference to Atkinson's Achievement Motivation Theory(1950), the motivation behind street basketball playing can be explained as follows:

$$Ta = (Ms \times Ps \times Is) - (Mar \times Pf \times If)$$



Ms: the need to succeed



Maf: the need to avoid failure



Ps: the subject's perceived likelihood of success



Pf: the subject's perceived likelihood of failure



Is: the incentive value of success

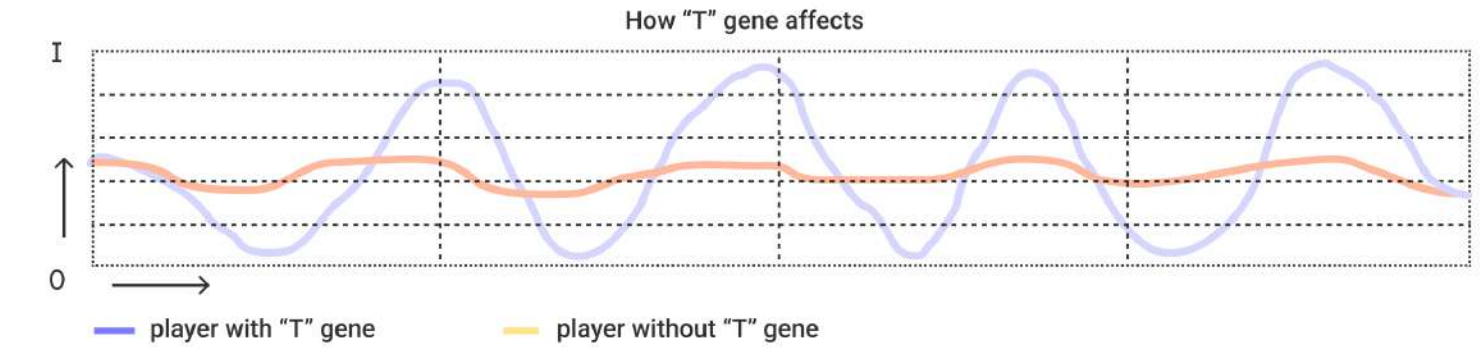


If: the negative incentive value of failure

Other Factors Affects Ta

Anger gene -- the "T" gene(significant I)

The "T" gene is the key determinant of whether a person is prone to anger. Higher levels of the "T" gene are associated with difficulty in emotional control, leading to increased irritability, which affects the rate of change in incentive value during playing.



The conclusion is derived from experiments conducted at the University of Bonn in Germany. Researchers selected over 800 participants to analyze the types of DARPP-32 genes present in their bodies.

Egoistic attribution bias(M)

The attribution bias, wherein individuals credit themselves for success and deflect responsibility for failure, fosters egoistic tendencies. This bias leads players to attribute success to themselves and failure to external factors or others, intensifying their drive for success or aversion to failure.



Lack of referees(P)

In the absence of referees acting as outside interveners, the extent and frequency of unfair acts in games will change, thus affecting the players' prediction of the result of the game.



Reflection

Through the above research, players' emotions are linked to motivation levels, influenced by Need (M), Possibility (P), and Incentive Value (I). Design opportunities can be inspired by these three aspects.



Interview

Combined with the above research on M,PI, we formulated the interview questions by introducing four factors:

individuals teammates opponents environment



Research objective: To improve the MPI model through user research, identify its relationship with anger on the field, and further develop a theory of anger factors on the field

Research methods: questionnaire survey (51 participants), open-ended interview(5 participants), semi-structured interview(5 participants)

Expected results: A comprehensive theoretical framework that can explain the factors that generate basketball anger

Through user research, new factors affecting basketball player anger have been discovered, and the MPI framework has been continuously improved to deeply explain the causes of basketball anger and extract design problems based on this.

Yi Chen Experienced basketball player

Isn't playing basketball all about winning? Losing a game makes me feel losing face. I could have performed better on the court, but I didn't.

The desire for social respect The desire for self-fulfillment

Expectation management

Maf, Pf, If

Zekun Ji Beginning basketball player

I don't like teammates who hold me back. If my teammates perform poorly, I would be frustrated and angry.

Teamwork

Effective communication

Ms, Ps, Is

Zhenshuo Teng Professional basketball player

I often feel pressure due to the intense physical confrontation and competition on the basketball court.

Intense basketball confrontations Innate personalities

Emotion management

Maf, Pf, If

Leyi Tan Beginning basketball player

I believe it's normal to feel anger, but it's not acceptable to vent that anger onto others.

Emotional outbursts

Rationalizing emotional outbursts

Other reasons

Tong Zhou Experienced basketball player

If the opponent fails to maintain a proper level of respect, resorting to verbal insults and personal attacks, it makes me angry.

Malicious behavior Lack of rule awareness

Rule interpretation and proper punishments

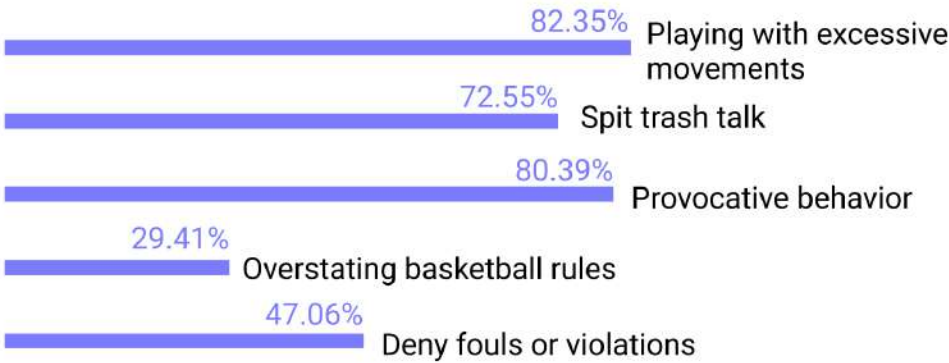
Other reasons

Conclusion : Basketball anger is the result of multiple factors working together. To prevent anger on the court, promote emotional management, create an effective atmosphere for communication and venting, and provide clear rules and appropriate consequences for malicious behavior.

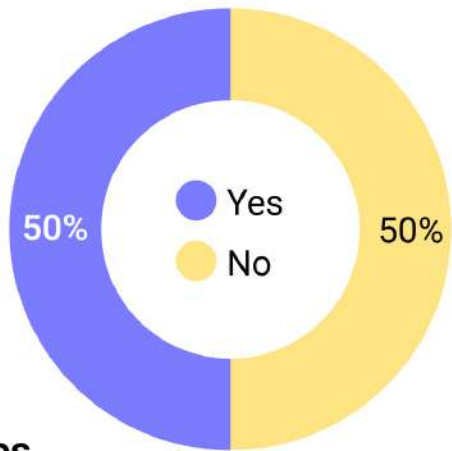
Survey

We have obtained 51 questionnaire data

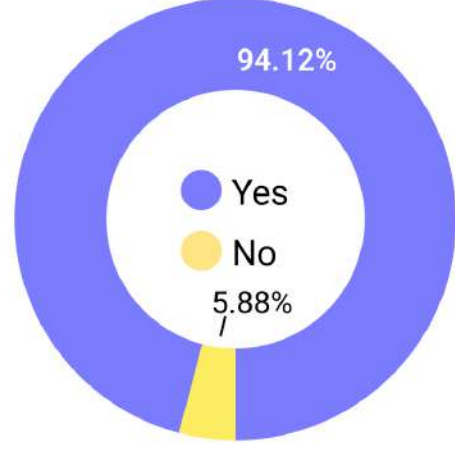
The angry impact caused by the opponent's behavior



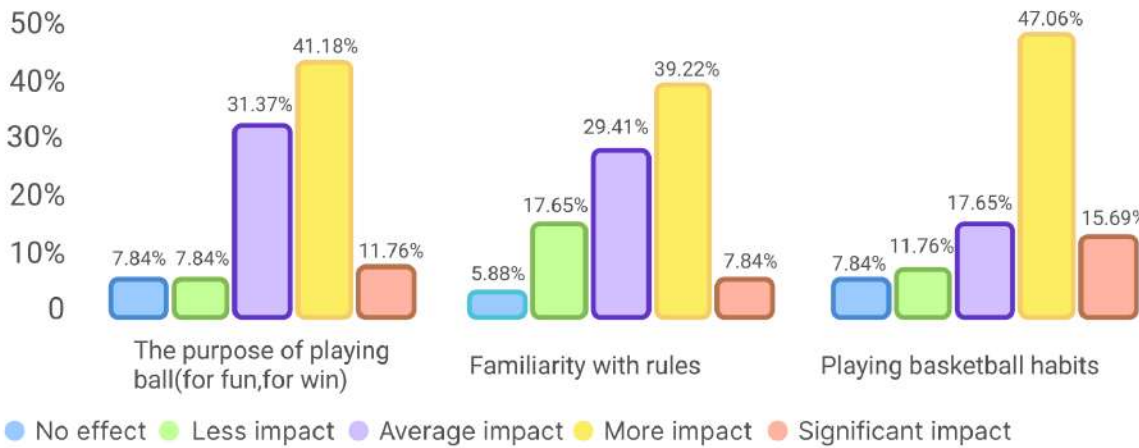
Have you ever made irrational decisions while playing due to anger?



Will anger affect performance on the basketball court ?



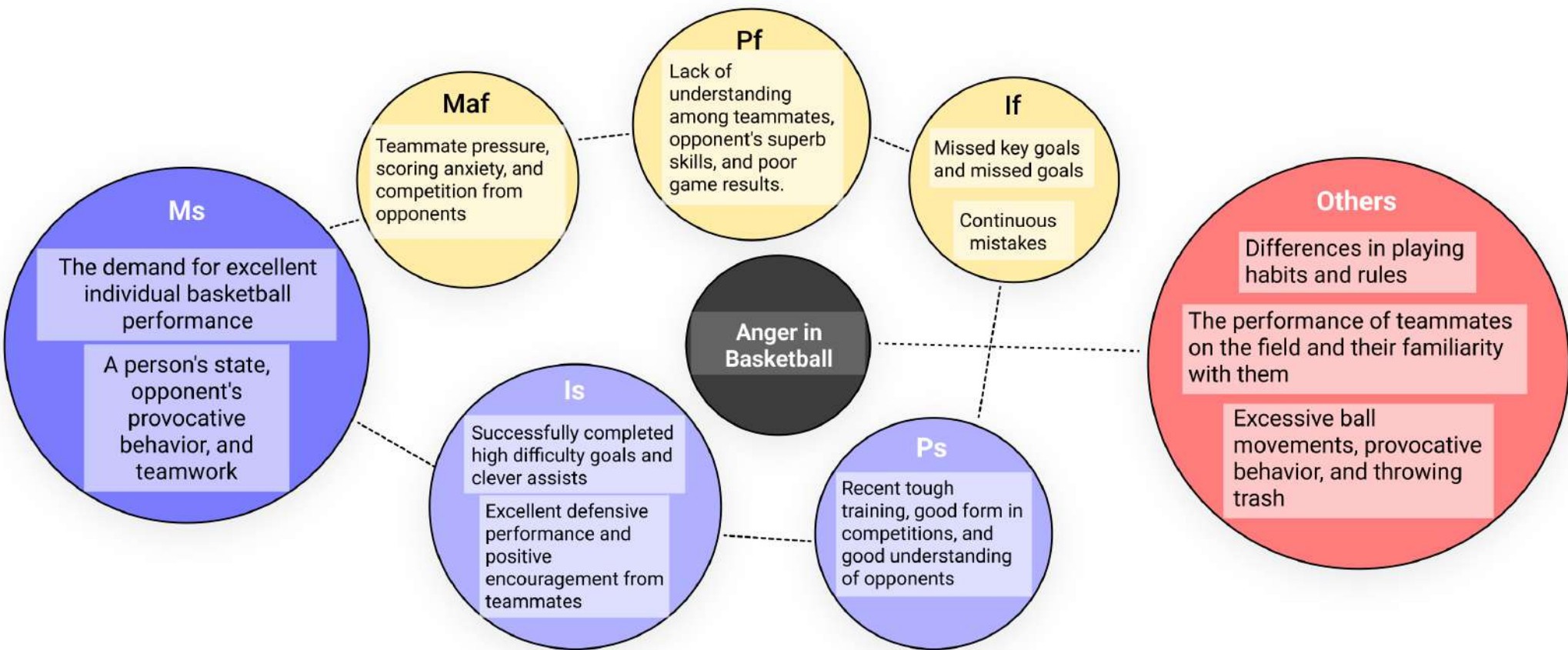
To what extent do you think the following differences between basketball players will affect anger



In summary, playing habits have the greatest impact on anger, followed by familiarity with rules .The purpose of playing ball has a relatively small impact on anger. These differences may be important factors leading to differences in anger among basketball players.

Summary of questionnaire

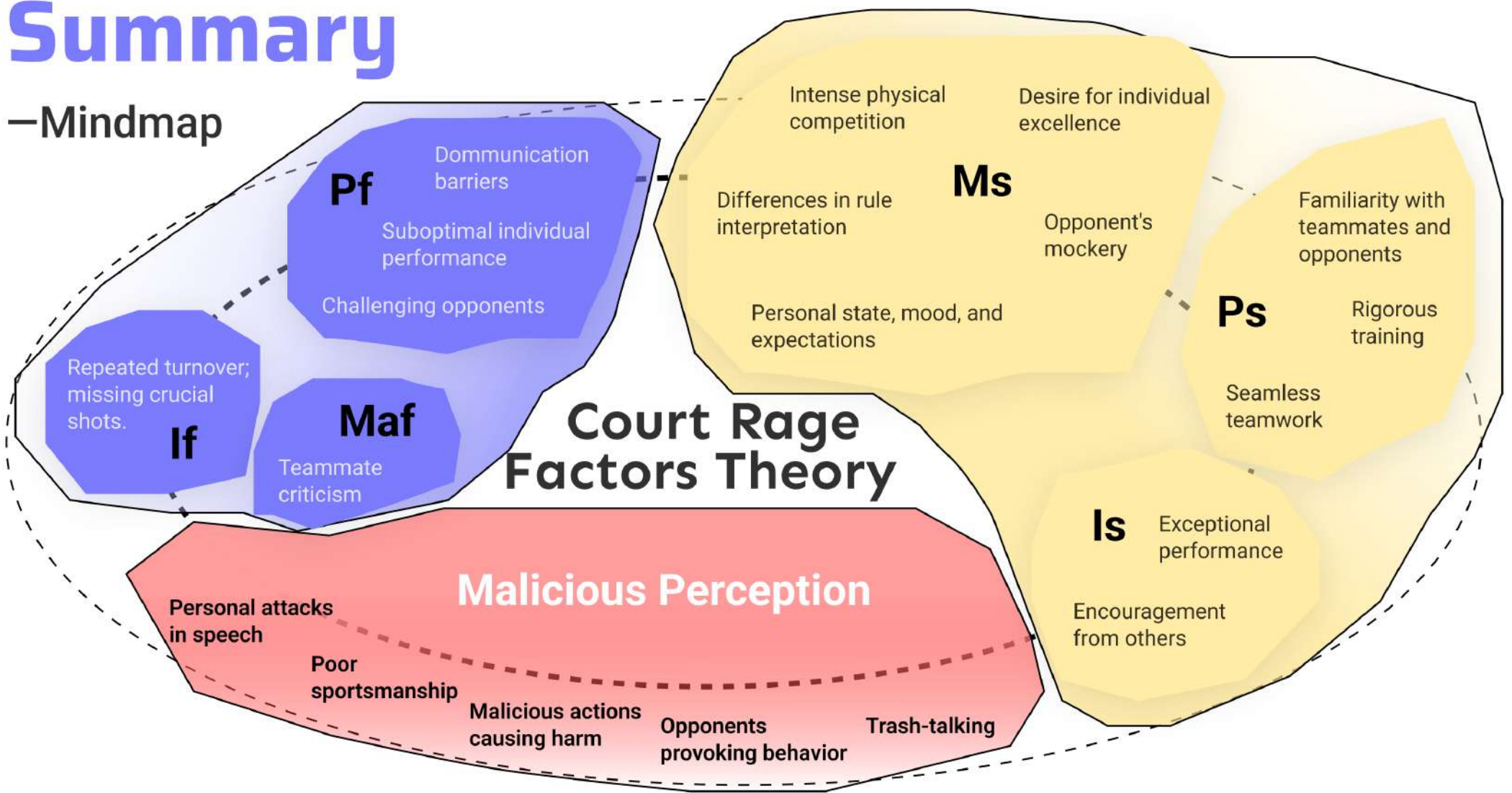
Based on user research, it was found that Atkinson's Achievement Motivation cannot fully elucidate the logical framework of the factors underlying tennis rage syndrome.



In order to better explain the factors related to "others" and to make the framework obtained from user research more comprehensive, it is necessary to introduce a new theory.

Summary

–Mindmap



Through interviews and questionnaire surveys, we explored the factors behind basketball rage and proposed the theory of basketball rage factors based on our findings.

Court Rage Factors Theory: Ms is the main cause of anger, with Is, Ps, Maf, Pf, and If as secondary factors. **Perceived malice** is another major cause for angry emotions.

–Persona

John College students

Playing basketball, opponents often make me angry.

26 years old
Guangzhou,Guang Dong
College students

Young Basketball enthusiast
Proactive Competitive
Student Passionate

PAIN POINTS

- It is difficult to control the excitement when playing basketball, which can lead to anger
- Losing the game will be very embarrassing, and they will be very serious about playing
- Frequent arguments and conflicts with opponents
- May generate anger due to frequent confrontation with opponents or excessive scale of actions

NEEDS

- Need to control his emotions and ensure his performance on the court.
- Need to grasp his normal passion and not transform it into anger
- Need to ensure that his emotions are stable and not influenced by others

Factors that generate anger

Playing with excessive movements
Provocative behavior
Competitive desire
Take seriously
State and emotions

GOALS

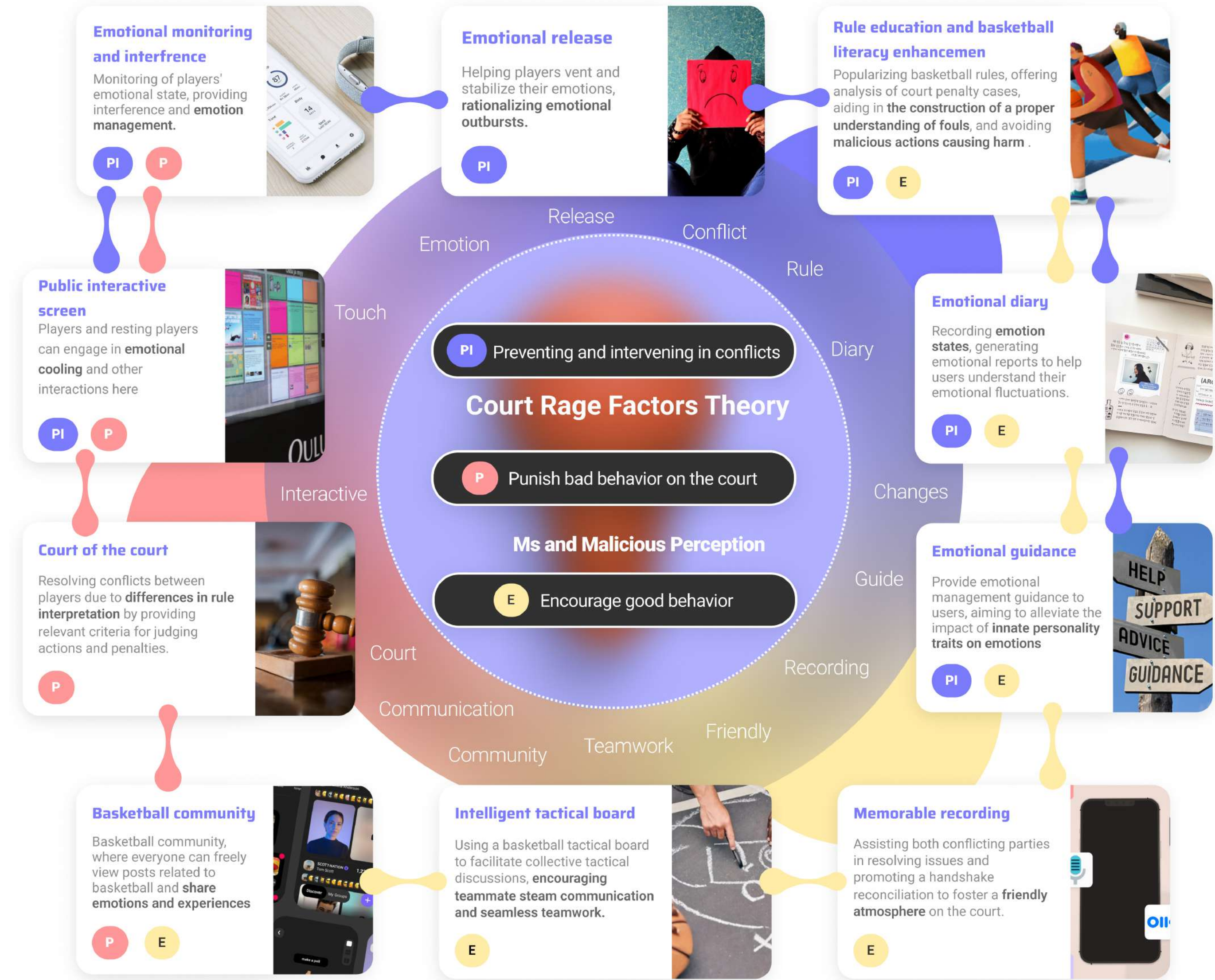
- Preventing and intervening in conflicts(PI)
- Punish bad behavior on the court(P)
- Encourage good behavior(E)

Ideation

Based on the research, I've identified three goals for preventing and addressing court rage in basketball:

Preventing and intervening in conflicts(PI), Punish bad behavior on the court(P), and Encourage good behavior(E).

So, how can we proactively prevent conflicts and encourage righteousness?



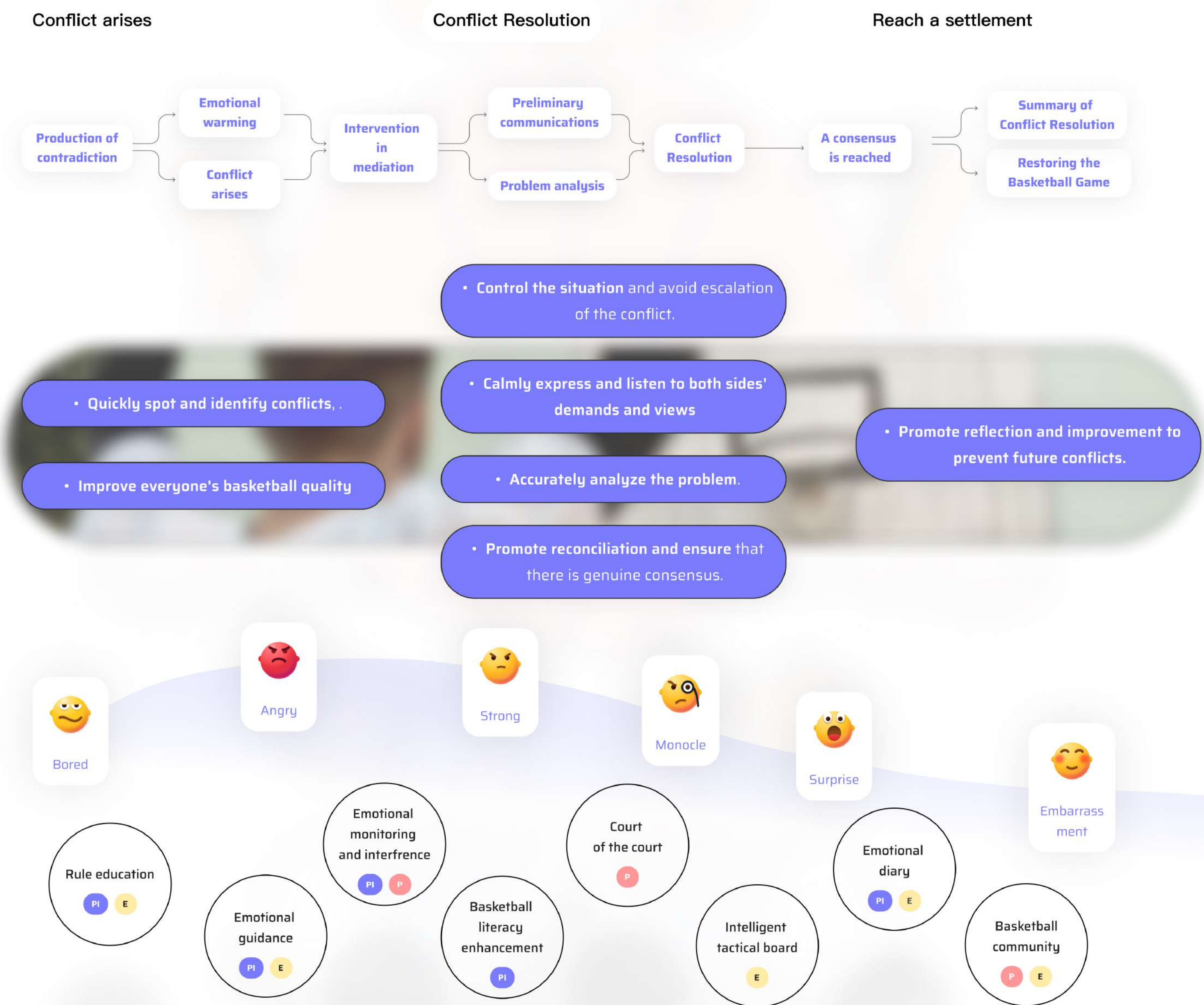
User Journey

Action

Thinking

Emotion

Solution

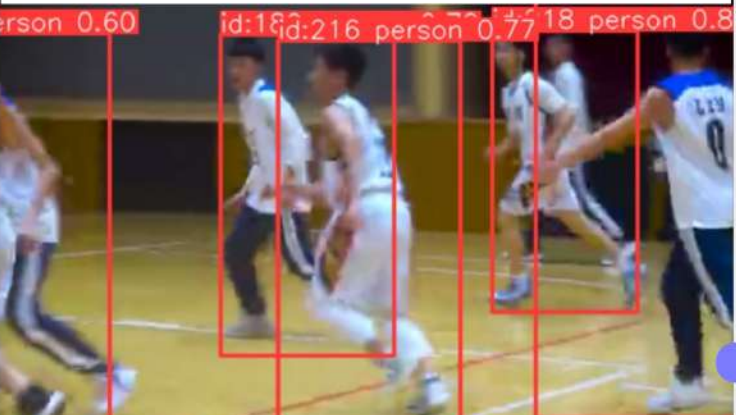


Tech Analysis

Conflict Detection System

YoloV8

Detecting and tracking basketball players

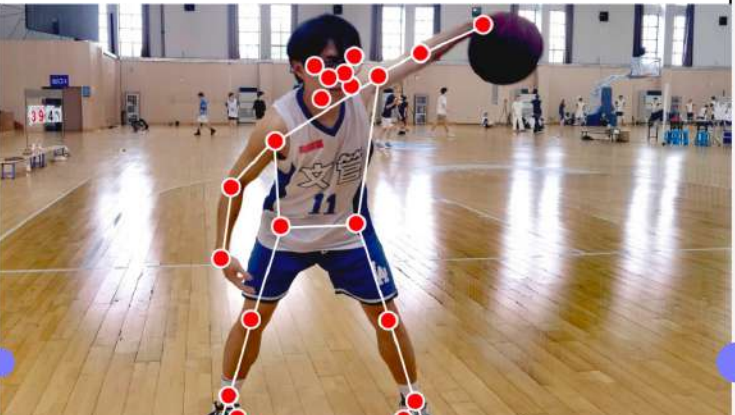


```
person 0.60 id:18d:216 person 0.7718 person 0.8
```

```
with np_pose.Pose(min_detection_confidence=0.5, min_tracking_confidence=0.5) as pose:
    # 检测并跟踪球员位置
    while cap.isOpened():
        ret, frame = cap.read()
        if not ret:
            break
        # 将检测到的球员位置写入视频
        image = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
        image.flags.writeable = False
        # 检测并跟踪球员位置
        results = pose.process(image)
        # 检测球员位置
        if results.pose_landmarks:
            np_drawing.draw_landmarks(frame, results.pose_landmarks, np_pose.POSE_CONNECTIONS)
        cv2.imshow('Pose Detection', frame)
```

Motion Capture

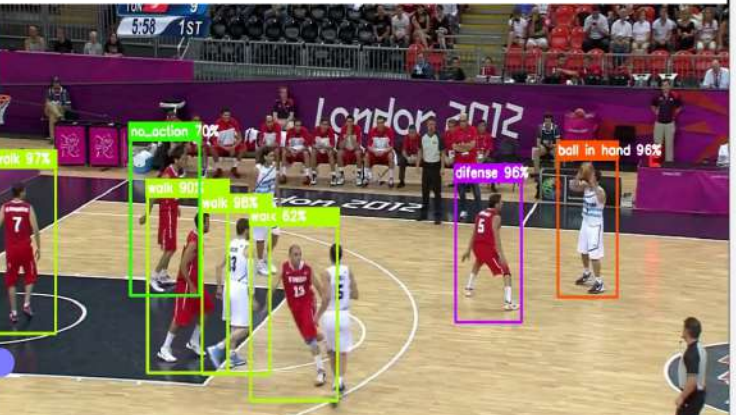
Detecting players' limb bones



```
with open(settings.VIDEOS_DICT.get(source_vid), 'rb') as video_file:
    video_bytes = video_file.read()
    if video_bytes:
        st.video(video_bytes)
    if st.session_state.get('Video Objects'):
        try:
            vid_cap = cv2.VideoCapture(
                str(settings.VIDEOS_DICT.get(source_vid)))
            st_frame = st.empty()
            while (vid_cap.isOpened()):
                success, image = vid_cap.read()
                if success:
                    _display_detected_frames(conf,
                                              model,
                                              st_frame,
                                              image,
                                              is_display_tracker,
                                              tracker)
                else:
                    break
```

Slow Fast

Behavior detection and analysis



Slowfast reference
Basketball Action Recognition Method of Deep Neural Network Based on Dynamic Residual Attention Mechanism—Jiongen Xiao,Wenchun Tian ,and Liping Ding.

Conclusion

I used YoloV8, Motion Capture, and SlowFast together to create the Conflict Detection System, which effectively monitors conflicts on the basketball court.

Emotional Detection & AR Filter

Emotion detection can identify the emotions of players on both sides of a conflict using facial recognition.

The AR filter tracks the player's facial emotions, helping to cool emotions, enhance communication, and resolve conflicts.

Part of the code

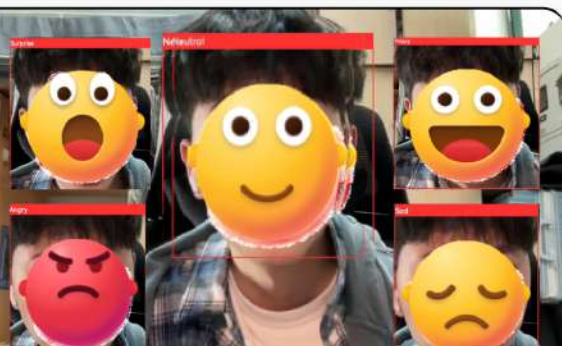
Display emotions and AR emojis

```
cap = cv2.VideoCapture(0)
if not cap.isOpened():
    print("无法打开摄像头")
    exit()
while True:
    # 读取帧
    ret, frame = cap.read()
    if not ret:
        print("无法读取帧")
        break
    # 将帧转换为RGB
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    # 检测人脸
    faces = face_detector.detect_faces(gray, min_confidence=0.5, min_size=(100, 100))
    for x, y, w, h in faces:
        # 检测面部表情
        sub_face_img = gray[y:y+h, x:x+w]
        resized = cv2.resize(sub_face_img, (100, 100))
        normalized = resized / 255.0
        reshaped = np.reshape(normalized, (1, 48, 48, 3))
        # 检测面部表情
        result = model.predict(reshaped)
        label = np.argmax(result, axis=-1)
        # 检测面部表情
        cv2.imshow('Video Stream', frame)
```



surprise

Successfully detected neutral, happy, angry, surprise, sad, fear emotions



happy

The current emojis are not enough to achieve the effect of emotional cooling



happy

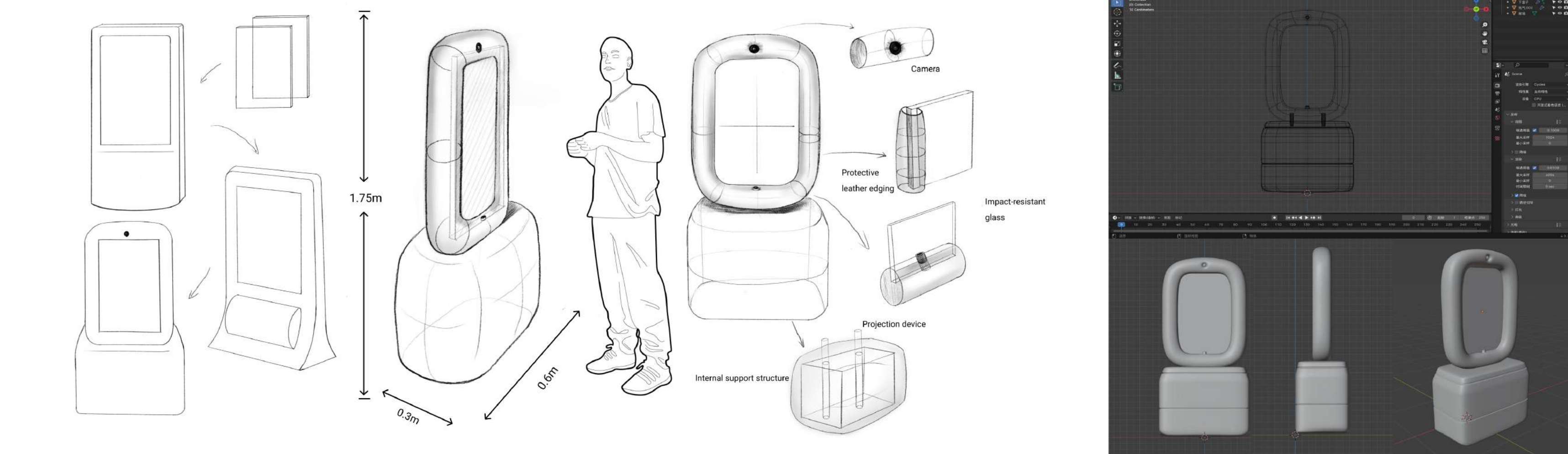


surprise

To enhance the effect of emotional cooling, Use cuter Pokemon dynamic AR emoticons

Development Process

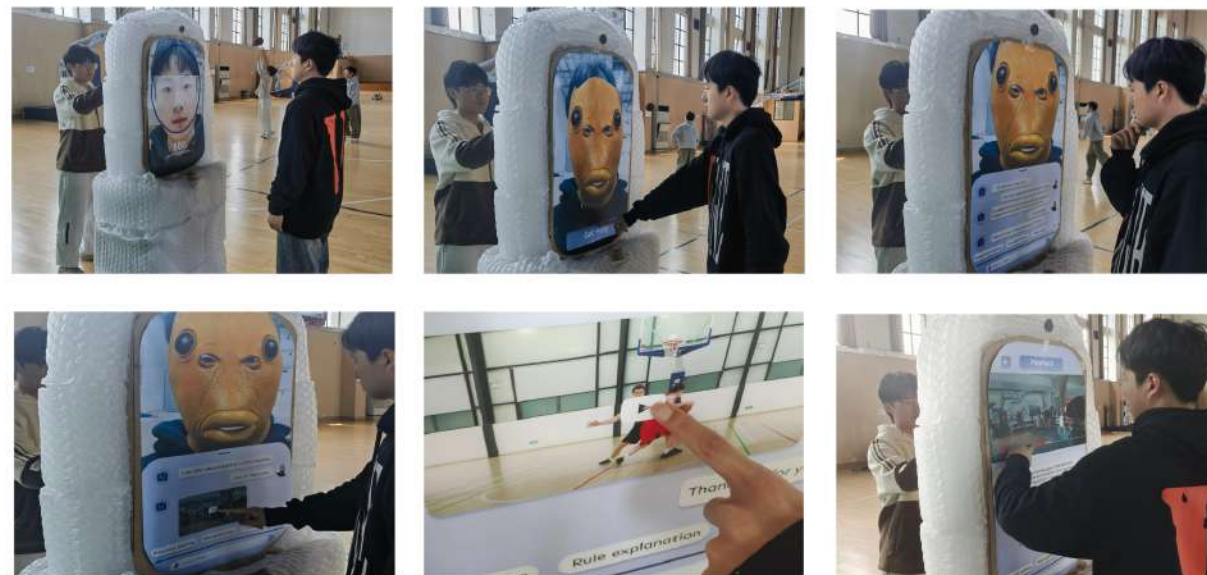
Sketch & Modeling & Prototype



Basic model made of cardboard and inflatable bumpers



Paper prototype



Conclusion

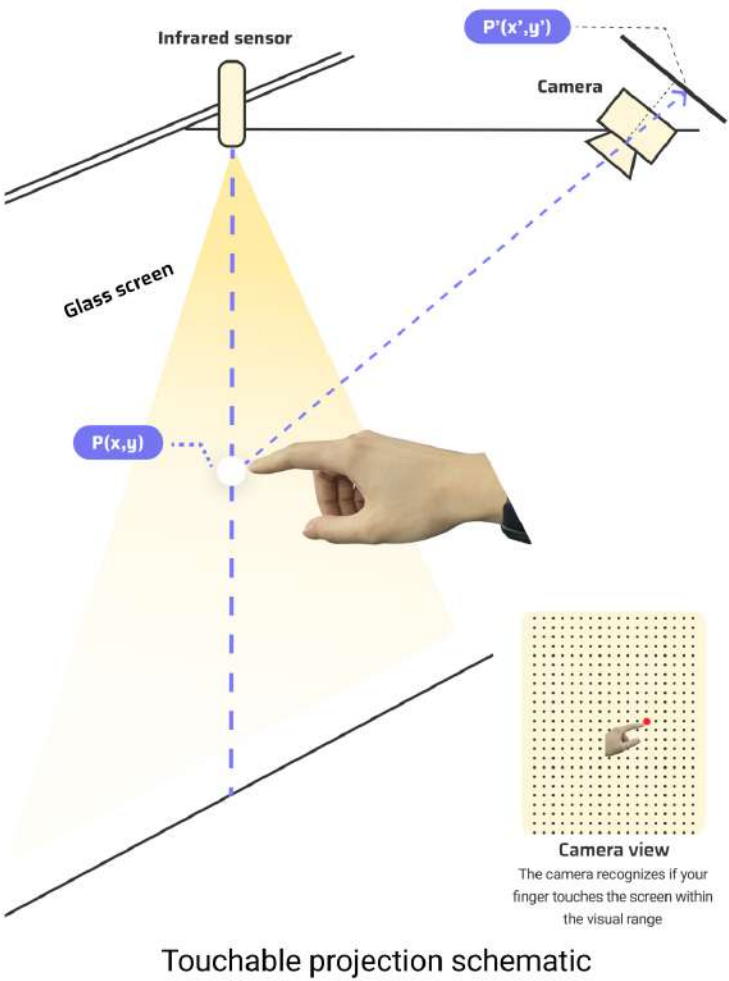
Due to frequent collisions occurring on the court, I chose to use a **projection to show images on impact-resistant glass** instead of traditional displays.



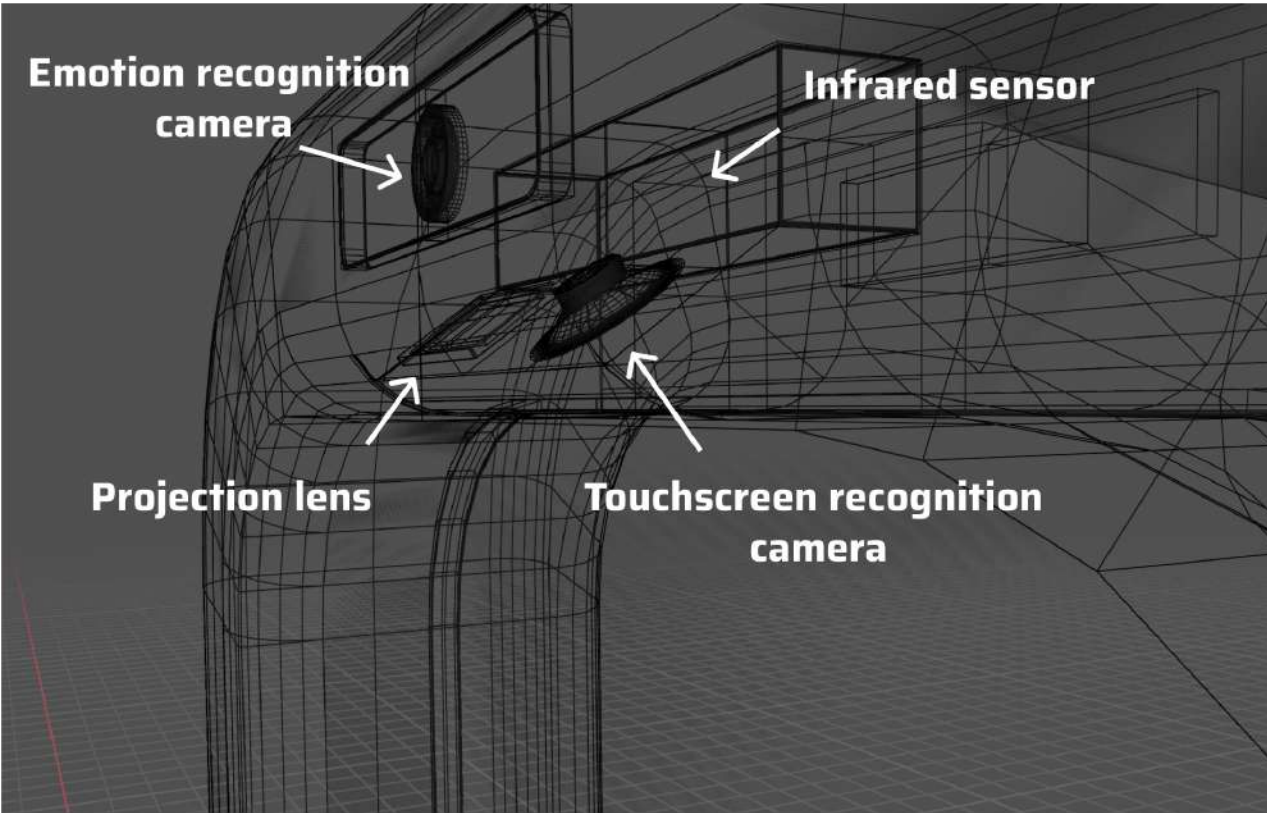
Through **usability testing**, I found that while physical exertion and AR filters can divert angry players' attention to some extent.

The key to truly resolving conflicts on the field lies in providing players with objective evidence and references.

Finalized Device

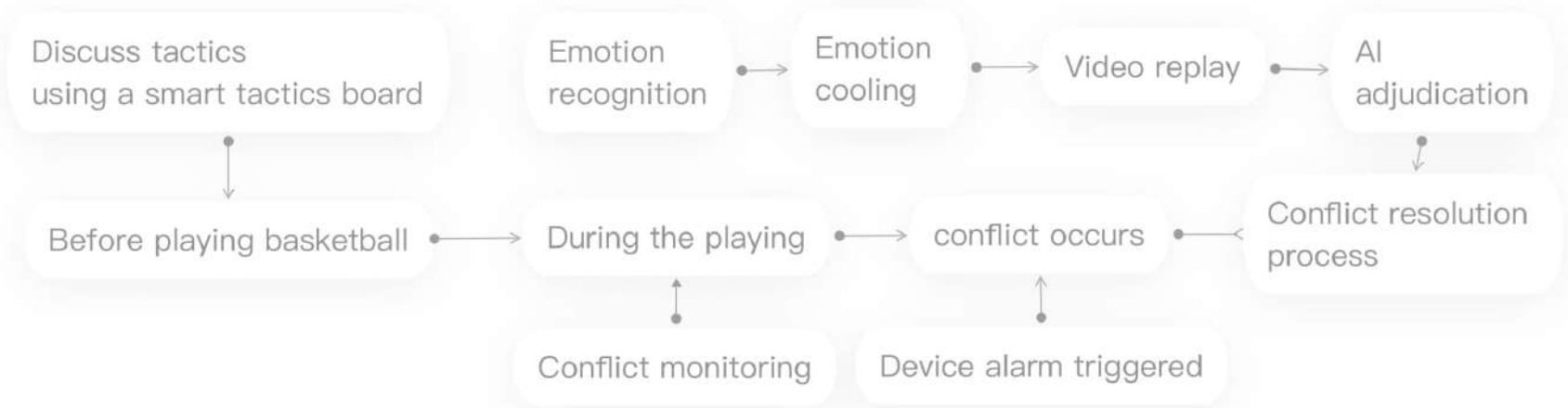


Based on Conclusions, I optimized the position of the projection device to make it more secure.

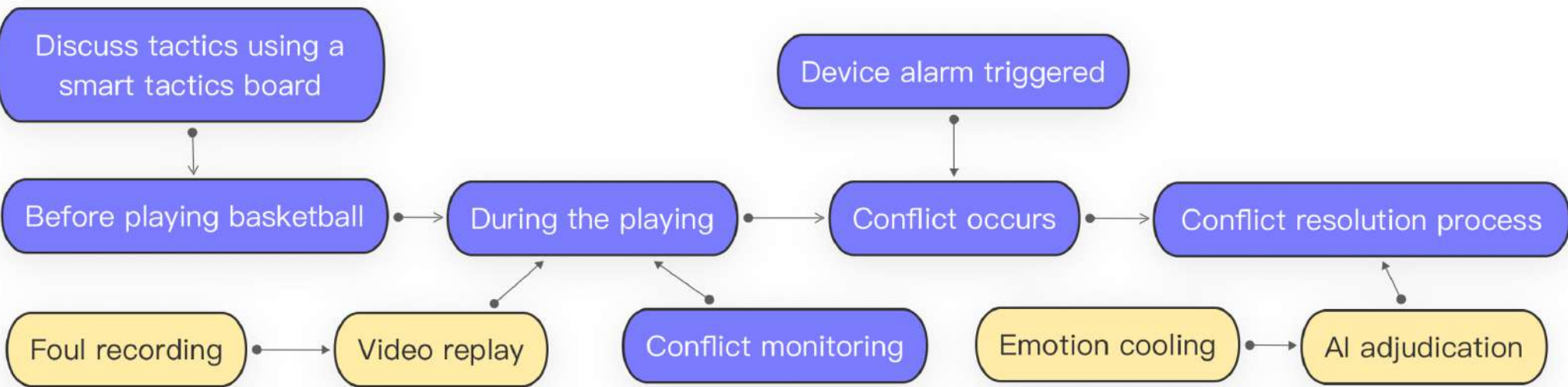


Besides, I improved the device's interaction process. I prioritized "video replay and reference to more effectively prevent conflicts, while "emotion cooling" will accompany players throughout the conflict resolution process.

Old flow chart x



New flow chart ✓

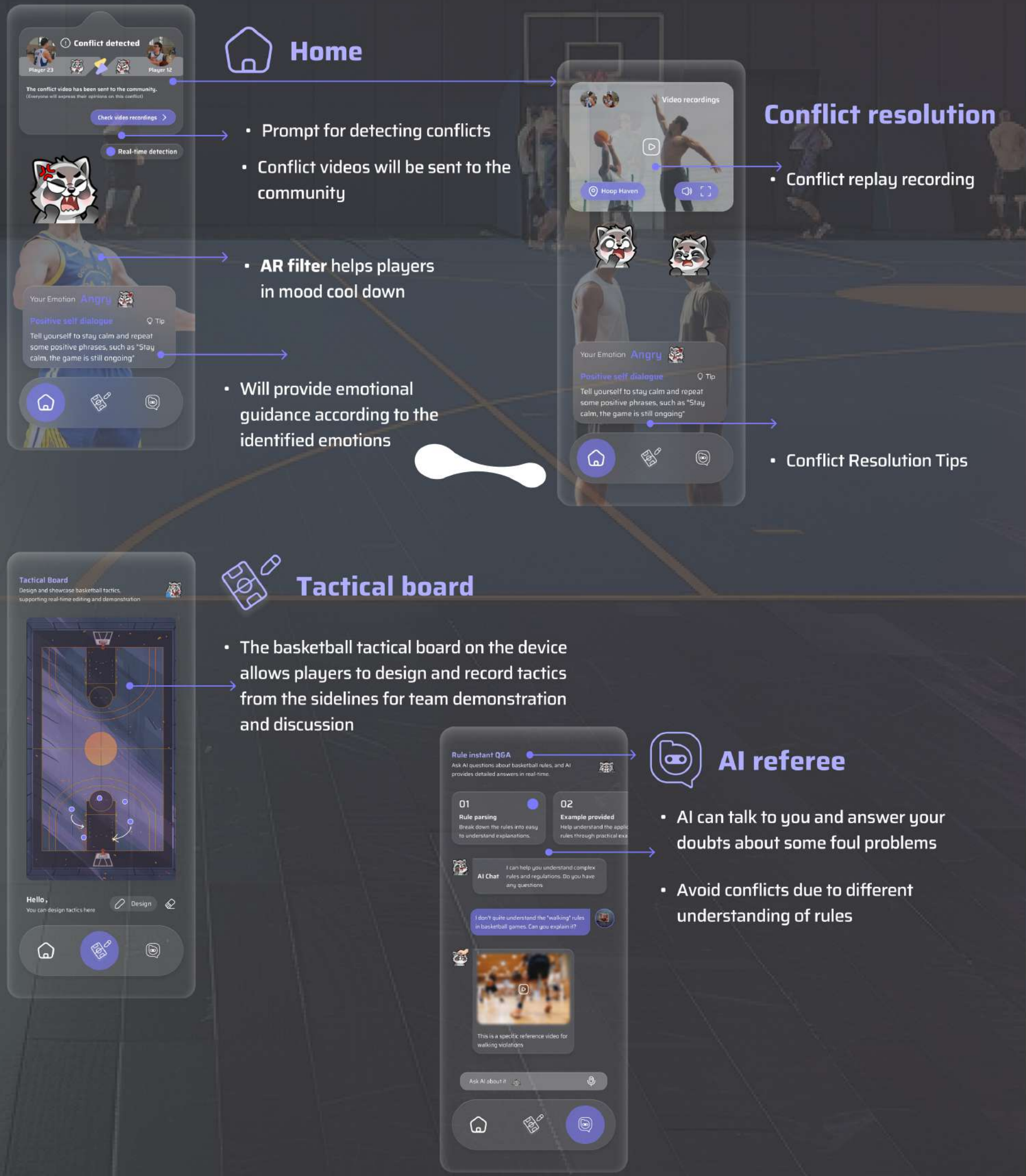


Usage scenario

Scene



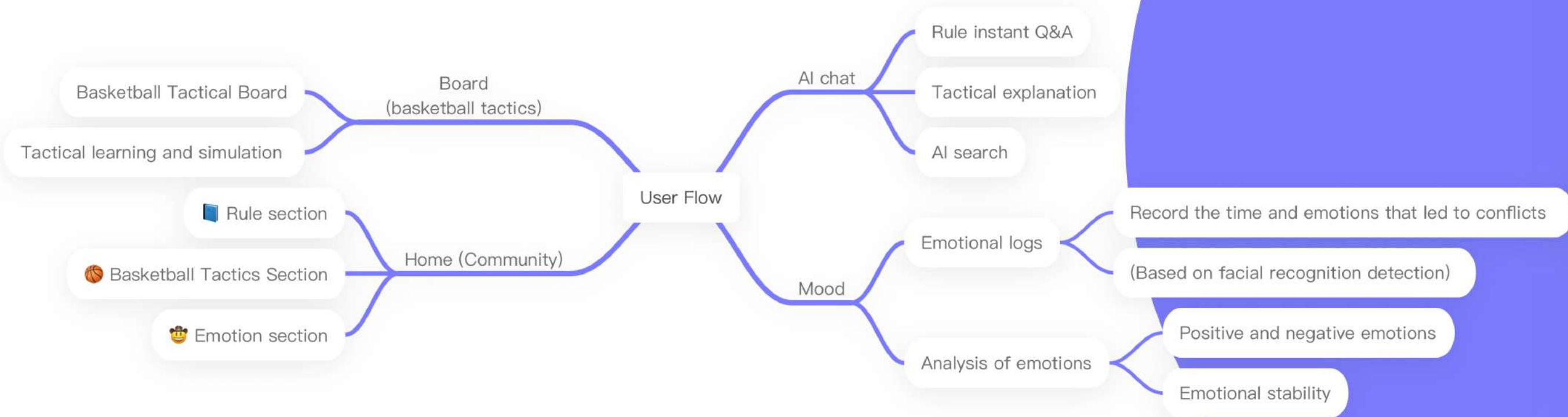
Device UI



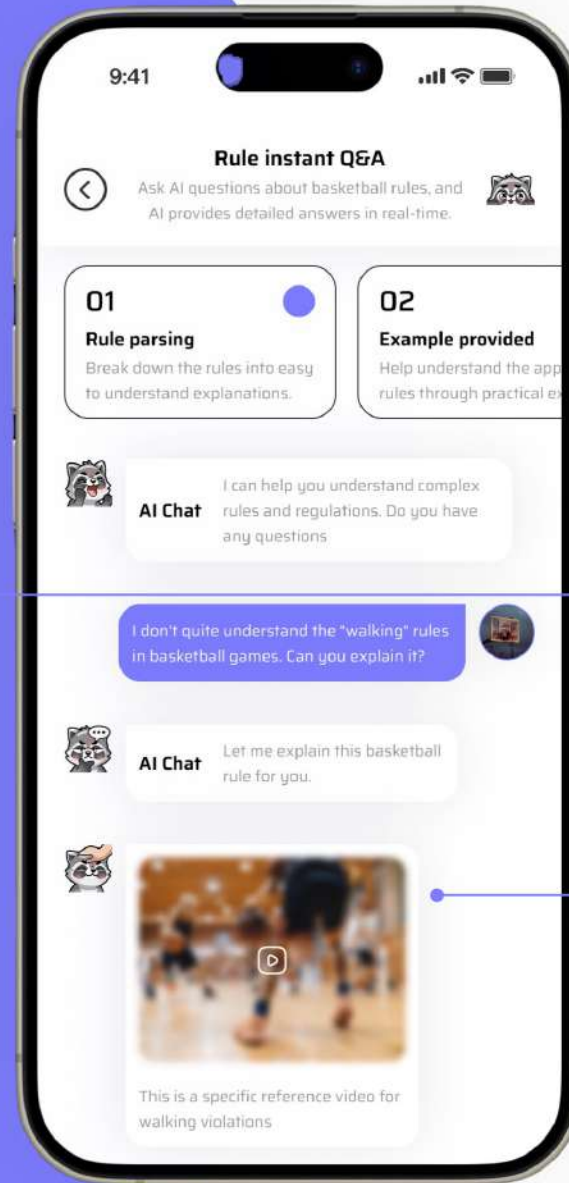
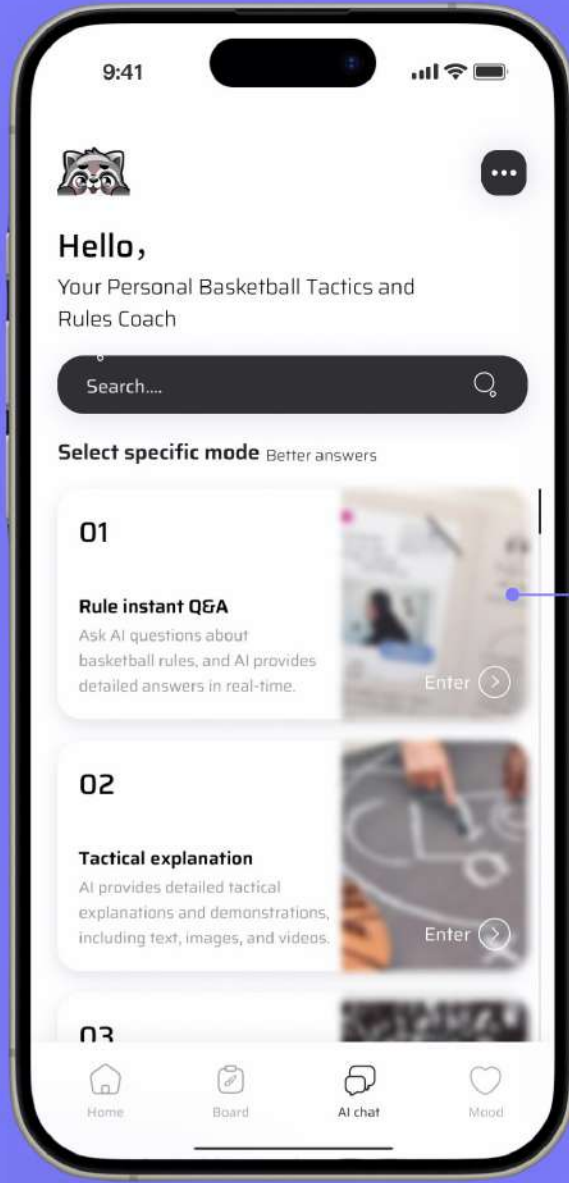
UI Design

Overview

Covering four major sections: **Home(community)**, **(basketball tactics)board**, **AI chat**, and **mood**.



Final Outcome

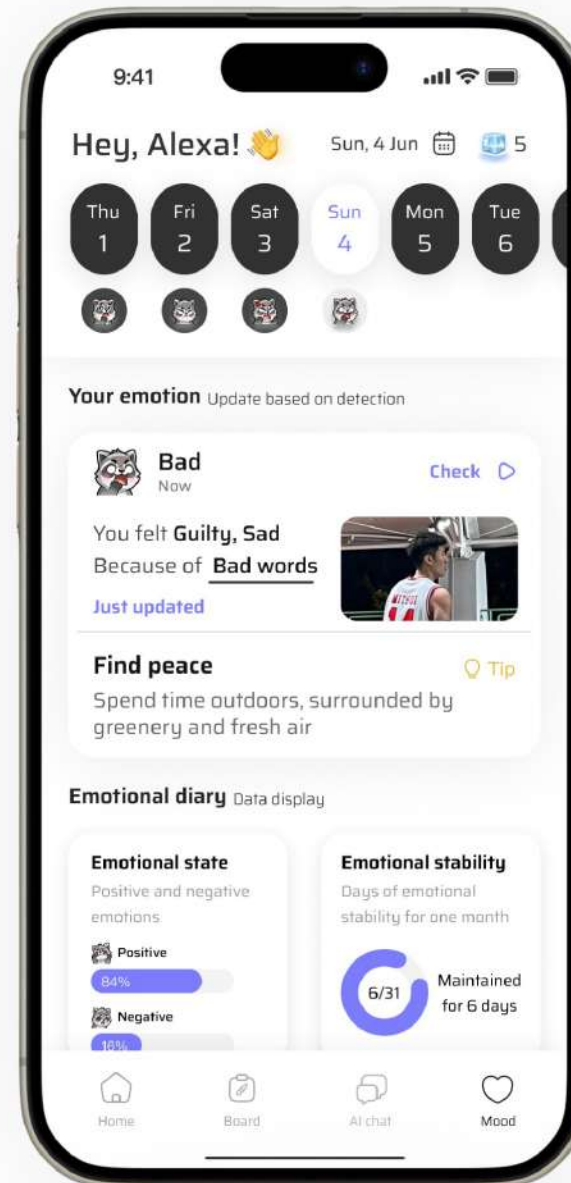


AI Coach



The AI chat module provides an intelligent dialogue platform where users can interact with AI, **inquire about basketball tactics, rules, and other related questions, and receive instant answers.**

- Rule instant Q&A
- Tactical explanation
- AI Search



Mood



The emotional diary module helps users record and manage emotional changes during basketball training and matches, **provides emotional management advice, and improves psychological resilience.**

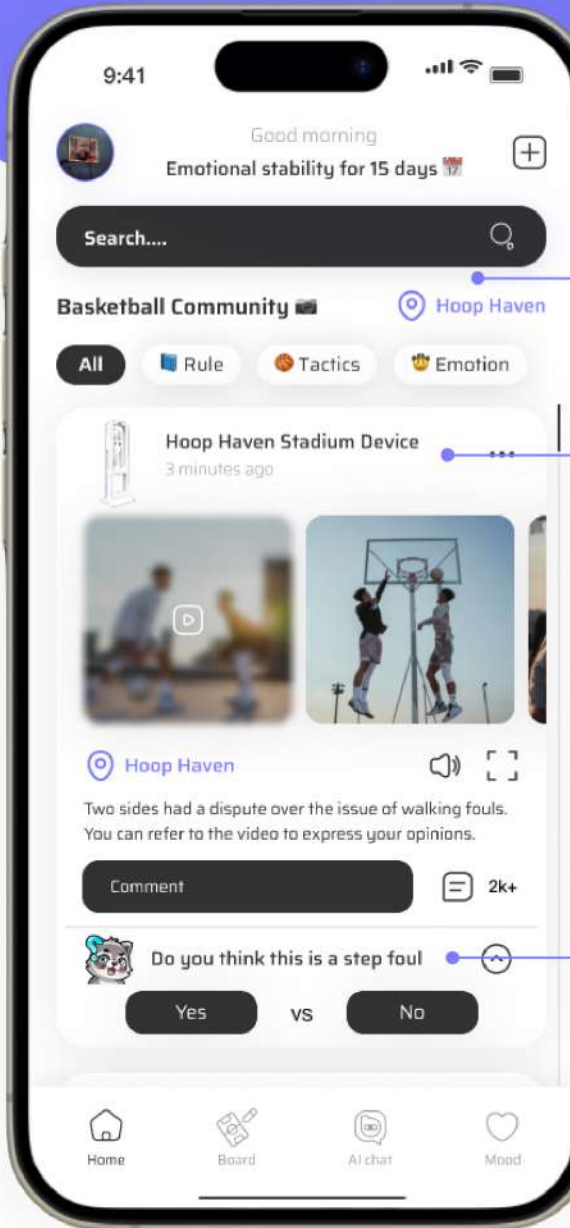
- Record the time and emotions that led to conflicts
- (Based on facial recognition detection)
- Positive and negative emotions
- Emotional stability

Home

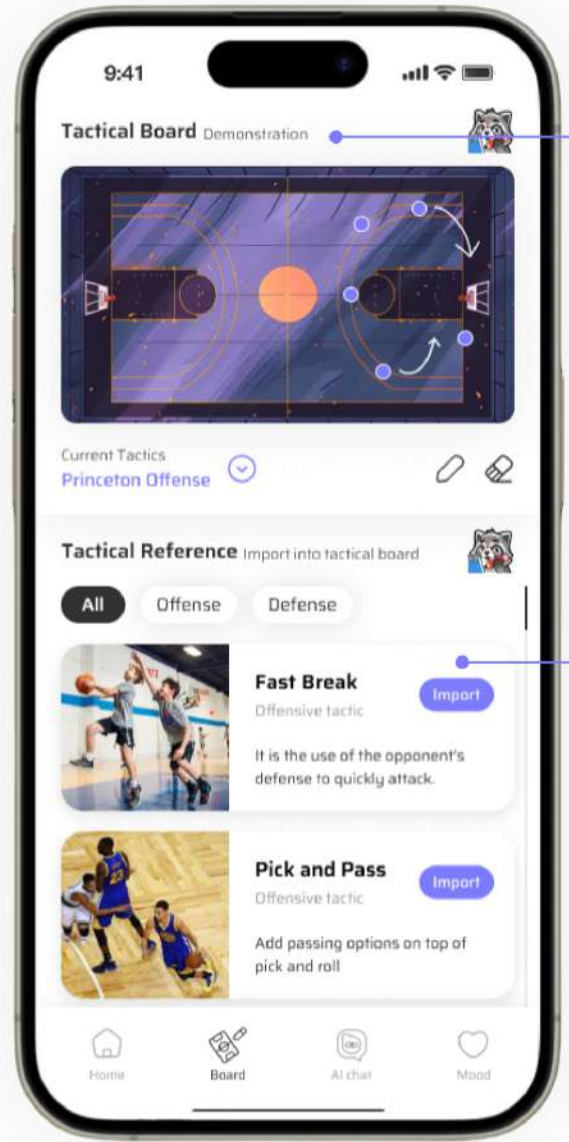


Basketball community, where everyone can freely view posts related to basketball and share emotions and experiences

- The conflicts detected by the device are uploaded to the community for evaluation and discussion



- Q&A encourages everyone to discuss and improve



Board



Using a basketball tactical board to facilitate collective tactical discussions, **encouraging teammate steam communication and seamless teamwork.**

- Tactical Board
- Tactical Reference

