Recommending and re-scheduling system based on mood prediction

Background

- Imaging you are no feel so good and sit on the floor of little room.
- No one know you are in that situation and no one talk to you.
- The bad mood will take quite long time to recover.

Loneliness and bad mood can lead:

For individual:

- Feeling hopeless or helpless
- Feeling inadequate or worthless
- Low work efficiency
- Unhealthy life

For society:

- Increase in drug abuse
- Higher suicide rate
- More violent cases

At the same time, unreasonable schedule will also increase people's pressure.

Purpose

Therefore, our goal is to give corresponding activity recommendations or advice in the right mood to

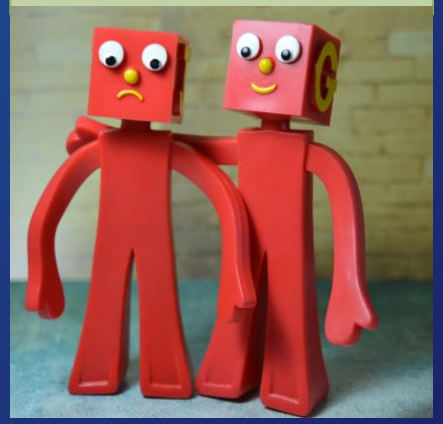
- keep user in a good mood or recover from bad mood
- keep user's work-life balance
- Arrange one's energy properly & Improve work efficiency
- Get ready for important events

Target user feature:

- Live alone
- Work long time in front of computers
- Have difficulty making decision

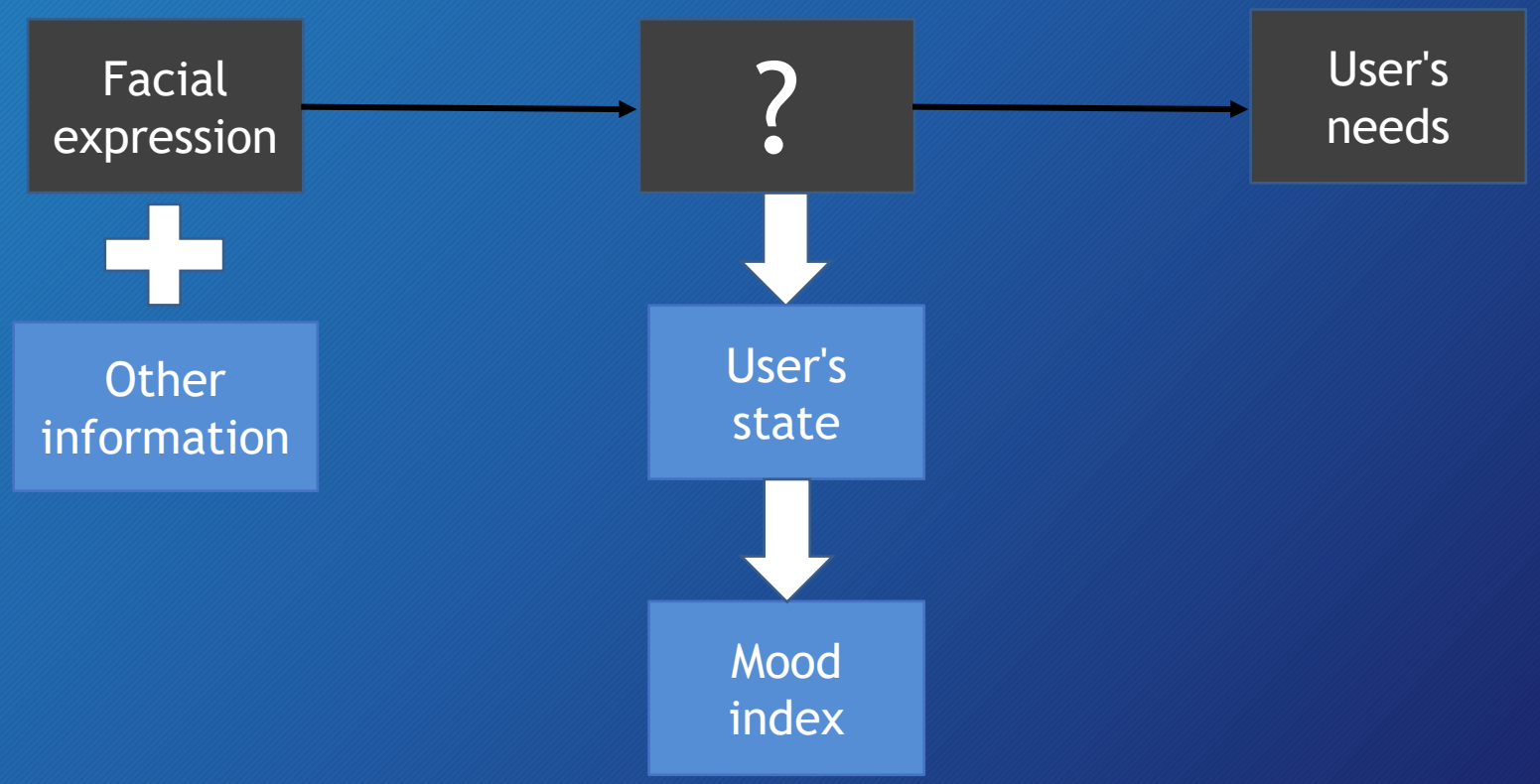
System image:

- 'a wise friend'

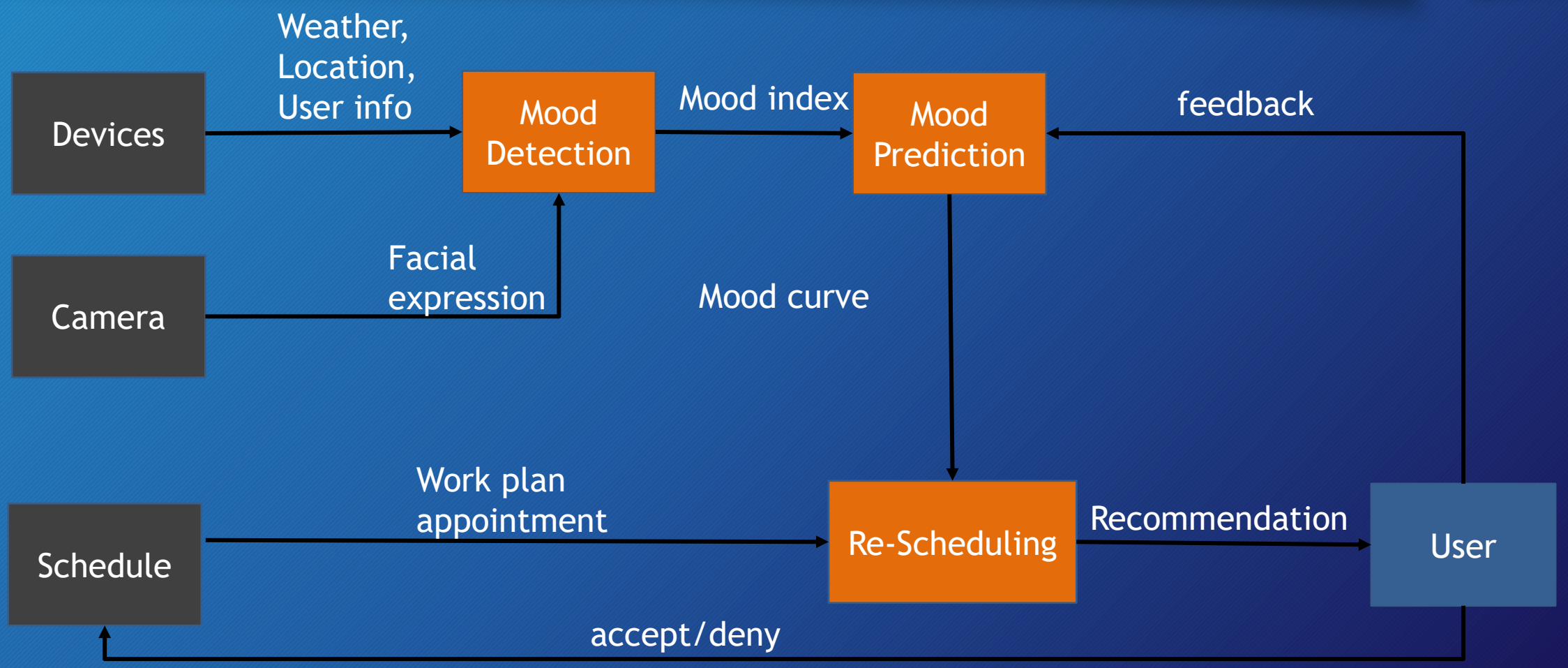


System Flowchart

How can we know the user's needs from facial expression?



System Flowchart



Module Introduction

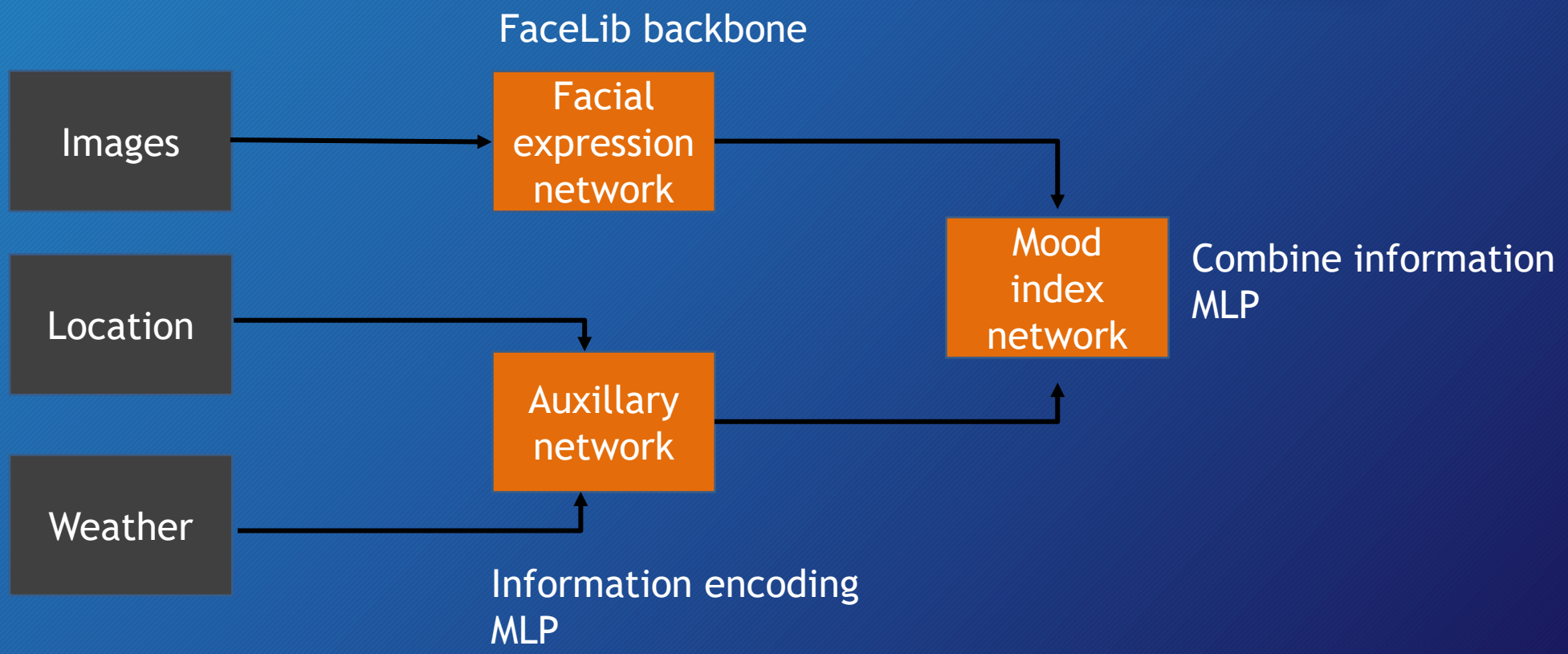
- The system consists of 4 modules:
  - Mood Detection Module
  - Mood Prediction Module
  - Recommendation Module
  - Re-scheduling Module

Mood Detection Module

- Analyze mood index from camera capture
- Moods are classified using mood indexes

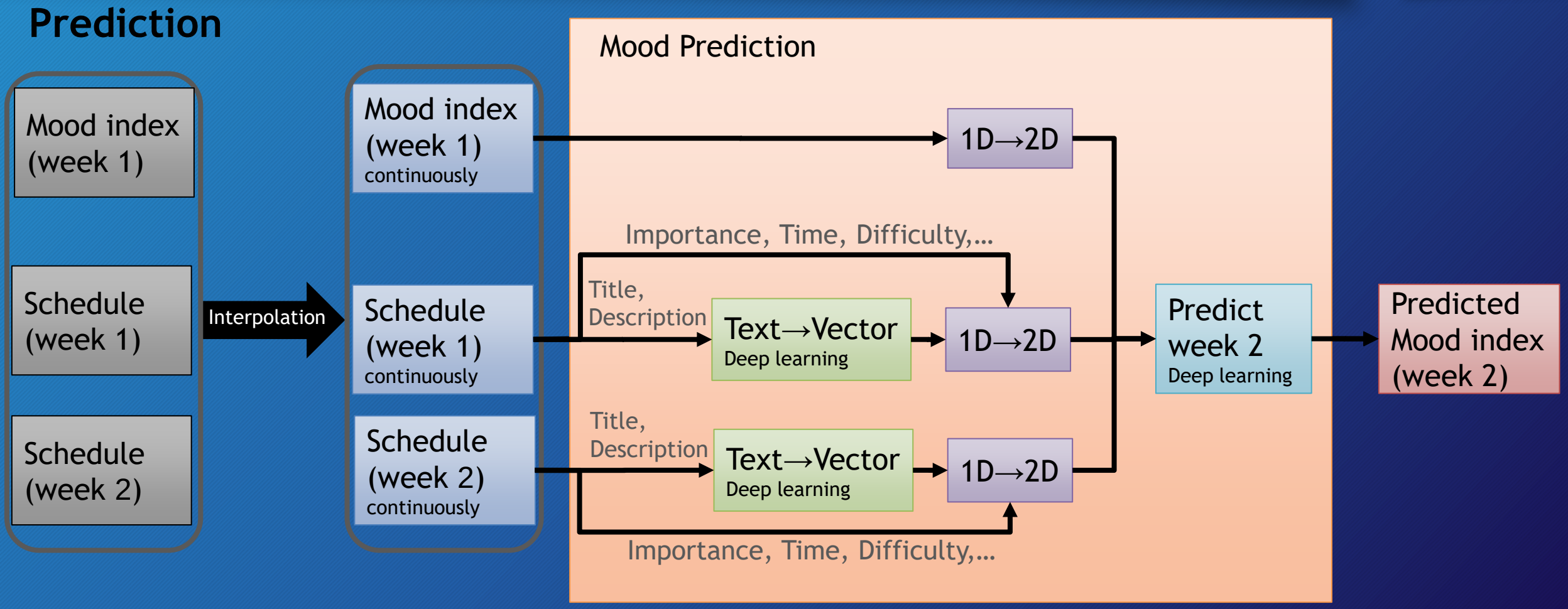
  [Stress, Chaotic, Happiness, Energy, Focus]
- Each mood index ranges from –1 to 1
- The information will be used for mood prediction
  - Location
  - Weather

Mood Detection Module



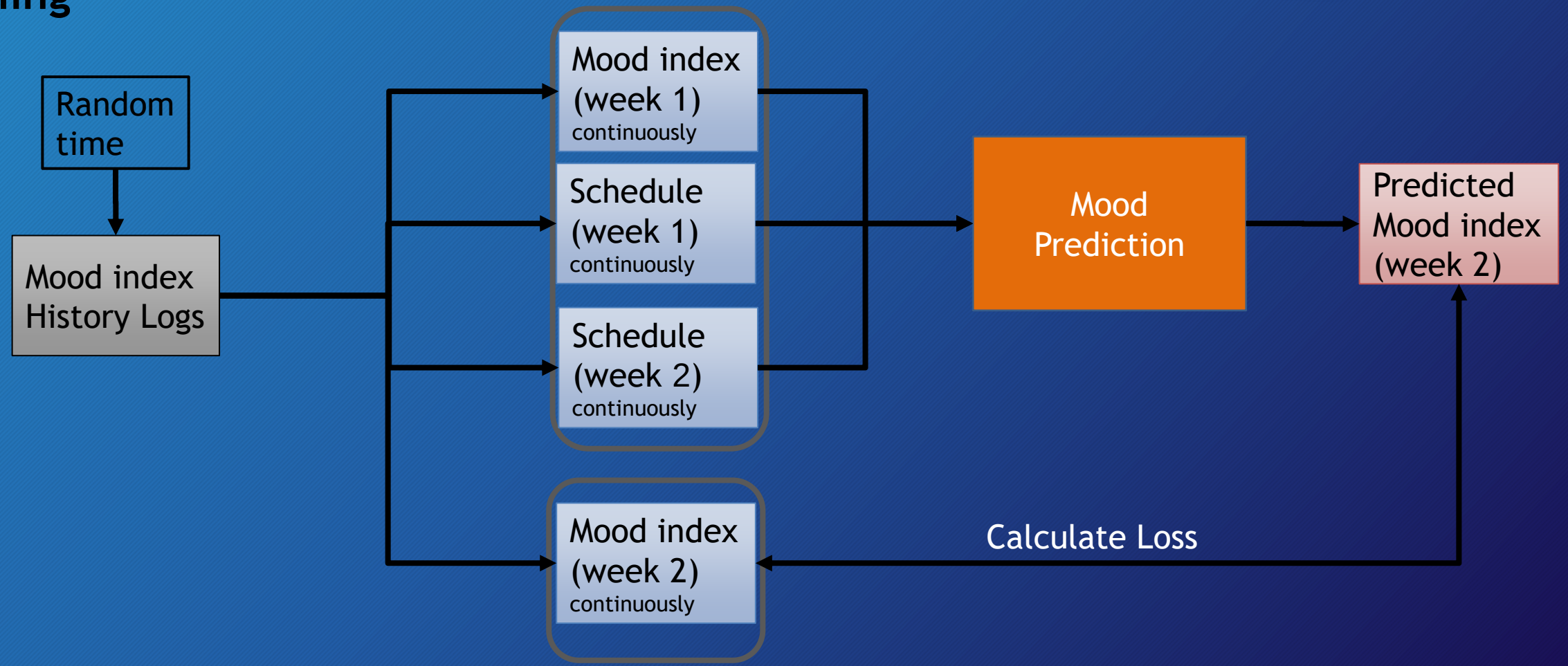
https://github.com/sajjjadayobi/FaceLib/tree/master/facelib

Mood Prediction Module



Mood Prediction Module

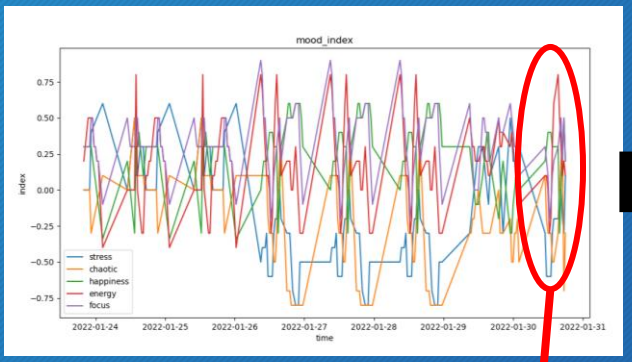
Training

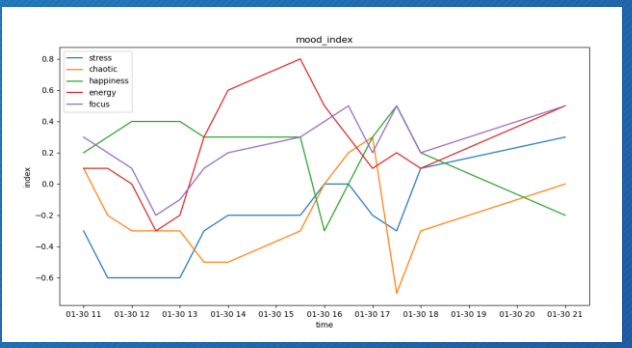


Mood Prediction Module (Demo)

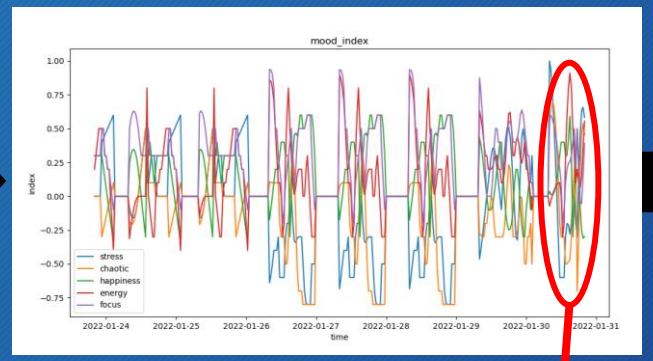
Prediction

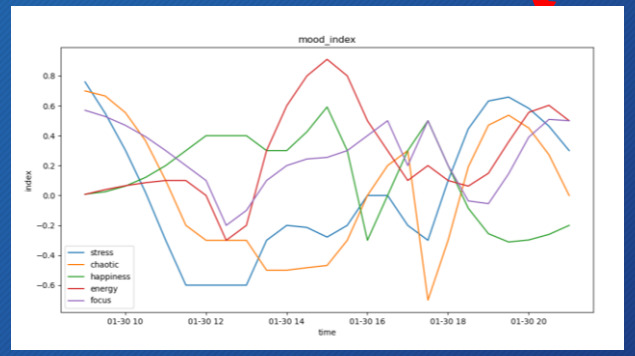
Mood index (week 1)





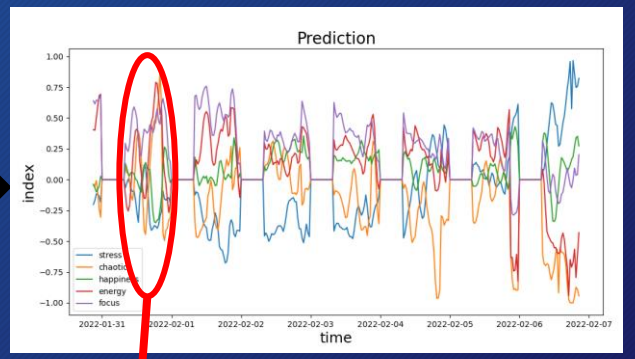
Mood index (week 1)
continuously

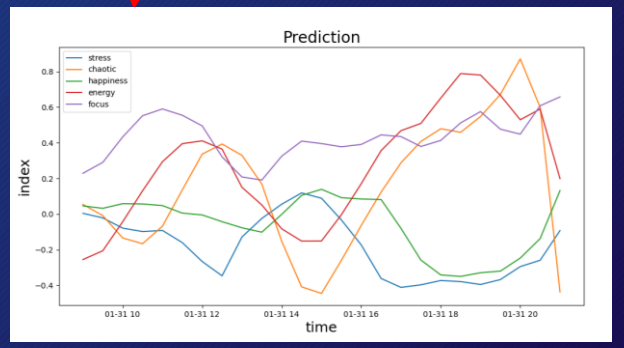




Mood Prediction

Predicted Mood index (week 2)

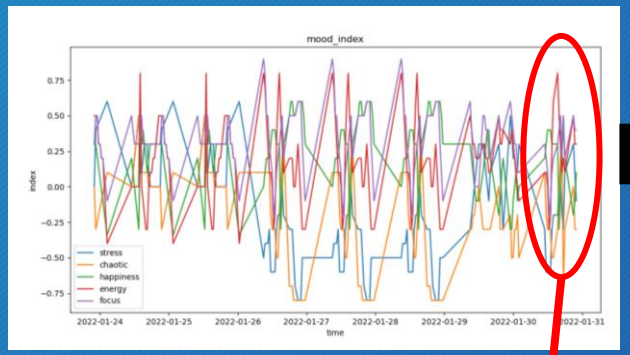


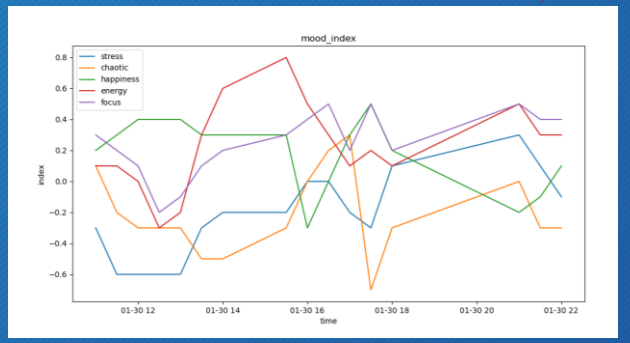


Mood Prediction Module (Demo)

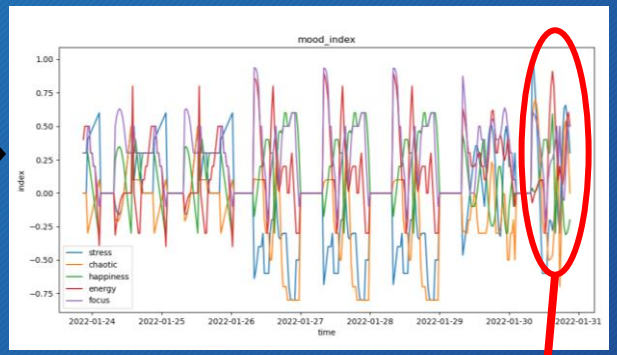
Prediction **After 1h**

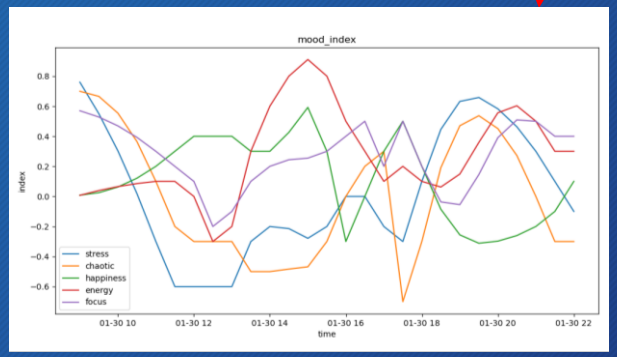
Mood index (week 1)





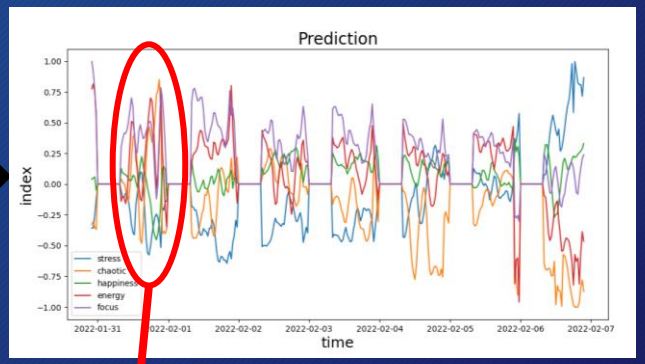
Mood index (week 1)
continuously

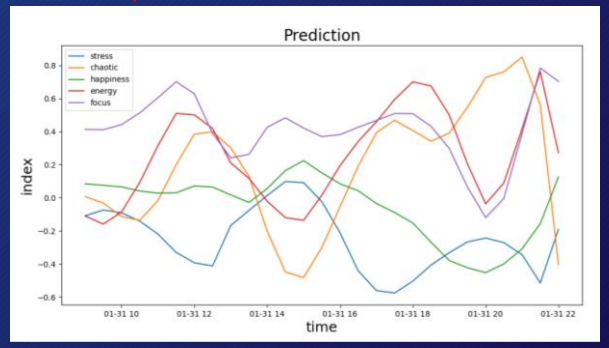




Mood Prediction

Predicted Mood index (week 2)

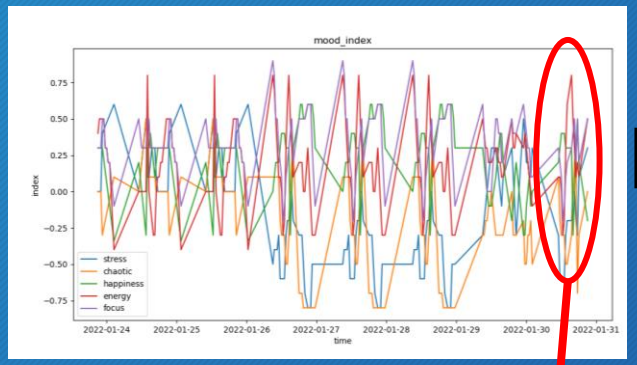


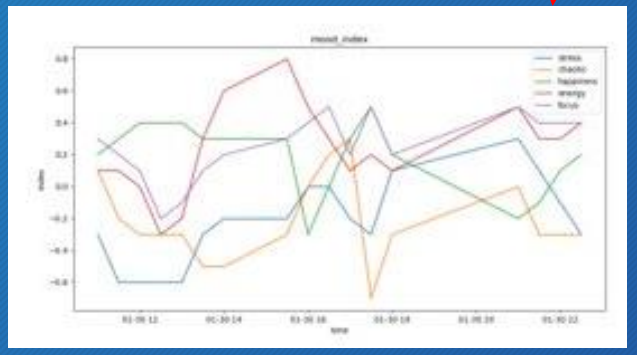


Mood Prediction Module (Demo)

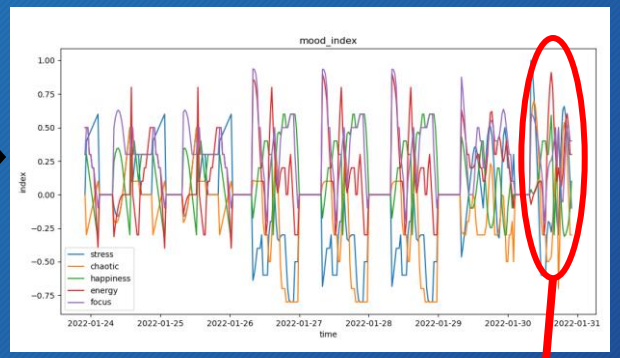
Prediction **After 2h**

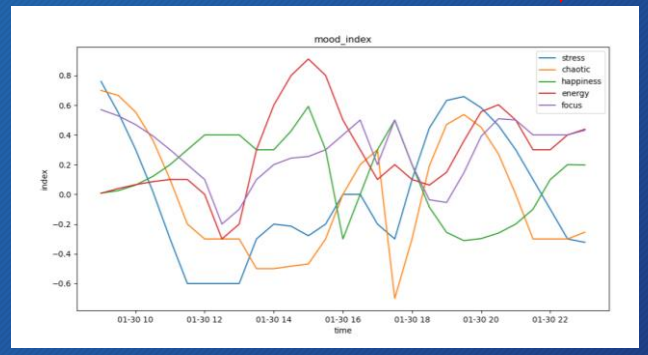
Mood index (week 1)





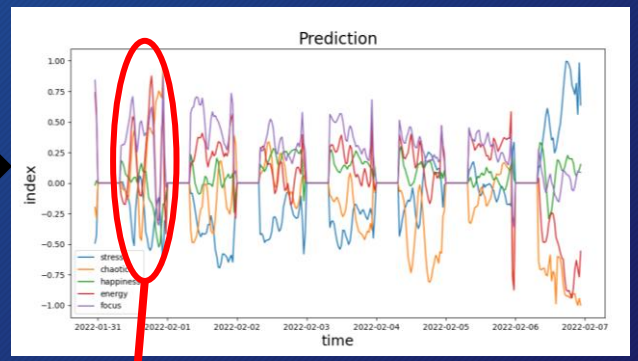
Mood index (week 1)
continuously

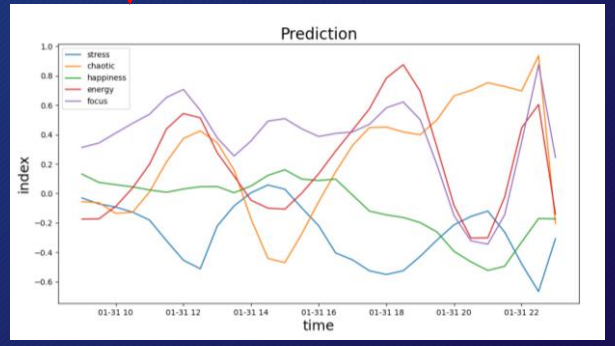




Mood Prediction

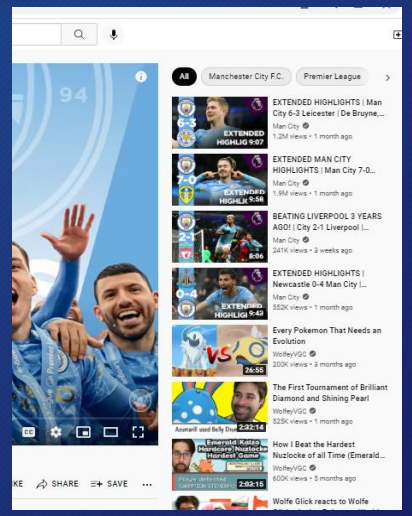
Predicted Mood index (week 2)

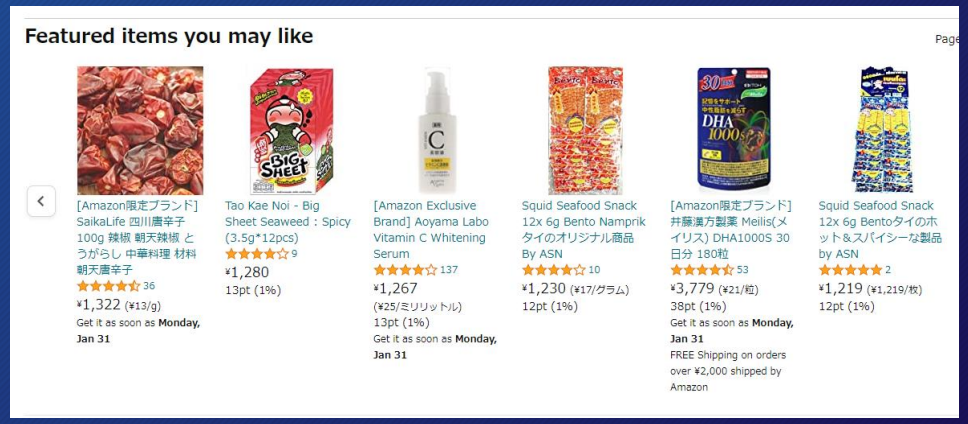




Recommendation Module

- Recommendation module uses mood indexes to recommend a suitable activities for the users
- We use Content-based filtering which can be commonly found online. i.e. Youtube, Amazon, Rakuten, etc.
- For each recommendable activity, we set a suitable mood state. i.e. Hot shower:
  [Stress, Chaotic, Happiness, Energy, Focus] =
  [1, 0, -1, 0, -1]
- We can use the current mood state [0, -0.5, 0, 0.6, -0.6] to calculate for suitability value with each recommendable activity (cosine value between the two vectors)
- We recommend the top 3 activities with the highest suitability value





Recommendation Module (Demo)

localhost:8888/notebooks/recommender%20algorithm.ipynb

jupyter recommender algorithm Last Checkpoint: 01/10/2022 (unsaved changes)

```
        list2.append(i)
        if len(list2) > 1:
            if len(list2) > 3:
                break
            for j in range(len(list2)-1):
                if df['Activity id'][list2[j]] == df['Activity id'][i]:
                    list2.pop(-1)
                    break

    return list2

#rec = get_recommendations(l)
#rec
s=0
c=-.5
h=0
e=.6
f=-.6
column_list = ["Stress", "Chaotic", "Happiness", "Energy", "Focus"]
l = pd.DataFrame([[s, c, h, e, f]], columns=column_list)
ac_indices = get_recommendations(l)
for i in range(0,3,1):
    print(df['Activity id'][ac_indices[i]])
```

```
Shopping
Swimming
Hot shower
```

In [9]:
```
df
```

Out[9]:

	Stress	Chaotic	Happiness	Energy	Focus	Activity id	Rating
0	1	0	-1	0	-1	Hot shower	5
1	0	1	1	-1	-1	Cold shower	5

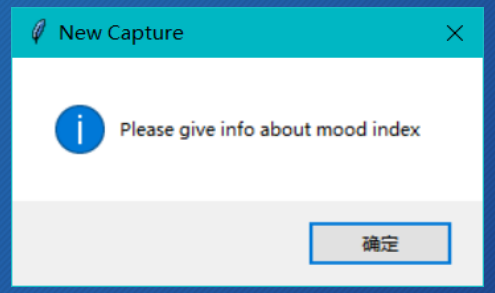
Re-scheduling Module

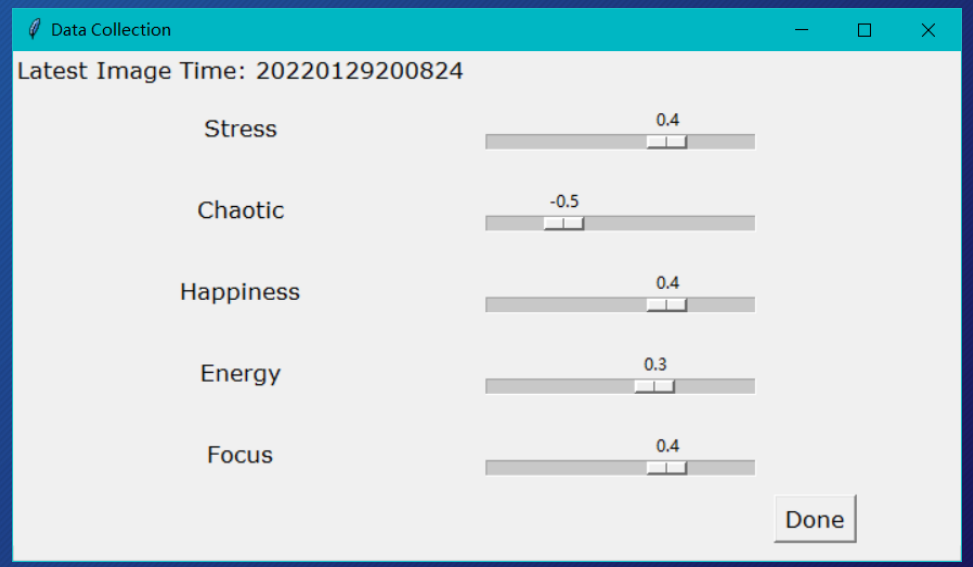
- **Add action**
  - The user sets his available time period. Work time, spare time, sleep and lunch time.
  - Basic arranging principle:
    - Finish as soon as possible.
    - Higher difficulty **D** needs higher mood state, have higher basic mood state threshold.
    - 0: no requirement
    - 1-5: **E**>**D**x0.05, **F**>**D**x0.05, **H**>-0.5+**D**x0.1, **Ch**<-**D**x0.05 threshold
    - **Suitable mood state [s, c, h, e, f] = [0, -0.15 * D, 0.1*D, 0.15 * D, 0.15 * D]**
    - Expected time required and deadline will be used to decide the latest time to the work.
  - Filter time period by setting mood index thresholds.
  - Calculate the suitability score and find the best time period.
    - Suitability score **SS** = (Importance **I+1)/6 x** closeness **C**
  - Reschedule every time a new work is added
- **Delete action**
  - Delete the pending work.
- **Completion action**
  - The work has been done.

Data collection

- Training data for mood detection
  - A program to capture your face and record location, weather and mood at the same time.

Photo from Web Camera





20220129190941: 31.3093 120.602 500 66 3.29 -0.4 0.2 -0.3 0.4 0.6

Time/Latitude/Longitude/Weather code/Temperature/Mood index

Data collection

- Training data for mood prediction
  - An expert evaluation intruduction to decide the mood index

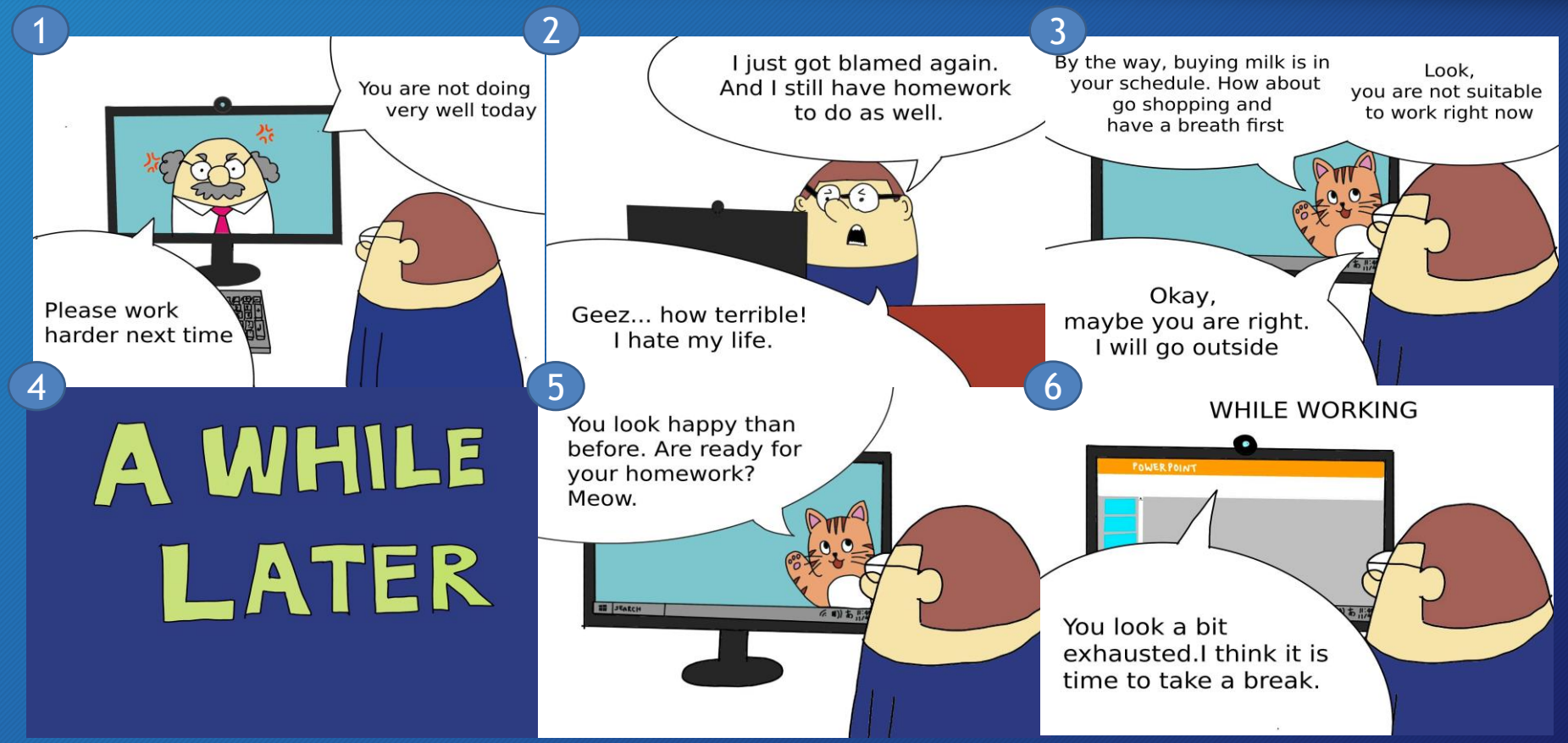
Event format

Title:	[string]	('xxx')	('CPI meeting')
Description:	[string]	('xxxx,xxxx,xxxx')	('discuss about the system requirement')
Importance:	[int]	(0,1,2,3,4,5)	(0 for default and 1 is least)
Difficulty:	[int]	(0,1,2,3,4,5)	(0 for default and 1 is easiest)
Comment:	[enum]	(1:life, 2:study, 3:work, 4:entertainment, 5:special, 6:other)	(3)
Time:	[int]	(week,hour)	(1(Monday), 13.5(13:30))
Lasting period:	[int]	(hours)	(2)

- Collect 1151 pieces of data from members

comment = [1:life, 2:study, 3:wo		Input							groundtruth					
Mood ID	timestamp	Title	Descriptio	Importanc	Difficulty	Comment	Lasting pe	feedback	Stress&W	Chaotic	Happiness	Energy	Focus	
1	1/10/2022 13:30	Get up	Get up sn	0	2	1	0	0	0.5	-0.5	0	0.2	0	0
2	1/10/2022 14:00	Get up	Get up sn	0	2	1	0.5	0	0.3	-0.7	0.1	0.1	0.2	0
3	1/10/2022 14:30	Lunch	Lunch	5	0	1	0	0	0.1	-0.9	0.2	0	0.4	0
4	1/10/2022 15:00	Research	Do resear	5	4	3	0	0	0.1	-1	0.5	1	1	0
5	1/10/2022 15:30	Research	Do resear	5	4	3	0.5	0	-0.02857	-0.97143	0.542857	0.771429	0.914286	0
6	1/10/2022 16:00	Research	Do resear	5	4	3	1	0	-0.15714	-0.94286	0.585714	0.542857	0.828571	0
7	1/10/2022 16:30	Research	Do resear	5	4	3	1.5	0	-0.28571	-0.91429	0.628571	0.314286	0.742857	0
8	1/10/2022 17:00	Research	Do resear	5	4	3	2	0	-0.41429	-0.88571	0.671429	0.085714	0.657143	0
9	1/10/2022 17:30	Research	Do resear	5	4	3	2.5	0	-0.54286	-0.85714	0.714286	-0.14286	0.571429	0
10	1/10/2022 18:00	Research	Do resear	5	4	3	3	0	-0.67143	-0.82857	0.757143	-0.37143	0.485714	0

Demo Manga


1
You are not doing very well today
Please work harder next time
2
I just got blamed again. And I still have homework to do as well.
Geez... how terrible! I hate my life.
3
By the way, buying milk is in your schedule. How about go shopping and have a breath first
Look, you are not suitable to work right now
Okay, maybe you are right. I will go outside
4
A WHILE LATER
5
You look happy than before. Are ready for your homework? Meow.
6
WHILE WORKING
POWERPOINT
You look a bit exhausted.I think it is time to take a break.

Demo Video

- Video here

Conclusion

- Limitation:
  - Need a lot of data to train (mood detection and mood prediction)
  - Require time to learn about the user's preferences
- Future work:
  - Improve the re-scheduling module by increasing the importance of work that is getting close to the deadline
  - Utilize data collected from the application in view of organization
  - Apply to team's work schedule
  - Arrange team meeting based on team's future mood prediction

Thank you for listening.