

CODEEG

User Manual

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01 Core Features

Web Application app.py

라우팅 처리, 비동기 테스크 처리 및 결과
와 렌더링 등 프로젝트의 메인 Flask
웹 애플리케이션

Data Processing

EEG / IMAGE data processing
및 virtual try-on 등
데이터 처리를 위한 step

Recommendation Workflow task.py

EEG 데이터를 기반으로
상의와 하의 각각의 이미지와
상하의 조합을 추천해주기 위한 단계

01 Core Features

Web Application app.py

라우팅 처리, 비동기 테스크 처리 및 결과 렌더링 등 프로젝트의 메인 Flask 웹 애플리케이션

[Web Application (app.py)]

- **역할:** 프로젝트의 메인 Flask 웹 애플리케이션.
- **주요 기능:**
 - 라우팅 처리 (/step1, /step2, /step3).
 - 이미지 업로드 및 세션 관리.
 - 가상 착용 기능 (dress_up.py 호출).
 - 비동기 태스크 처리 및 결과 렌더링.

01 Core Features

Data Processing

EEG / IMAGE data processing
및 virtual try-on 등
데이터 처리를 위한 step

[EEG Data Processing]

- **ERP Analysis**
 - `erp_combination.py`와 `erp_combination2.py`: EEG 데이터에서 P300 피크를 분석해 사용자의 의류 선호도를 파악
- **Recommendation**
 - `recommendation.py`: 상의 및 하의 각각의 Top 5 추천.
 - `recommendation2.py`: 상하의 조합 중 Top 3 추천.

01 Core Features

Data Processing

EEG / IMAGE data processing
및 virtual try-on 등
데이터 처리를 위한 step

[Image Processing]

- **Image Resize & Combination**

- **task.py:** 상의 및 하의 이미지를 리사이즈.
- **task2.py:** 상하의 조합 이미지를 생성 및 리사이즈.

[Virtual Try-On]

- **dress_up.py:**

- Replicate API를 통해 상의와 하의의 가상 착용 이미지를 생성.
- 결과 이미지를 지정된 디렉토리에 저장.

01 Core Features

Recommendation Workflow task.py

EEG 데이터를 기반으로
상의와 하의 각각의 이미지와
상하의 조합을 추천해주기 위한 단계

[Recommendation Workflow]

- 상의 및 하의 추천 (task.py)
 - 목적: EEG 데이터를 기반으로 상의와 하의 각각의 Top 5 이미지를 추천.
 - 주요 프로세스:
 1. 이미지 전처리: 상의 및 하의 이미지를 리사이즈.
 2. ERP 분석: erp_combination.py를 사용해 EEG에서 P300 피크 추출.
 3. 추천: recommendation.py를 호출해 P300 피크를 기반으로 Top 5 이미지를 추출.
 4. 저장: 추천된 이미지를 지정된 디렉토리에 저장.
- 상의-하의 조합 추천 (task2.py)
 - 목적: EEG 데이터를 기반으로 상하의 조합 중 Top 3를 추천.
 - 주요 프로세스:
 1. task.py로 상의와 하의 각각의 Top 5 이미지를 추출.
 2. 조합 생성: 상의/하의 Top 5를 조합해 25장의 상하의 조합 이미지를 생성 및 리사이즈.
 3. ERP 분석: erp_combination2.py를 사용해 조합 이미지에 대한 P300 피크 추출.
 4. 추천: recommendation2.py를 호출해 P300 피크를 기반으로 Top 3 조합을 선정.
 5. 저장: 조합에 사용된 상의, 하의 이미지를 포함해 해당 조합을 지정된 디렉토리에 저장.

02 Supporting Utilities

[Preprocessing (preprocess.py)]

- EEG 데이터 전처리:
 - 필터링, 노멀라이제이션, 에포크 추출 지원.
- 이미지 전처리:
 - 디렉토리 내 모든 이미지를 리사이즈 및 결합.

[Signal Filtering (iir.py)]

- Butterworth 필터를 적용해 EEG 신호를 정리
- (Bandpass, Lowpass, Highpass 지원).

[Data Analysis (analysis.py)]

- ERP 분석 기법 제공.
- 데이터 전처리 및 동기화 기능 포함.

[Visualization (plot.py)]

- EEG 데이터와 주파수 분석 결과 시각화.
 - PlotEEG: EEG 채널 데이터를 시각화.

03 Directory Structure

```
CODEEG/
├── __pycache__/
├── data/          # Directory for storing EEG data
├── event/         # Directory for storing event data
├── images/        # Repository for original images
├── plot/          # Directory for storing ERP analysis plots
│   ├── bottoms/    # Plots related to bottoms
│   ├── combination/ # Plots related to combinations
│   └── tops/       # Plots related to tops
├── run/           # Scripts for execution
└── src/           # Source code directory
    ├── __pycache__/
    ├── analysis.py  # EEG analysis module
    ├── iir.py       # Signal filtering module
    ├── plot.py      # Data visualization module
    ├── preprocess.py # Data preprocessing module
    ├── recommendation.py # Clothing recommendation algorithm
    ├── recommendation2.py # Improved clothing recommendation algorithm
    ├── task.py       # Basic experiment task
    └── task2.py     # Improved experiment task
    ├── static/
    │   ├── css/       # Stylesheets
    │   ├── data/      # Data files for web
    │   ├── images/    # Images for web
    │   └── images/    # Images for web
    │       └── result # recommended images results (top garments, bottom garments, combinations)
    ├── js/           # JavaScript files
    └── uploads/      # User-uploaded files
    └── templates/
        ├── dress_up.html # Virtual fitting page
        ├── index.html    # Main page
        ├── report.html   # Result report page
        ├── start_page.html # Start page
        ├── step1.html    # Step 1 experiment page
        ├── step2.html    # Step 2 experiment page
        └── step3.html    # Step 3 experiment page
    ├── app.py         # Flask web application
    ├── dress_up.py   # Virtual fitting logic
    ├── erp_combination.py # ERP-based clothing combination analysis
    └── erp_combination2.py # Improved clothing combination analysis
└── README.md      # Project documentation
```

04 Key Modules

Task Modules

- **task.py**: 상의 및 하의 추천을 위한 상위 5개 이미지 선택.
- **task2.py**: 상하의 조합 추천을 위한 상위 3개 조합 선택.

ERP-Based Recommendation

- **erp_combination.py**: 상의/하의 선호도 분석.
- **erp_combination2.py**: 상하의 조합 선호도 분석.

Virtual Try-On

- **dress_up.py**: 가상 착용 이미지 생성.

05 Workflow Summary

app.py를 실행하면 다음을 수행할 수 있는 웹사이트와 연결

1. EEG 데이터와 이미지를 결합하여 상의, 하의 추천 수행 (**task.py**) - **Step1**
2. 상하의 조합 이미지를 생성 후, 최종 조합 추천 수행 (**task2.py**). - **Step2**
3. 사용자 이미지를 업로드.
4. 가상 착용 이미지를 생성 (**dress_up.py**).
5. 결과를 웹 애플리케이션에 표시. - **Final Output**

STEP 1

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CODEEG란?

주의사항 및 동의 안내

개인정보 수집 및 이용 동의

뇌파 장비 착용 확인

주의사항

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CODEEG

해당 버튼 클릭 시 테스트 페이지 접근 가능

뇌파 기기 착용 하셨나요?

개인정보 수집 및 이용 동의 하시나요?

다음

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STEP 1

뇌파를 활용하여 사용자가 관심을 가지는 의류(상의/하의)를 탐색하고,
해당 옷을 사용자의 사진에 생성형 AI 기반으로 합성해 시각적으로 어울리는지 확인 가능



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BOTTOM TEST

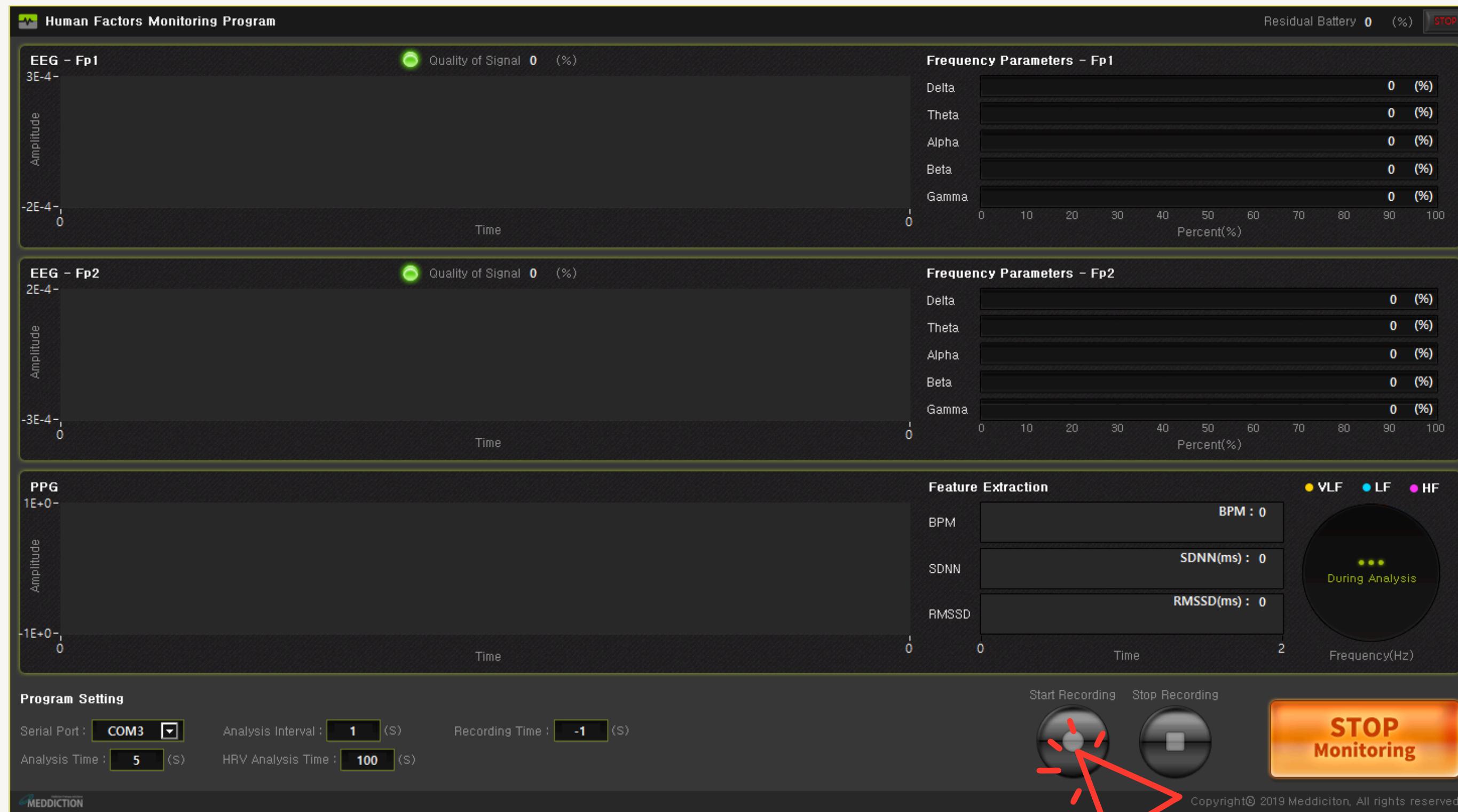
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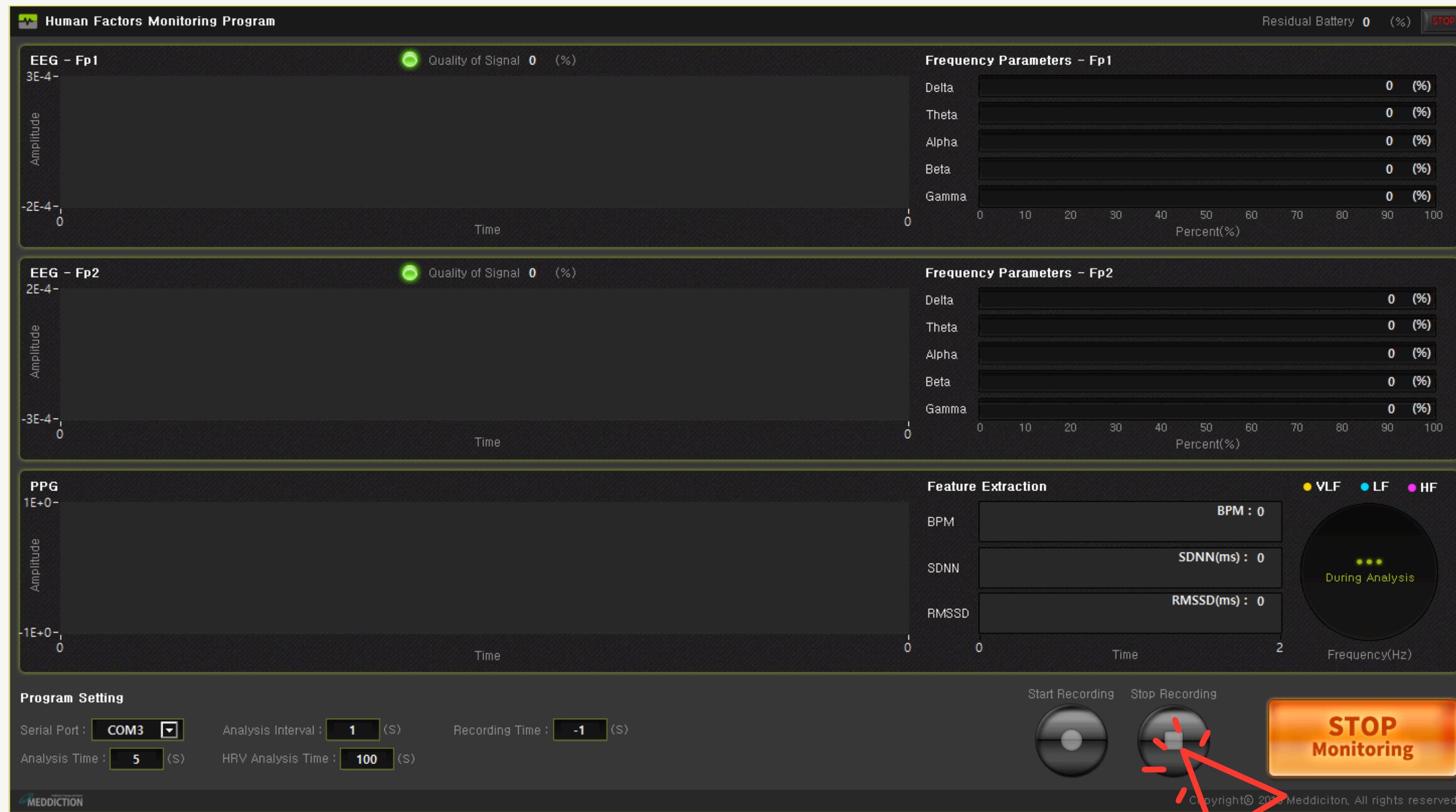
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**After the presentation of
30 top garments image stimuli**

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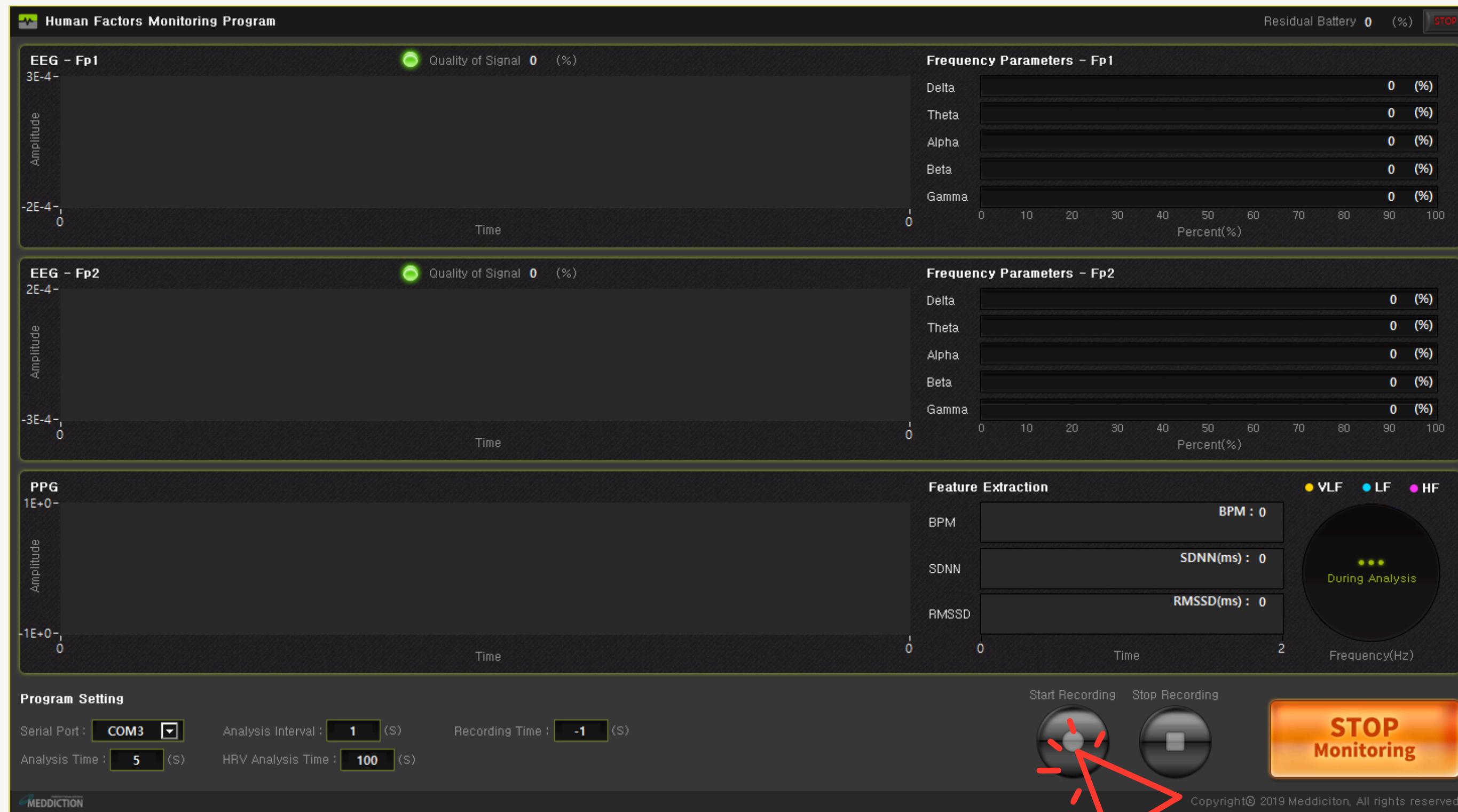
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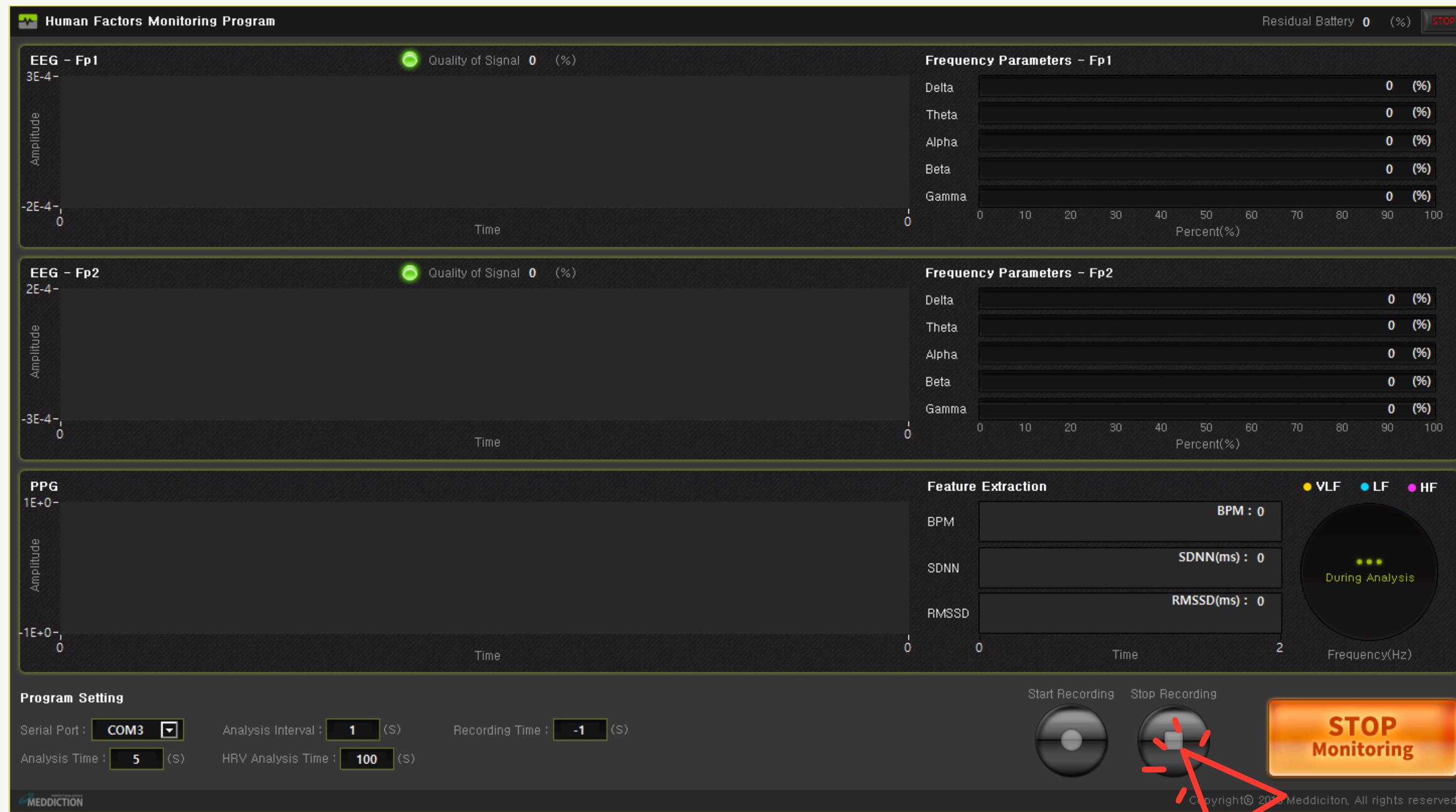
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30 bottom garments image stimuli**

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STEP 2

STEP 1에서 뽑힌 사용자가 관심을 가진 옷에 대하여 코디 조합을 추천을 위한 단계입니다!

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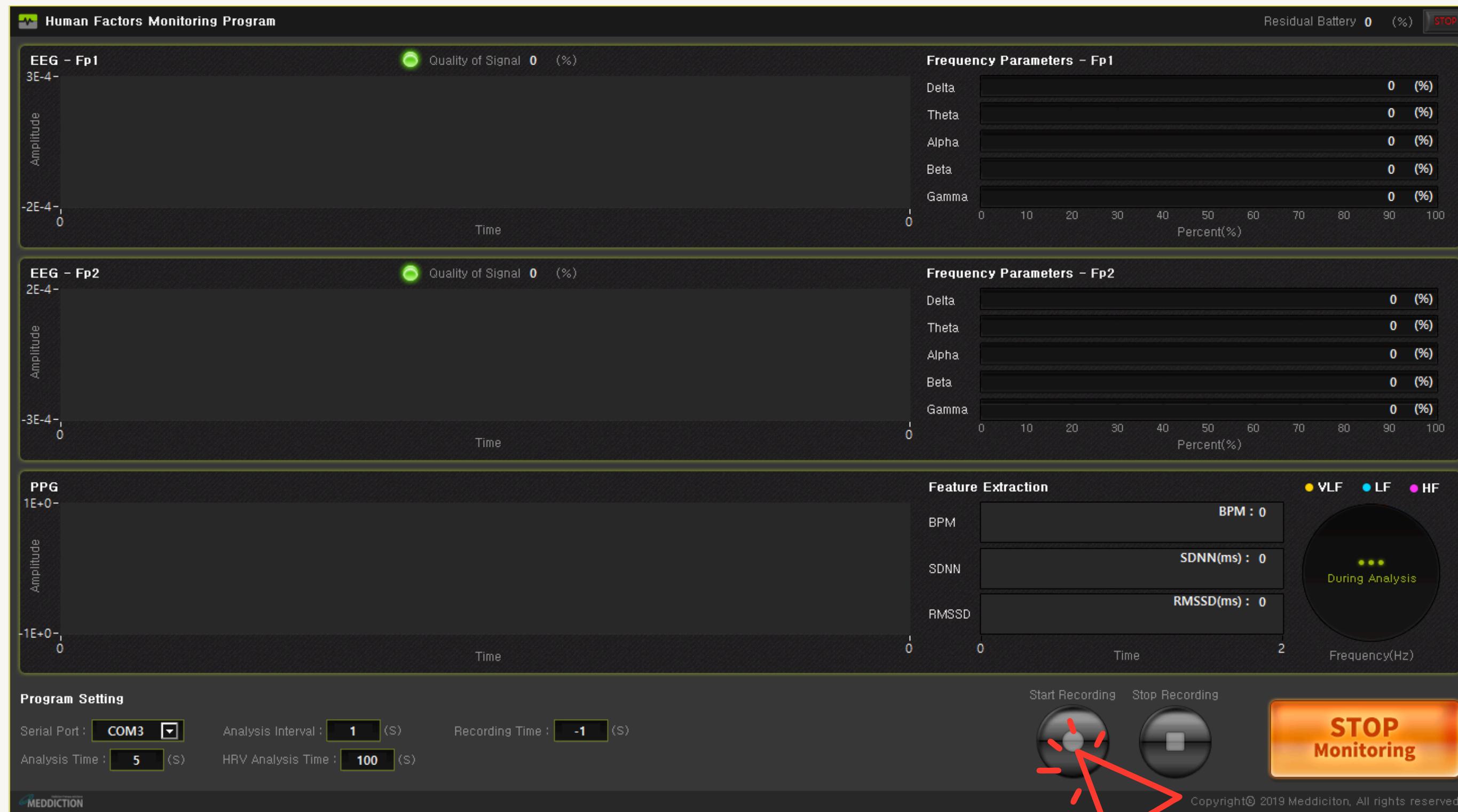
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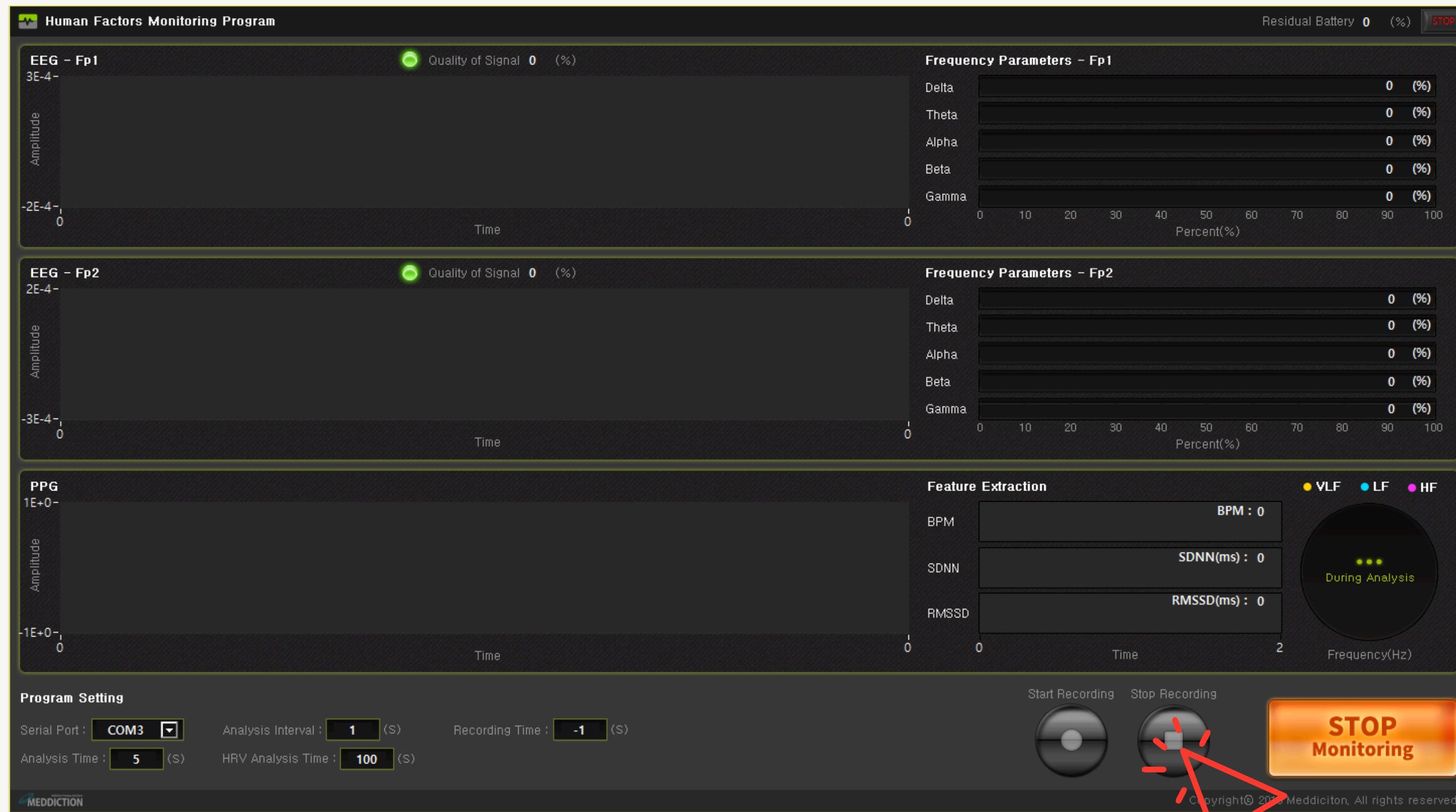
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25 top-bottom combination image stimuli**

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Final Output

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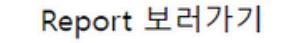
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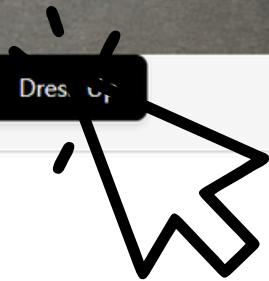
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Dress Up

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↑
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Dress Up

Dress Up

Report [Report]

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Selected Clothes

Top 1

Top
white shirts
price : 32,900 won
[Shop Now](#)

Bottom
washed denim
price : 48,900 won
[Shop Now](#)

+ add to cart

Top 2

Top
hairy round Knitwear
price : 32,900 won
[Shop Now](#)

Bottom
washed denim
price : 48,900 won
[Shop Now](#)

+ add to cart

Top 3

Top
white shirts
price : 32,900 won
[Shop Now](#)

Bottom
sweat pants
price : 48,900 won
[Shop Now](#)

+ add to cart

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Thank You
