Bidding on [P2024-16] Online Virtual Dressing Room with Advanced Try-On and Clothing Retrieval Features

Bidder: TEAM2024.07

1. **Project Summary and Understanding:**

The purpose of this project is to make use of machine learning, computer vision (target tracking and detection) and image processing technology to meet the needs of customers to realize accurate changing online (virtual) through the camera and other related basic equipment, and then search the clothes related to the needs of keywords so as to better serve the diversified and convenient and accurate changing needs of customers. The aim is to be able to change clothes in an immersive way even in the changing room of a physical store.

2. Team Member and Project Matching Degree:

Dear supervisor:

First, our team has full enthusiasm for this project, which is the source of motivation to do the project well. Secondly, our team has a strong learning ability and has the ability, confidence and enthusiasm to learn new knowledge. In addition, all members of our team have strong enthusiasm for artificial intelligence, machine learning, computer vision, image processing and other related fields, which may become our research direction in the future. This is a common feature that can promote team cohesion and promote project completion.

Then, our team members have some project or research experience that is relevant or helpful to the completion of the project (as reflected in the member's CV), which can also show that we can deal with and solve similar or new and unknown difficulties and challenges. Finally, our team has a clear division of tasks, a detailed plan, and a certain understanding of the project, which will be our reassurance to win the project. To sum up, our team is the best candidate for this project.

Our team sincerely hopes to get the opportunity to win the bid for this project and has the determination to complete the project.

3. Envision Project Solutions:

For this project, our team's understanding is to use image processing technology

to effectively separate people from the background, and then use machine learning and computer vision to accurately extract and analyze people's faces and limbs, and distinguish faces, limbs and torsos (This may require Convolutional Neural Networks and Generative Adversarial Networks to efficiently and accurately extract relevant features from full-body photographs of large numbers of people) . Then the torso clothes can be replaced by the clothes of the sample through image processing to achieve the effect of changing clothes. Finally, through computer vision and image processing to improve the changing room background and related sample clothing keyword classification, and to give customers keyword guidance, to meet the requirements of the virtual changing room project.

The project can be broadly divided into five main modular parts:

User Experience (UX): Design an intuitive user interface that guides users through outfit selection, providing seamless navigation and a visually appealing experience.

Image Processing: Utilize the pre-built 2D dress try-on algorithm effectively, ensuring realistic clothing overlay and intelligent face replacement techniques to maintain identity while trying on virtual outfits.

Dataset Development: Create a diverse and expansive clothing dataset with rich descriptive text to improve searchability and recommendation accuracy.

Recommendation System: Implement machine learning techniques that analyze user preferences and previous choices to provide personalized outfit suggestions efficiently.

- **Search Functionality**: Develop robust text-based retrieval algorithms that filter searches based on user-provided keywords to streamline the outfit selection process.

4. Project initial Management and Scheduling:

Task	Duration	Start Date	End Date (3 pm)
Create Git Repository		2024.10.8	
Announcement of Bidding Results (hypothetical)	1 week	2024.10.9	2024.10.16
Equipment requests [Understand and learn the use of hardware and software libraries]	1 week	2024.10.16	2024.10.23
Completed Ethics forms [Learn about machine learning]	/	2024.10.16	2024.10.23(? 10.31)

Team Project Website [continue learning machine learning]	1 week	2024.10.16	2024.10.23
Project Planning and Research	2 weeks	2024.10.23	2024.11.5
Precise extraction of human faces and limbs (analyzed from many models)	3 weeks	2024.11.6	2024.11.27
Interim Group Report (4000-5000 words)	**1 week**	**2024.11.28**	**2024.12.5**
Setting up the environment atmosphere of virtual fitting room	2 weeks	2025.2.19	2025.3.5
User Interface Design	2 weeks	2025.2.19	2025.3.5
Testing, Debugging, and Refinement	2 weeks	2025.2.19	2025.3.5
Final Review and Documentation	2 weeks	2025.3.5	2025.3.19
Team final reports (7000-8000 words) and software	**3 weeks**	**2025.3.12**	**2025.4.2**
Recording of Software Demonstration/ Recording of Team Presentation/ Team Promotional Digital Artifact	**2 weeks**	**2025.3.26**	**2025.4.9**
Prepare (TBC) Open Day and Live Q&A (1min Intro)	1 week	2025.4.9	2025.4.16
Individual final reports (2000 – 2500 words)	2 weeks	2025.4.8	2025.4.22

5. Possible Equipment Requirements and technology:

- Possible hardware requirements:
  - Programmable HD camera
  - IMU
  - Kinect V2

- Possible software requirement (Including python libraries):
  - OpenCV
  - Matplotlib
  - PyCharm

- Pytorch
- NumPy
- SciPy

Putty –- (connect the external device)
Real VNC Viewer – (remote connection)
Technology needs:
GAN: generative adversarial network
CNN: convolutional neural network
YOLO: You only look once
Computer vision and image procession
Pose capture