Discussion on Intelligence and Man-machine Interaction Design of Bus Stations

Tao Xuehua, Yi Yanli

Digital Art, Chengdu Neusoft University, Sichuan, Chengdu 611844

Keywords: Bus stations; intelligence; man-machine interaction; design

Abstract: In this thesis, the author integrates existing problems and human demands in bus stations and attempts to relieve the contradiction between the urban environment and mankind based on the humanized design thinking. Nowadays, the intelligent design and its products start integrating into our life from private electronic product to large-scale facilities. User experience and man-machine interaction should be more valued and become carriers of the city culture, enhancing experience of city buses. Bus stations, as important city facilities, become inseparable with it.

1. Introduction

The contradiction between public transport and people has become a social issue, which can't be fully solved by design. However, design can satisfy people's demands. Relieving the contradiction is a good way. With the progress of technologies, the intelligent era is coming with information collection, disposal, integration, and feedback to ultimately form an information platform, providing information resources and services for the society. Bus stations are used as public facilities. Meanwhile, as the cultural media with the wider coverage, bus stations can integrate urban culture with good social advocacy.

As the infrastructures of urban traffic, bus stations provide waiting space for people and solve basic demands for people. Meanwhile, they are used as public facilities and represent the urban development degree and cultural propaganda. The lagging shapes and functions of traditional bus stations can't meet the requirements of modern people. The rapid economic development drives acceleration of urbanization progress. Also, public transport is upgrading. A great number of bus stations follow the footsteps of the era, integrating with the public traffic system in real time. Existing bus stations can't meet both people's aesthetic demands and yearning for humanistic care. As cultural communication carriers of cities, bus stations can't stand out cultural features of cities. Hence, it is necessary to meet people's demands advancing with the times through design, integrate the urban culture into design, and let each city show their style.

2. Intelligent design and man-machine interaction

2.1 Main concepts of intelligence

Intelligence means that things have attributes to meet people's various demands under the support of technologies, including the network, big data, Internet of Things, and artificial intelligence.

Intelligence is mainly reflected in informatization and considers computers as the core for information collection, disposal, integration, and feedback to ultimately form an information platform and provide information resources and platforms for the society. Intelligence does not exist independently. Intelligent tools have the virtual, huge, and organizational internet information system. Popularity of intelligent tools causes huge impacts and changes on our thinking, work, and life, symbolizing that the society is reforming. The society proceeds to the new era.

2.2 The trend of intelligent design

The intelligent design always regards artificial design as the origin and focuses on various human behavior habits, psychological features, and demands. Intelligence does not simply convey information, but conveys information required by people through entity media to meet human demands and psychological features. Information communication in intelligent design does not mean the unidirectional conduction but should be bidirectional or multidirectional. For example, a

  DOI: 10.25236/icited.2021.005

machine transfers information to people, while people receive information to give responses. On the contrary, the machine will be varied with people's responses. The more complicated feedback mechanism can contain environmental factors. Among them, systematic sorting is conducted for connection and changes among people, machines, and environments.

2.3 The purpose and significance of interaction design

Interaction design is a kind of mechanism for designers to interact with products or services. Based on user experience, man-machine interaction design considers the background of users, user experience, and feelings during the operation process, so as to design products for ultimate users, who can feel happy as using products, conform to their logic, as well as effectively complete and use products. Interaction design covers traditional design and system design engineering and shows the unique practice method. The philosophy of interaction design affects the design methods. The previous design methods focus on design completeness and normalization, but interaction design can bring the feedback mechanism to the design philosophy and realize self-criticism and self-improvement through the feedback mechanism.

3. Research status

After buses occurred for a long time, bus stations still have had lots of problems. In terms of current days, bus stations can't meet modern people's demands and also have unreasonable design.

1. Imperfect infrastructures: as small-scale public space of cities, bus stations can provide a comfortable waiting environment, but many bus stations can't supply such space. For example, too narrow canopy can't keep out heavy rains and exposure to the sun. People will get wet or expose to the sun. The platforms can't supply accurate and effective bus information. Some platforms have been equipped with real-time electronic signs of buses, but they have some time errors. Functions of electronic signs are relatively single and lack of additional functional modules, such as mobile charging stations, umbrella return sites, and parking lots of bike sharing, and so on.

2. Oversized proportion of advertising: existing bus stations have large advertising areas, resulting in serious shrinkage of bus information. In this way, bus information display will be easily ignored or even mislead people to consider advertising platforms as bus stations or let unfamiliar people fail to find out bus information. Under the circumstance, it is necessary to add intelligence.

4. Design of bus stations

4.1 Design reflection—starting from functions and people first

Bus stations, as the small-scale public space, can provide shield for people. Since bus stations are situated in roads, platforms can't block roads horizontally and vertically. Traditional bus stations can't provide real-time vehicle information, so people have to wait for a bus in advance. Bus behind schedule caused by traffic jam or traffic accidents wastes lots of time for passengers, so waiting for a bus becomes a trouble. Increasing the real-time bus system can let passengers exactly know the predicted arrival time and state of buses. Passengers can freely dominate time. Through interaction design, it provides more humanized and perfect information and increases humanized warm tips, such as temperature and weather forecast, etc.

Bus stations with intelligence have strong capacity in information collection and integration. Stations become small-scale information platforms. According to the survey, people's maximum demand for bus stations is the real-time bus inquiry, so that trip efficiency of people will be dramatically enhanced. The sense of experience by bus will be increased. The real-time bus system reduces uncertainties of buses and relieves people's anxiety and impatience in current days. People can reasonably dominate and practice it.

4.2 Research achievements

By investigating people's demands, various bus stations are compared and regard demands as entry points. Urban bus stations are designed by analyzing people's problems and demands.

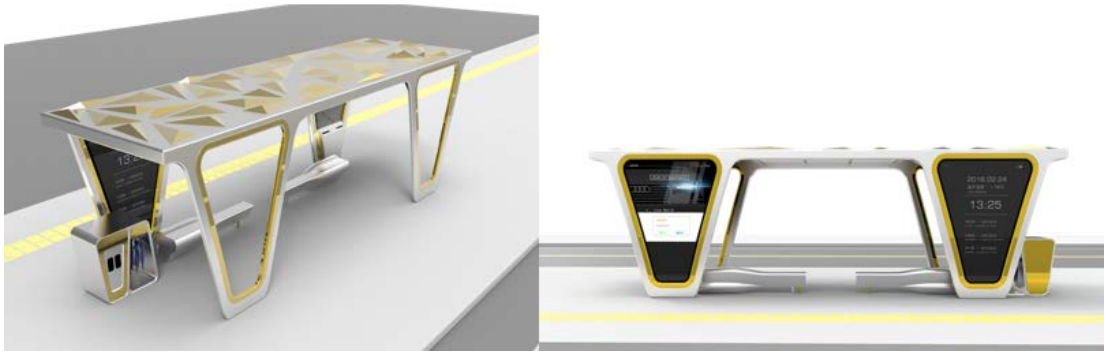

Figure 1 Bus Station Design

Intelligent bus stations have the inseparable relationship with information. The information functions of bus stations are one of the most desired functions for people in current days. Information is also the essential factor in the bus station design. Information of bus stations should contain bus lines, station positions, and real-time bus information. According to people's demands in current days, some self-help inquiry functions can be increased. Interaction designs definitely classify lots of information and hide different functions and information under icons. It is concise and clear for using and enhances sense of experience.

Lighting equipment: the top of platforms is installed with LED. Photosensitive sensors can be used to automatically sense luminance of surroundings. In the dark, LED will turn on automatically. On the contrary, it will turn off at daybreak.

Benches: benches in bus stations should provide a rest place for passengers. Due to more people of passengers, benches should have concise modeling as much as possible to save space. The straight sitting mode can save more space.

Trash cans and umbrella shelves: trash cans and umbrella shelves can become integrated. Trash cans use the open mouth to drop litter. Umbrellas shelves can provide umbrellas for people who can take away umbrellas by scanning QR code with deposit and then they can return them as getting off with deposit refund.

Electronic signs: electronic signs have basic real-time bus information, map inquiry functions, and line inquiry functions. Also, electronic signs can offer weather forecast and warm tips so that people feel intimate and humanistic care. Bus card charging functions are convenient for passengers to charge in the neighborhood and make use of electronic scanning for payment.

Mobile charging stations: self-help charging stations are embedded below electronic signs for six mobiles to charge at the same time, providing temporary charging sites for passengers.

5. Conclusions and prospects

Bus stations in Chengdu were chosen as research objects to discuss people's demands, social demands, and association with bus station design. There are many factors affecting the design, so it is necessary to balance each factor in design on the necessary basis. It is firmly believed that this will be an important process to be considered during the design process. With the basic beginning point of modern people's demands, the author combined modern people's psychological features and positive philosophy of society, as well as conducted the intelligent bus station design by focusing on the "people first" design thought, so as to provide convenience for people, become the carrier of urban culture, enhance urban buses' sense of experience, making contributions to social development.

References

[1] Zheng Min, Digital Bus Station Design [J], Journal of Taiyuan University, 2014.

[2] Xu Wenjun, Humanized Design of Bus Stations in Infrastructures [D], Nanchang University, 2010.

[3] Bian Yiwei, Humanized Design of Modern Bus Stations [D], Nanchang University, 2014.

[4] Fei Fei, Applied Research of Experience Design of Urban Bus Stations [D], Wuhan University of Technology, 2012.

[5] Liu Baopeng, the Regional Culture Research of Harbor-type Bus Station Design in Chengpi Express Way[D], Southwest Jiaotong University, 2011.