Ux Design of Artificial Intelligence News Robot

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Abstract. Background: Artificial Intelligence and 5G are coming with an unstoppable tide. As a representative of traditional industries, the news industry is transitioning from labor-intensive to intellectual-intensive by using the advanced AI technologies. Product Design: In order to help news industry to catch up with the rest of high-tech world, a UX designer’s job is to make the interaction between users and AI useable and useful. By understanding journalists’ pain points and what AI can do to help, UX designers found out the best landing scenarios and designed 25 intelligent media robots. With the robots’ help, reporters can collect and process news resources faster and better. Conclusions: This study proves that developing intelligent news robots among journalists by using a theory-based, evidence-driven, and user-centered approach has the potential benefits of low cost, high accessibility, and good adherence. The productivity of journalists has been greatly improved with intelligent media robots. Intelligent news robots have advantages such as fast producing speed, high efficiency, low cost, high accuracy and strong news digging ability. However, it also has limitations such as limited reporting fields, poor readability and lack of depth.

1. Introduction

1.1 Ai Impact
In an interview with Wired magazine in November 2017, Professor Hawking said, “I fear that AI may replace humans altogether.” Although AI has permeated every aspect of people's lives, there are few intelligent algorithm models developed for journalism. The most widely accepted AI assistance is intelligent writing robot, such as the summary of financial news, Weibo data collecting, etc. [1]. Journalism is an open and complex field that often requires multiple AI technologies such as image recognition, face recognition, voice recognition, natural language processing, and so on.

1.2 The Challenges for News Industry
As 5G communication period comes, media is breaking the limitation from the conduits and hardware devices, news will mainly present in videos not only in text and pictures [2]. However, the year of 2018 is the official starting point of the short video as a kind of independent form of mass media content. After Chinese Spring Festival Gala of 2018, short video companies have become traffic giants at a rocket speed [3]. According to QuestMoboile released on October 23, 2018, the China mobile Internet fall report shows that: as of September 2018, there were 1.061 billion monthly active users (MAU) watching online videos and 48% of them (518 million) preferred watching online short videos [4].

1.3 Design Proposal
The job of UX designer in this situation is to bridge the gap between AI technology and journalists, to find out the best place to meet users’ needs and business goals, and the pain points users want to
eliminate. In order to find the use cases suitable for AI in news industry, designers need not only to understand how news is produced, but also what technology could help.

For the purpose of this paper, I focused mainly on the most relevant design solutions extracted by the interviews in two aspects: (1) generating data-driven news which includes data collection, data analysis and data visualization; (2) detecting emergency event through image recognition, face recognition, OCR and other techniques.

2. Data Driven News
Data news, also known as data-driven news report. It is a new type of news report based on data capture, mining, statistics, analysis and visualization. Data visualization is an inevitable result of the comprehensive penetration of data technology [5]. Its appearance has changed the traditional news production process.

2.1 Design Methodology
One-on-one interview and user testing were used in this study. In total, we chose 5 journalists to join our group interviews. The average age of participants is 31.3 years old, and the education level is mainly college degree, majoring in Journalism.

Each interview lasted about 40 to 60 minutes, accompanied by his/her other team member who is either a visual designer, chief editor or a data analyst. The participants should include the following criteria: 1) participant is a journalist who has at least 3 years working experience; 2) participant can independently or corporately produce data news. The main topics discussed in one-on-one interview include the following:

1) Data news producing frequency and requirements;
2) The team structure, data news producing process and the production cycle;
3) Their concerns about data privacy and security when using online products;
4) What features they want to see and use during data news producing.

2.2 Participants Insight
Insight 1: Labor intensive and time consuming
It is widely accepted that producing a data news has a high threshold in news reporting. In our study, all the participants said they can barely finish a data news by themselves. The producing team must include at least one data analyst (collecting and analyzing all the relevant data), one visual designer (data visualization), journalist (writing an article) and one video producer (adding audition, subtitle and after effects). Some people (n=3) mentioned that if the data news requires timeliness, then it requires at least 4 to 5 people to finish one clip.

Normally, it takes at least 3 people to produce a piece of data news, but if it is an emergency event, like our recent data news – Typhoon Lekima, it took 5 people to complete the job. My chief editor asked me to create two data visualization videos with lengths between 30 to 45 seconds, one shows typhoon path and wind speed; the other one presents the scale ranking of landing typhoons. I need to finish these two clips in less than 3 hours, which are intensive.

Insight 2: High standard of visual
The investigator (n=2) also claimed that although they have AE templates, they are not universal for all the data news. Traditional data visualization video uses AE, although the style is nice, the design cannot correspond to the data accurately and avoid human errors.

Yes, I know I have 3 AE templates, but the templates I have are outdated. I have used these templates so many times that the audience must be bored.

The probability of using an AE template is 45%, most AE templates I have are not suitable for data requirements or I need to spend a lot time modifying the animations.

Insight 3: Data preparing
The difficulty of collecting news resources is a universal problem among all the journalists. During our research, participants (n=4) are not only having trouble to collect and structure data, but also having difficulties to find the right report angle through all the data categories.

*I don’t have a data analyst to help me get through all the data. If the data is not complete, I have to shift my topic... The data I have comes from the authorized websites, so if the data is not complete, I have no idea where I can get more data.*

The interview provides insights into how journalists produce data news and what problems they have during the news producing process. In conclusion, there are four accepts should be taken into consideration: (1) the product requires the ability to collect data or analyze data; (2) it should be better to implement multiple visual styles, which can satisfy users’ visual pleasure and introduce diversity; (3) real-time preview function is also a requirement; (4) the design of this product must take user friendliness under consideration, especially for those who don’t have design background; (5) functions like voice-over, text-to-speech, subtitle generation, even using a virtual reporter can be designed as other intelligent robots, which are also required in news production.

2.3 Product Design

It was important to understand the different factors that may influence the user’s experience. After mapping all the possible concepts and translating them into the spectrums and situations framework, the user flow of this product is shown as **Figure 1**.

![Figure 1 Data News User Flow](image_url)

After login, user will enter the homepage which contains all the available AI news robots. By choosing Data News Robot, user can produce data news all by him/herself. The user journey can be shown as below:

Firstly, data resource - user can choose more than one stored data from the database. If the database could not meet users’ need, user could upload their own excel sheet as well.
Secondly, the product covers 18 template styles (shown as Figure 2) such as pie chart, line chart, bar chart, word cloud, ranking chart, etc., which meet most requirements of content production. User could choose only one of these charts to generate the video.

Finally, after selecting data and visual template, user could modify data, change graphic symbol color, background color, and add additional notes [6].

2.4 Final Designs and User Feedback
In total, 3 key frames are considered in this applet design (Figure 4), including (1) data browsing, (2) data and chart selecting, (3) data modifying, such as uploading customized excel sheet or editing original data sheet, (4) final video previewing with changing subtitle or colors.
2.5 User Testing
Because Super Typhoon Lekima attacked Zhejiang Province on August 10th, our users were required to use this product to produce a typhoon data news.

Figure 4 Mockups

Figure 5 Final Product Designs

Figure 6 Final Product Designs
Participants are interviewed with final designs (Figure 5) and documented their original text. Comparing with the traditional time-consuming method, the new design is highly efficient. Participants (n=4) can easily create the data news even without a design and visualization background. “This time, with the help of the data news robot, I can do this video all by myself – which is used to be done by three people and now can be done by one. It subverts my original production process, reduces communication costs and improves work efficiency.”

The templates can satisfy most participants’ requirements, and the pre-stored data broadens the report boundaries, which offers new reporting angles. “I found there is plenty stored data I can use in this product. By comparing with the other data, the video I created is so interesting and got a lot of attention from our App users.”

3. Emergency Detection Robot

According to the Emergency Response Law of the People's Republic of China, emergencies refer to natural disasters, accidents, public health events and social security events that occur suddenly, cause or may cause serious social harm and require emergency measures to deal with [7]. The frequency of emergencies is much higher than people’s expectation. For example, in September 2019, 14,464 warning was published through China’s national warning release system. Meteorological, natural resources, emergency management, water conservancy, civil defense office, foreign affairs, housing and construction, ecological environment, public security, transportation, cultural tourism and other departments published 14,403 natural disaster warnings, 4 accident warnings, 2 warnings related with public health, and 55 involved with social security [8]. The details are shown as Table 1.

| Category               | QTY  | Category            | QTY  | Category          | QTY  | Category             |
|------------------------|------|---------------------|------|-------------------|------|----------------------|
| Thunder                | 4155 | Thunderstorm        | 57   | Geographical disasters | 7     | Overseas public health |
| Storm                  | 2784 | Cold wave           | 52   | Landslide         | 6     | Blizzard             |
| Gale                   | 1649 | Wave                | 41   | High risk forest fire | 6     | Forest fire          |
| High temperature       | 1287 | Mountain torrent    | 40   | Overseas social security | 6     | Haze                 |
| Heavy fog              | 1043 | Storm surge         | 22   | Grassland fire     | 6     | Maritime accident    |
| Geological disasters   | 784  | Sea zone winds      | 21   | Other geological hazards | 6     | Flood                |
| Thunderstorm with winds| 592  | Civil defense alarm | 21   | Geologic hazard meteorology | 4     | Emergency security    |
| Forest fire            | 566  | Alarm trial         | 18   | Forest fire within territory | 4     | Waterlogging         |
| Typhoon                | 557  | Sandstorm           | 16   | Thunderstorm winds | 3     | Other forest fire    |
| Brought                | 242  | Sea wind            | 10   | Transportation safety | 3     | Oversea travel alert |
| Frost                  | 136  | Disaster risk       | 8    | Heavy pollution    | 3     | Travel alert         |
| Strong convective      | 98   | Air raid sirens     | 8    | Heavy pollution weather | 3     | Typhoon              |
| Hail                   | 91   | Waterlogging        | 8    | Meteorological disasters | 3     | Earthquake           |
| Storm with wind        | 71   | Icy roads           | 8    | Flood disaster     | 2     |                      |
3.1 Product Design

With massive media resources, it is impossible for reporters to identify all the emergency events, which normally require timeliness. Emergency identification robot is able to identify emergency events and allow reporters to prioritize this kind of news.

Scenario 1: Object detection

The first AI landing scene is to search for specific objects in video. There is no doubt that when emergency happens, law enforcement will show up on the front line. After discussing with AI engineers, we have decided to identify 6 categories of object labels: firefighter, firefighting truck, police car, policeman, ambulance, medical staff. We show the testing results in Figure 7.

| Algorithm Category | Label         | Sample Size | True Sample | Total Algorithm Prediction | Right Algorithm Prediction | Precision | Recall  |
|--------------------|---------------|-------------|-------------|----------------------------|-----------------------------|-----------|---------|
|                    | Police car    | 495         | 66          | 41                         | 38                          | 92.68%    | 57.59%  |
|                    | Policeman     | 495         | 117         | 169                        | 113                         | 66.27%    | 96.55%  |
|                    | Firefighter   | 495         | 126         | 84                         | 79                          | 90.04%    | 62.69%  |
|                    | Fire fighting truck | 495 | 76 | 67 | 53 | 92.98% | 69.74% |
|                    | Medical staff | 495         | 83          | 93                         | 72                          | 76.78%    | 88.75%  |
|                    | Ambulance     | 495         | 56          | 41                         | 40                          | 97.56%    | 68.97%  |

Figure 7 Object Detection Testing Results.

For example, in Figure 8, Emergency Identification Robot recognizes all firefighter’s shots and highlights them on video track. User can easily select the object label and locate the right clips.

Figure 8 Firefighter Recognition
Scenario 2: Incident recognition

Based on the Chinese national emergency database, we chose fire and explosion as the second AI landing scene. Because most explosions occur in a flash and often cause a fire, so that the accuracy and recall rate of the explosion algorithm are not ideal. The demerits of current explosion algorithms can be summarized in four aspects: (1) misidentify fireworks; (2) identify dense smoke as fire; (3) unable to identify explosion; (4) able to recognize explosion, but in wrong time. Therefore, in order to improve the recall rate of the explosion algorithm, more variables should be taken into consideration, such as decibel and surrounding explosion damage.

The testing result of fire algorithm is obviously better than explosion algorithm as it is much easier to identify (Figure 9). However, flashing yellow lights, fuel burning or light flashes can be mistaken as fire.

Figure 9 Fire Recognition

4. Conclusion
In 2019, we can see the huge impact of AI technology on design and experience. “The innovator’s dilemma” describes that “every technology from slow to fast to the bottleneck, another subversive technology will quietly sprout and replace the previous technology.”[9] As a result, some design trends may disappear as a result of technology drive, or as a result of technology disruption.

Whatever the technology and products are, they should all be user-centered. UX designers need to understand and collect the requirements from users’ perspectives. Designer’s design process should not only focus on design itself, but also pay attention to become as a bridge between technology and people.

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