

Check <http://smedia.ust.hk/dragastar/> for the HD video of this interactive artwork.

Drag A Star – the Social Media in Outer Space

James She
HKUST-NIE Social Media Lab.
Hong Kong University of Sci. & Tech.
Hong Kong
eejames@ust.hk

Carmen Ng
JM Network
Hong Kong
carmenng@joinmert.com

Desmond Leung
Desmond Leung Media Arts
Hong Kong
desmond@desmondleung.net

ABSTRACT

“Drag A Star” is an interactive installation artwork that gives audiences an immersive and stunning interactive experience to remember the myth of making wishes upon a shooting star. Through the interactions with the display, audiences can learn about meteorites from outer space based on scientific and artistic perspectives by catching a shooting star with their smartphones. Audiences can send their wishes to a shooting star through their smartphones, while being able to read and reply the wishes from others at the same time. The piece was created based on the latest technologies of digital display, screen smart-device interactions, mobile applications, and web-based messaging systems. Extensive scientific, artistic and design efforts were integrated to create these cyber-physical interactive experiences between shooting stars and audiences. The artistic statement of this installation, akin to many ancient myths about wishing upon shooting stars, is about the possibility of catching a shooting star physically through technologies, and realizing someone’s wish after reading them. Hence the existence of shooting stars could likely be the social media in outer space - a world where a connection is made between other beings in the Universe.

Categories and Subject Descriptors

J.5 [Computer Applications]: Arts and Humanities - arts, fine and performing; I.4.8 [Computing Methodologies]: gesture processing and recognition.

General Terms

Performance, Design, Experimentation, Human Factors.

Keywords

Interactive Artworks, Shooting Stars, Screen-Smart Device Interaction, Smartphones and Mobile Applications.

1. Introduction

1.1 Artistic Statement

Once upon a time in ancient Greece, there lived the Gods of Olympus [1]. From time to time, curiosity drove the gods to peek over the edge of the Universe; during that process, stars would be knocked over as they looked down from high above [2]. Make a wish, they say, when you see a falling star. It is the moment in time when the realm of immortals is opened briefly, and people on Earth make wishes directly to the gods and the stars above. These wishes may eventually come true when the gods are moved by the hopes and dreams of everyday people. Nowadays, people may not believe in such a myth so beautiful; the possibility to realize and actualize a wish when they share their wishes to others in the Universe. Recent scientific discoveries revealed that the meteorites themselves, like hard drives, retain memories of their origins and their travels [3]. So fascinated by these memories of meteorites, artists have tried to utilize the unique compositions in a meteoroid to create artistic representations that are easily

understood by everyone [4]. With the advances in interactive and smartphone technologies today, our belief is in the future where stars can be caught on the fly with just a "dragging" gesture through our smartphones; the opportunity lies in sending out our own wishes with the stars, or even reading out and realizing the wishing messages of others. This is an interactive artwork with scientific, artistic and professional design efforts to engage the rebirth in the meanings and experiences of the myth. Now, the night sky is where humans on Earth are connected by Draggable Stars - to read and send messages of wishes from others or even from higher beings in the Universe. If an audience manages to "drag" a star into his/her smartphone before it vanishes and read the messages inside a meteoroid, one may send a wish back to the farthest corners of the Universe. Like the ancient myth, someone out there may happen to have the chance or the power to realize the wishes of others when they catch the same Draggable Stars. A smartphone by then is no longer just for connecting everyone on Earth through today's social media platform, but also allows us to interact with others in the Universe through our wishes and others over these Draggable Stars; in this way shooting stars are a representation of the social media in outer space!

1.2 Related Technologies and Artworks

New advancements in digital media, smart devices and interactive technologies are always pushing new and innovative dimensions for art pieces in the artistic and media-related fields. [5] In proposing a cyber-physical interactive broadcast/multicast media system, it allows users to interact and collect content from digital displays through user smartphones with an intuitive hand gesture. The technology was, however, only applicable to image content on a display for user interaction. [6] As the first attempt to use emerging screen-smart devices in conjunction with interactive technologies on an art installation, it allows audiences to interact and keep a snapshot of an animated painting in the smartphones. On the other hand, [4] we have collaborated on artistic visualizations inspired by unique memories of meteoroids, where the art installation does not involve any interaction with audiences. [7] Some space-themed films were produced with 3D technologies to give the audience an impression of touchable content that could be sought out. However, it does not involve any interaction with the audience. This interactive artwork will be one of the first attempts to fill and bridge missing gaps across these related works in the technical, art and industrial communities.

2. THE ART AND USER EXPERIENCES

2.1 Drag A Star

Fig. 1 shows how our interactive artwork, “Drag A Star”, looks like and how audiences would experience and interact with the installation. A large visual wall formed by a high-resolution LED display (any high resolution projector or TV in suitable sizes would suffice) was the first interaction point for the audience; a video was ran continuously to give audiences an impression of

Check <http://smedia.ust.hk/dragastar/> for the HD video of this interactive artwork.

being under a night sky along with a short introduction about the piece. A draggable device from CyPhy Media [8] was connected to the display with programmed content for various interactive scenarios, enabling robust screen-smart device interactions that would allow audiences to catch a random shooting star on the display - simply with smartphones installed with our mobile application.



Fig. 1. Drag A Star - the interactive artwork and user interactions.

An audience may miss the chance to catch a star in time just like real life experience. For those who have successfully “dragged” the star, they could experience an interesting journey of learning and discovery about the shooting star from scientific and artistic perspectives, enhanced by imaginative interactions with their smartphones. Audiences can read and reply wishes of others after exploring the memories of the meteorites, or make a wish on the same draggable star on hand. Fig. 2 describes the flow chat of the designed user interactive experience on user smartphones. More technical details to achieve these setups will be described in the next section. To convey our expected artistic statements over interactions, aesthetic and convincing content about these shooting stars were produced acutely for the display and the user's smartphones. These contents were produced aesthetically and reliably from comprehensive scientific data about each Draggable Star (i.e., meteoroids). The aesthetic merits of the content will be described in the following.

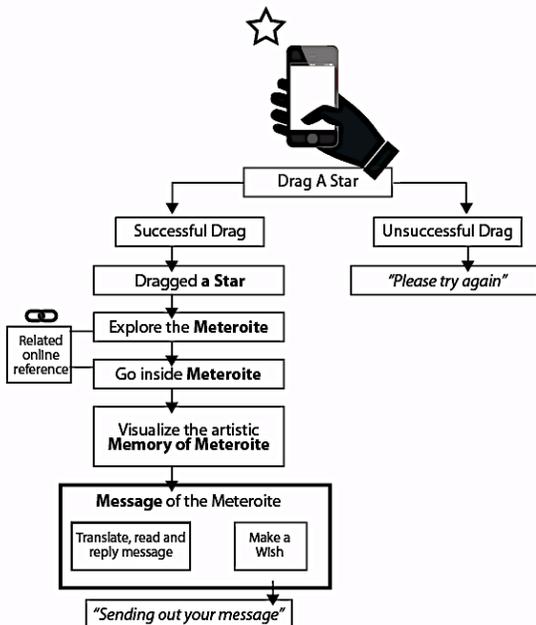


Fig. 2. Flow chat of user interactive experiences on smartphones.

2.2 The Time-lapse Night Sky

The content on the display was designed to give the audience a stunning and aesthetic night sky, which was the first user interface that attracts and engages audiences to start the interactions with the installation through their smartphones. The LED wall of the night sky provides not only a beautiful and immersive feeling full of stars in the darkest and most crowded nights known to man, but the random appearance of the shooting stars on the screen were realistically produced with particle system techniques that challenge audiences to catch a star with a simple “dragging” gestures directly through their smartphones with a dash of sheer luck.



Fig. 3. A snapshot of the time-lapse night sky video.

2.3 Draggable Stars

When an audience successfully catches a Draggable Star in his/her smartphone, one could zoom in the associated meteoroid to explore the multi-layered information and understand the star from scientific evidence and artistic visualization of the memories inside the meteoroid. Furthermore, the audience could read or reply the wishes from others, in addition to simply making a new wish. With our comprehensive scientific survey, a collection of discovered meteoroids with their multi-layered content were produced aesthetically and sampled in Table 1. Fig. 4 shows an example of a meteoroid and the associated multi-layered information that could be experienced by the audience on the smartphones once he/she has successfully “caught” the particular Draggable Star on the smartphone:

Scientific layers - one can see the compositions and structural patterns of the elements inside a meteoroid (Fig. 4b and c) that were surveyed from comprehensive scientific reports - but aesthetically produced to give audiences an appealing characteristic;

Artistic layers - one can see an artistic visualization unique to the particular meteoroid based on the corresponding composition extracted from artistic productions of Meteoroid Memories Series [reference]. Each of these artistic visualizations will dissolve into an artistic decoding user interface to firm a connection to me imaginative layers (Fig. 4d and e);

Imaginative layers - After decoding memories of meteoroids, it was imagined that scientific breakthroughs in the near future would allow us to read and reply wishes to others, or to create your own new wishes much like how messaging works in our social media systems today. While sending back the stars with our own wishes or replies, one may be able to connect with new friends or to even realize the wishes of others (Fig. 4f and g);

Check <http://smedia.ust.hk/dragastar/> for the HD video of this interactive artwork.

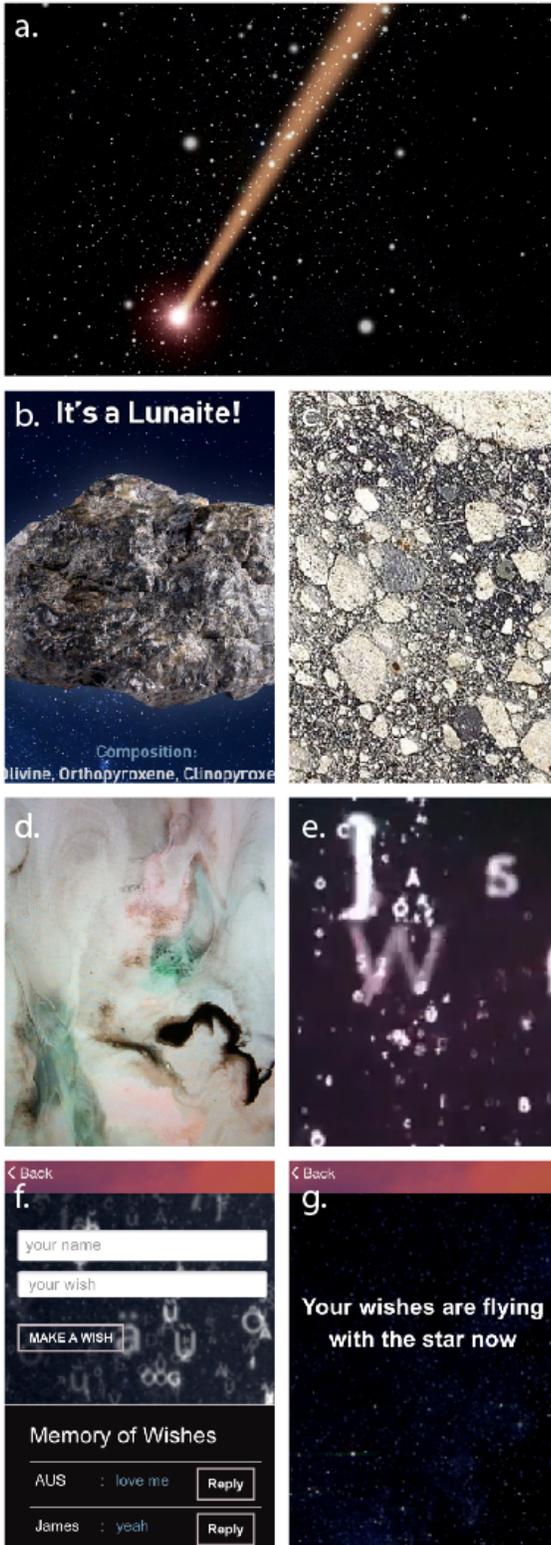


Fig. 4. Interface and content designs of a draggable star.

3. TECHNICAL DESIGNS

To support our artistic statements, Fig. 5 was the technical design of our installation that gives audiences an intuitive interaction that starts from dragging a star, to exploring the multi-layered content about the meteorite, and to even interact with others on their wishes through a web-based messaging platform. These

interaction processes must be very robust and responsive, but also scalable to any size of the audience at the site of the installation. The technical designs involve the following 3 aspects of interactions: 1) draggable star-audience interaction (or screen-smart device interaction); 2) exploring draggable stars on smartphones; 3) audience interaction through wish-messaging.

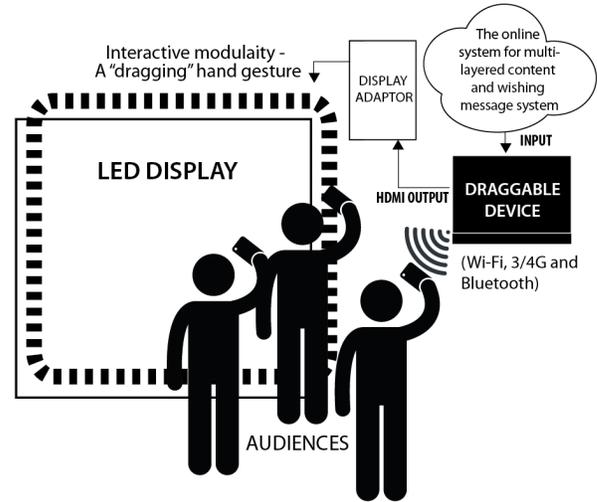


Fig. 5. Technical designs of the involved interactions.

3.1 Draggable Star-Audience Interactions

This installation was designed to mimic real-life situations where multiple shooting stars occasionally fly over the night sky; multiple audiences may try to catch the same or different stars with their smartphones before the star vanishes. There were chances that an audience may not be able to catch any star. The interaction must be able to synchronize with the audience's dragging gesture when the shooting stars appear on the display randomly, and the installation must react to the dragging gestures of multiple audiences at the same time. Such real-time and scalable screen-smart device interactions for multiple users was implemented through CyPhy draggable device [8], in which the device will synchronize the visual situations of a running video on a digital display and the real-time gesture movements learnt by the mobile application in user smartphones.

3.2 Exploring Draggable Star

When an audience successfully drags a star into his/her smartphone, an image of a random but unique meteorite corresponding to a Draggable Star would show up on the smartphone. There were clickable links on this image in the mobile application that directs audiences to external scientific information about the compositions, cross-sectional views and astronomical details of the meteoroid. Audiences who only want to explore the artistic visualization of the meteorite memories may click and further explore inside the meteorite and reach the imaginative wish-messaging interface at the end.

3.3 Audience Interactions Through Wish-Messaging

When an audience finishes the artistic visualization of the meteorite memory, these visualizations will be decoded and transformed into an interface that allows audience to make wishes

Check <http://smedia.ust.hk/dragastar/> for the HD video of this interactive artwork.

through an online wish-messaging system. Audience may read and reply wishes from others, or to send out a new wish. Eventually, someone may have the chance or power to realize someone else's wishes much like the tales from classical mythology - the interactions between audiences were stored in the memory of each Draggable Star over the wish-messaging system.

3.4 Robustness, Transportability and Scalability

Robustness: The piece was designed to scale the interactions for a large number of audiences up to the limit of the Wi-Fi infrastructure in a gallery or museum, or the range over a collection of Bluetooth transmitters. In summary, the installation should be able to handle up to at least 200 audiences based on the proven records from previous works by us [1, 2].

Transportability: The installation is very transportable and could be easily re-setup by simply bringing the draggable devices to any site with suitable digital display and the availability of Wi-Fi or mobile Internet access as all the content, messaging systems and interactions were already pre-loaded and accessible online through the compact draggable device. Smartphone wise, audiences would simply be able to use their own.

Scalability: The installation can be deployed with most high definition displays or projectors as long as an HDMI input of the display unit and Internet access (i.e., Wi-Fi and 3G/4G) for user smartphones are in place. Unlike some installations, which require dedicated interaction devices for the audience, our installation simply uses any number of participating audience's smartphones as long as the mobile application has been downloaded.

4. CONCLUSION

This interactive art installation tries to engage the audience with an immersive and interactive experience, in allowing audiences to recall and re-live the myth of the shooting star. Our draggable night sky was in fact a social media platform that allows audiences to send out their own wishes, and to even play the role of ancient Greek gods who could read wishes of others and realize wishes for those in need. To achieve these artistic ideas, high-quality and comprehensive artistic, scientific and design efforts were extensively produced and integrated as described in earlier sections. This installation has induced an on-going research for more advanced screen-smart device interactions and also aesthetic developments for decoding the memories of meteoroids. Meanwhile, this installation will be developed as an educational and artistic 3D space-themed film with user smartphone interactions in venues such as cinemas or space museums.

5. ACKNOWLEDGMENTS

Thanks to CyPhy Media Limited for sponsoring the uses of LED, draggable devices, and voice over efforts by Mr. Gavin Ng.

6. REFERENCES

[1] Fresco by Giulio Romano. 1532-1535. The Gods of Olympus", Chamber of Giants, Palazzo Te, Mantua, Italy
 [2] Day Translations. 2012. Wishing Upon A Star: Is it true or just a myth? (Dec. 7, 2012). <http://www.daytranslations.com/blog/2012/12/wishing-upon-a-star-is-it-true-or-just-a-myth-62>
 [3] Simon Redfern. 2015. Meteorite is 'hard drive' from space. Science and Environment. (Jan. 21, 2015). <http://www.bbc.com/news/science-environment-30916692>

[4] D. Leung. 2015. Meteorite Memory Series. Methods of Arts. (Mar. 16-20, 2015). Connecting Space Hong Kong.
 [5] J. She, J. Crowcroft, H. Fu, P.H. Ho. 2013. Smart Signage: A draggable cyber-physical broadcast/multicast media system. IEEE Transaction on Emerging Technologies on Computing. 2, 2 (Sep. 2013), 232-243.
 [6] J. She. 2014. i-LiberTango. Stonehenge New Media Arts Exhibition. Hong Kong. <https://www.youtube.com/watch?v=prsLA8JVxUk>
 [7] Journey to Space. (2015) Kennedy Space Center. US.
 [8] Draggable Device, CyPhy Media <http://www.cyphymedia.com/products/draggable-devices>

Table 1. Table of Meteorite Information

Types of Meteorites	Composition	Stone Type	Parent body
Lunaite 	Olivine, Orthopyroxene, Clinopyroxene	Achon drite	Moon
Martian Meteorite 	Olivine, Pigeonite pyroxene	Achon drite	Mars
Imilac 	90% Fe, 9.9% Ni	Stony-iron	Unknown
Sikhote-Alin 	93% Fe, 5.9% Ni, 0.42% Co, 0.46% P, 0.28% S	Iron	Unknown
Canyon Diablo 	7.1% Ni, 0.46% Co, 0.26% P, 1% C, 1% S	Iron	Unknown