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Abstract

Wearable technology has seen an increase in developments over the last two decades of commercial products and devices. Some of these sectors that boast new and unique innovations in wearables include the health and medical field, military, space exploration as well as wearables being produced in the creative industries such as fashion, film, and the performing arts. These innovations owe a debt to early technology that was wild and creative for its time but has now been made possible due to human achievements in technological advancements. This research explores using existing technologies to augment or progress traditional performing arts practices that have deep historical roots. These practices include the Mevlevi or Whirling Dervishes of Turkey and Spanish Andalusian flamenco. Throughout this exploration, a device was created that is meant to be interacted with by the user/performer. It is a wearable device that can be attached to clothing or held in the palm of the performers hand and used as an extension of the body or a wearable musical instrument. The intersections between these historically rich practices become clear when analyzing movements, origins, language, spiritual connections and music. The wearable devices track and capture meaningful movements of both practices which in turn becomes a new immersive digital experience for an otherwise traditional art form.

Keywords: Wearable Technology, Sonic Art, Performance, Cultural Performance, Dervish, Flamenco

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Introduction

Developments over the last several decades have seen innovation in the fields of robotics engineering, medical and healthcare sectors, the military, commercial devices, and the performing arts. Applying technology to clothing that could serve an artistic and performative purpose opens the possibilities for speculative exploration. This could be using electronic circuits to operate on the body as mechanisms for producing a number of actions including emitting sounds by attributing gestures to them, controlling other factors such as lighting on stage, and transmitting tactile cues that inform the wearer that they have initiated an action to which something was output. Immersive experiences that utilize sound can be created as a way to allow a wearer to gain more control over what outcome their movements will make. The body can be a tool in creating compositions and as an accompaniment to other instruments on a performing arts stage or as a stand-alone act. Haptic mechanisms can also contribute to the sensory experience. The performer initiates sound that provides feedback through tactile cues. These vibrations also mimic the reverberations felt when using physical instruments close to the body. By creating devices for costumes or attaching sensor systems on the body, performers can engage with interfaces that enhance their performance. Wearable technology is a rapidly growing field of research that will continue to be in demand for use commercially.

The main focus of this research is to explore using existing technologies in creative ways by developing a device that can be embedded or attached to clothing which tracks and captures movements of the wearer and emits sounds. The inspiration for a performance piece using these sound costumes are derived from the rich cultural traditions of the Mevlevi Dervishes of Turkey and Andalusian Spanish Flamenco. These two practices have centuries-long traditions that have been deeply rooted and developed by merging and absorbing cultures to hone distinct practices that are recognizable the world over. The potential implications can lead to the preservation of cultural heritage by digitizing these movements and cultivating new performance works as well as developing more streamlined systems that can be integrated into clothing in a sustainable and practical way.

1. Developments in Wearable Technology

Humans have recently begun to integrate technology into their clothing and on their bodies for the purpose of enhance most everyday functions. Wearable technology can be defined as a category of electronical devices that are attached to the body, embedded into textiles and fabrics or even implanted onto the human skin. Seymour (2009) states that fashionable technology or wearable technology also has a purposeful function such as delivering computational data while creating meaningful design that is aesthetically pleasing. Sazonov (2014) further describes wearable technology as having components such as small computers that provide feedback to the user through various ways of communication such as sensing and processing that information through to an application.

The idea of human augmentation in wearables has been incremental over the last few decades but it is now becoming more of a reality. Raisamo et al (2019) comment that human augmentation is a means by which technology is somehow integrated through the use of wearables especially, as a way to enhance human capabilities or productivity. It is arguable that humans have already augmented themselves to a certain degree by using and carrying portable devices such as smartphones and smartwatches that transmit and deliver information at the touch of a button (Balanganur, 2020). Humans have for centuries been seeking ways of adding to or extending what is already on their bodies in an effort to minimize human labor but also to adorn themselves with useful gadgets and devices that enhanced their daily lives (Ryan, 2014). Some of these inventions include the wrist or pocket watch, and eyeglasses up until one of the first truly wearable pieces of technology that also transported music, the Sony Walkman (Ryan, 2014).

1.2 Wearable technology applications

Wearable technology roughly falls under three main categories: consumer devices, wearables for the health sector and health-related applications, and textiles or skin-based applications that have been integrated with technology in some way (Mikhalchuk, 2017). Advancements in the health sector have provided the bulk of research being done in wearable technology but consumer products are increasingly becoming in higher demand with a market that is now flooded with a gadget for almost any need or purpose. Just about anything that can be attached to the body whether it is a ring, a hearing aid, glasses, socks, a watch, footwear or jewelry, can be connected wirelessly or through Bluetooth to feed data to a source.

Wearables are expanding into several different markets such as healthcare, sports/fitness, military, security and defence, gaming, smart homes, as well as crowd sensing/interaction. With these areas targeting consumers that are not just for a niche market such as high fashion, the possibilities of integrating technology into clothing is inevitable. Therefore, this research aims to develop and apply technology to clothing that provides an enhanced or augmented experience in the area of the performing arts by integrating technology seamlessly onto garments.

With the advent of the internet and the development of the Internet of Things wearable devices has been flooding the market of wearable consumables now for the past few decades. To be more precise, since the highly marketable Sony Walkman was introduced on 1979 (Frazen, 2014), wearable computing devices have morphed into a field that can now include anything from an Apple iPod to Google Glass and numerous iterations of smartwatches, headsets and even jewelry. These and many other commercially available products for consumer use are at the forefront of wearable technology and are gaining momentum. With the ever-changing socio-economic global climate and the advent of 5G technology, the demand for using wearable technology as a necessity for humans to function at a faster and more efficient pace will likely increase dramatically over the next 10 to 15 years.

2. Wearable Technology in Fashion, Costume and The Performing Arts

The world of fashionable wearable computing or using technology in the performing arts as it is known today may have started with the wearing of electrical diadems created by Gustav Trouvé for a dance/ballet performance of 'La Farandole' in Paris that was worn by ballet dancers in 1884 (N.A., 1884). Trouvé may have developed one of the first electrical interfacesan example of wearable technology used in performances on stage (Sjuve, 2008). These illuminated headbands were a key innovation of their time and paved the way to incorporating small-scale electronics by integrating them into clothing or for use on the body and in the performing arts milieu (Hughes-Riley et al, 2018).

Within the last two or three decades, wearable technology has served a vast array of aesthetic experimentation on the body using textiles, conductive materials, sensors among other things, to augment garments in a way that was never thought possible. These explorations have been the result of necessary collaboration between engineers and scientists. In 2006, Philips Design

created along with fashion tech designer Nancy Tilbury, the *Skin Probe* project for which they designed two dresses: the *Bubelle Dress* and the *Frisson Dress*. Both dresses were an exploration into sensing using the body to project information or emotion onto a fabric using biometric sensors (Weir, 2007). Antic (2011) describes the project as Philips Design's prototype to test its viability in the future mainstream market of clothing that could be integrated with technology. The *Bubelle Dress* in particular was made up of biometric sensors that detect the wearer's heartrate which could then be translated as a color in the form of a bubble shape displayed by LEDs. This interplay and interaction of how wearers might conceive of using technology to relay information to their surroundings was an experiment that began to set the world of just couture fashion apart from fashion that had a function or purpose hence, wearable technology.

Costumes and fashion pieces that have been created for the stage for performing arts practice such as musical theatre, rock and pop stage shows or spectacles, circus performance among others have all begun to test the possibilities of how technology can be used to enhance garments and performances in this area.

Schneegass & Amft (2017) explain that in the last two decades, pop star performers and celebrities have been looking to enhance their on-stage performances with technology whether it be in the form of flashy LED lit costumes or perhaps even controlling certain aspects of the show's spectacle such as lighting or sound. One of the more well-known artists to explore this intersection between fashion and technology has been Lady Gaga. In 2013, Studio XO and TechHaus (Lady Gaga's technology design team) collaborated to create the *Volantis* also known as the *Flying Dress* in which she actually flew. The dress was unveiled at the launch of her ArtPop album and is created with six battery powered rotors that can lift the wearer a few feet of the ground and propel them forwards (Howarth, 2013).

Wearable technology in the performing arts must be evaluated in all fields whether it be for the stage, musical performance or in cinema. In the world of fashion technology alone, there can be many sub categories such as art-related fashion tech, high fashion tech and/or just fashion technology. There are several crossovers as well such as designers who were trained as engineers or scientists who have collaborated with fashion designers to develop new ways of implementing technology into clothing while others are focused more on the performative or entertainment aspect of using technology in clothing, costume or fashion.

Fashionable Wearables

Fashion designers have for the most part over the last three decades, embraced technology in one form or another; whether implementing technology in aspects of the fashion show such as lighting, projections, illusions, sound and other effects as well as using technology as a medium for which to create fashionable garments from. Seymour (2009) remarks that the ideal partnership of scientists/engineers and fashion designers can result in creating truly functional and aesthetically beautiful wearable computing. Fashion designers are not necessarily proficient in programming tech for use in their fashion tech design pieces therefore this union of fields is not only crucial to the output of truly operative smart garments but also inevitable. Perhaps it was the work of Turkish-born Hussein Chalayan that in the early 2000's broke ground in this area of fashion tech with his wildly innovative designs in his Spring/Summer collection of 2000 where he debuted his *Remote-Control Dress*. Sometimes referred to as the 'airplane dress' *Remote-Control* is a manifestation of Chalayan's concepts of combining architectural structures with the human body (Quinn, 2010).

CuteCircuit is a company founded by Francesca Rosella and Ryan Ganz out of London, UK. Many of CuteCircuit's designs have now become synonymous with wearable tech pop - fashion. Their brand of functional wearables has gained notoriety amongst wearable tech designers. The Sound Shirt is another immersive garment that similarly uses haptics. It was created as a piece of clothing that could replicate the vibrations of instruments being played for the hearing impaired during a concert or performance. The shirt is totally wireless without any wires or visible cables, it is lightweight and provides subtle vibrations from 30 high resolution haptic actuators (Albano, 2020). The haptics provide and immersive experience for the wearer whether or not they are hearing impaired making it a uniquely innovative design.

2.2 New Digital Musical Instruments; The performative Body

A number of digital musical instruments have evolved over time that have claimed to solidify a foothold in the field of wearable electronics for the use of creating sounds or music. The Mi.Mu Gloves are an example how wearable technology can be used to create music for composition and performance. The gloves use gesture recognition with which to create sounds using dedicated software (Glover) that is designed to allow the user to program each gesture according to how they want to map sounds to them. Sawh (2019) remarks that the gloves were designed to make composing music easier for musicians and artists especially during live performances where the gloves enable performers to be more hands-off on their instruments and more creative with their hands and gestures. Adam Stark who is the company's director and lead creative force says that the gloves are meant for people to express themselves through movement (Brewis, 2019).

The Mic Tic¹ and the Enhancia Neova² wearable MIDI ring are other examples of creating music and sounds with the body using devices that are attached or worn on the body and are controlled by gestures and movements. The MicTic comes with two arm bands – one is for the controlling hand and the other is to manipulate sounds with that have been pre-chosen from a bank of sounds or musical genres on its compatible app. The Enhancia Neova MIDI ring is like an extension of the composer's mind in that the ring can change sounds that are play on an instrument based on the gestural movements of the wearer. For example, if the user is playing a piano and would like to play a key and change the pitch slightly or use vibrato, the user enacts a gesture that reflects the different musical terms.

The possibilities of creating devices for initiating music or sounds that accompany live performances or pre-recorded pieces reveal an exciting opportunity for exploration and development. Some pioneers in the field of using technology together with dance or performance include Merce Cunningham whose 1999 performance of *Biped* interlaced elements of dance alongside digital representations of the body on a screen behind the performers using motion tracking technology (Jacobs, 2020). Birringer (2002) expressed that technology has changed the way in which relationships between humans and machines interact with one another in spaces providing new bodily boundaries yet in turn using technological advances in the theatrical arts as a significant tool for creation. These digital tools can provide the potential to create and design unique pieces of work. One of the underlying interests that are significant to digitizing body movements is the scope for recording, preserving and archiving them. This could also be of interest for examining performance practices that have

¹ https://www.mictic.com

² https://www.enhancia-music.com/product/neova/

developed over centuries resulting in deeply rooted traditions that can be augmented or progressed in a contemporary performance setting.

3.1 The Digital Dervish

The inspiration behind creating a performance piece using a wearable device is the sacred practice of the Whirling Dervishes or Mevlevi Order of Turkey. The Dervishes have had a long and ingrained history in Turkish culture for centuries. It is one of the oldest known dance/performance/spiritual practices in the world and has recently been proclaimed an intangible cultural heritage of humanity in 2005 through UNESCO³. The practice of the *sema* which is the word for the sacred ritual that the Mevlevi order practice in their 'turning' performances, has rarely changed over the past several hundred years.

The most formative element in the way a Dervish moves adheres to the epithet that they ascribe to: whirling or turning. The movement during a *sema* of continuous spheres sometimes for an hour, is the physical embodiment of the metaphysical connection between the 'dancer' and the Almighty Creator. It is the abandonment of all worldly attachments and it is focused upon annihilating the temporal self through the recitation of *dhikr* or *zikr* (Pietrobruno, 2019). There have been tales passed down through Mevlevi tradition that Mevlana (Rumi) walked passed a goldsmith hammering and he felt compelled to start turning to the rhythm of the vibrations the metal made (Feuerlicht, 1975). Feuerlicht (1975) describes that the Mevlevi have argued that the *sema* is in fact not a dance because to some, dancing is frowned upon in Islam, but that they are turning and that everything including the clothing they wear has significant meaning.

Some of the more prominent figures in current contemporary art circles globally who practice versions of the *sema* include performance artist Ziya Azazi[,] Isha Kurun and Rana Gorgani who can easily be found on social media sites such as Instagram. Azazi explores the repetitive nature of turning dervishes and concedes that there are not only mystical and meditative aspects to turning, but mental transformations that occur when one whirls (Choksi, 2015). Performance artist and practicing Dervish, Sercan Çelik has used technology and electronic music to enhance his version of the traditional *sema*.

Highlighting certain aspects of the *sema* and the movement that is created from it using music or sound with technology can be a way of looking at the historical tradition through a contemporary lens. The differences lie within the subtleties where the audience is able to detect that something is unusual about the Dervish costume – it is a unique message that is being communicated by different means, through an audio-visual, immersive wearable technology experience. The ideal performer will be one who is available to be open-minded about creating a contemporary version of the *sema* but who also adheres to the formal elements of the traditional practice. There are practicing Dervishes who have declined to using technology in their practice since it is their intention to preserve the *sema* in its original form without any need for adding technology, lighting, music or visual effects.

The elements to be tracked and captured with the device the 'Sound Drop' (of which there will be three) on the Digital Dervish Dress are the rotating patterns of the *tennure* or skirt of the Dervish, the arm and hand movements and one device will be attached to the bodice (chest area) to use as another element of interaction. A sketch of the design for Digital Dervish Dress can be seen in Figure 1.

³ https://ich.unesco.org/en/RL/mevlevi-sema-ceremony-00100



Figure 1: Digital Dervish sketch

The breakdown of intended use and how each unit will be programmed can be seen in Table 1.

Costume	Unit 1	Unit 2	Unit 3
Digital Dervish	 Tracks arm and wrist movement Sounds are triggered based on gestures Sounds are interchangeable Touch sensors turns unit on and off LED lights up when the action is completed Haptics are triggered when movement is initiated 	 Sounds are triggered by touch only Longer, ambient soundscapes LED is on when touch sensor is turned on and can be turned off by touching once 	 Tracks movement of skirt When fully rotated in open position and sensor passes a certain threshold, ambient sound is emitted Sound increases in volume as skirt opens LED flashes when rotation is faster

Table 1: Digital Dervish Units Described in Detail

3.2 Flamenco Sonic

Traditional flamenco is an expression of song, story, dance, and instrumental music usually accompanied by a Spanish guitar (*toque*), vocals (*cante*) and dance (*baile*) (Washabaugh, 1996). The practice of flamenco has also been recognized by UNESCO⁴ as an intangible cultural heritage of humanity in 2010. Flamenco is a way of making the music a visual experience and in many cases, an emotional one for both the performer and the audience. In popular culture, some of the most well-known flamenco dancers such as Carmen Amaya have dazzled the globe and introduced flamenco as a generically Spanish tradition. She was one of

⁴ https://ich.unesco.org/en/RL/flamenco-00363

the true leaders in the flamenco community and a world-renowned dancer. Although Carmen had a tiny frame, she commanded the stage and pounded the floorboards exhibiting her exceptional footwork – often referred to as the 'Queen of Gypsies' (Zatania, 2013).

One theory suggests that the word 'flamenco' stems from two words 'felah-mengus' which some claim roughly translates to 'wandering country person' but many Arabic speaking people contradict this loose translation and meaning (Nutter, 2020). The word is often attributed to the association with the Gitano or Gypsy Roma that originally migrated from parts of Southern India through to Europe and the Anatolian Peninsula between the 5th and 10th centuries due to the flamboyant and expressive dance they practiced with costumes of short jackets and thin legs resembling the likes of flamingos (Melegh et al, 2017).

The traditional formal elements of flamenco can be broken down by examining the generational overlaps in cultural history. The origins of the practice are blurred; most flamenco is associated with the Andalusian region of Spain but it's roots may have come from further afield since the song traditions that influenced Gitano music in the Middle Ages were established by Islamic, Jewish and Christian traditions (Washabaugh, 1996). According to Akombo (2016) flamenco can be attributed to Gypsy culture which dates back eight centuries and specifically to the descendants of the Moors in that region of modern-day Spain. Totton (2003) suggests that the dance developed from the melting pot of cultures and descendants of Greek colonists, Sephardic Jews, Christians and Phoenicians. The music and form of narrative or story-telling began developing among these various cultures and the Gypsies who would perform with and amongst the Moors and the Jews shaped what is known as flamenco music today (Akombo, 2016). Leblon (1994) remarks that migrations from India through Persia of Gypsy people around the 5th century contributed to the development of the Romani language as well as the intermingling of musical cultures that they brought with themselves. As well as developments in song and body movements practices, musical instruments such as the tambura, a stringed instrument with a wide wooden base, the cymbalom (in Hungarian *cimbalom*), a stringed instrument played by using mallets, and the Persian *nev* or *nay* which is a reed instrument, were also experimented with throughout the Eastern and even Western European countries via the silk road (Leblon, 1994). Hayes (2009) writes that flamenco has become somewhat of a national identity of Spain and Spanish cultures but the Gypsies have also claimed it as a form of civil rights activism due to its origins.

Flamenco has garnered an incredibly visible sensibility in its form and associations that it has become recognizable almost the world over. The distinctive costumes and dresses worn by female dancers with large flowers worn in the hair and colorfully polka-dotted layered and ruffled dresses and shawls to the tightly fitting bolero jackets and trouser with crisp white shirts traditionally worn by men, flamenco can quickly be associated with something Spanish or of Latin origin. Many iterations of flamenco have also been explored in many different cultures but in pop culture as well. Assimilating within other cultural practices, the dance formation, costume and overall atmosphere of a flamenco performance has been seen in many different areas of film, television among others.

Some contemporary and well-known performers such as Macarena Ramirez and Israel Galván have cultivated their practice out of the need to contemporize or modernize traditional notions of flamenco. While Ramirez performs pure flamenco, she has also embraced new techniques and technologies to implement into her practice. Similarly, Galván who is considered to be one of the greatest flamenco dancers of all time, push the boundaries of how this practice can be augmented by using exterior elements such as sound and lighting to accompany his practice with. Pure flamenco is a self-contained unit; it needs no reformation or alteration however, this branch of contemporary flamenco has used methods of augmenting the practice by inviting artists, musicians and dancers from other disciplines to interpret flamenco dance narratives.

The Flamenco Sonic Dress will be outfitted with the Sound Drop device using three separate units as with the Digital Dervish Dress as can be seen in Figure 2. One device will be worn on the wrist, one on the bodice or the hips and the third near the ankle.



Figure 2: Flamenco Sonic

The movements and gestures will be emphasized according to how the dancer steps or uses the touch sensors on the devices. Each device will vibrate once the action has been completed alerting the user. The following table describes the use of the devices to be worn on the Flamenco Sonic Dress.

Costume	Unit 4	Unit 5	Unit 6
Flamenco Sonic	 Tracks sudden wrist and arm movements Emits sounds (based on flamenco guitar) LED lights up when action is completed Haptics vibrate to cue wearer that action has been made Sounds are interchangeable 	 Worn as a brooch on the bodice of dress Turned on and off with touch sensor Emits elongated sound samples which finish, or can be looped LED lights up and stays on as long as performer turns it off Vibration initiated when it is turned on arch. 	 Tracks foot movement When dancer puts foot down with greater force, vibration, LED and sounds are triggered
	unit on and off	Uniy	

Table 2: Flamenco Sonic Units Described in Detail

4. Morphing the Dervish and Flamenco with Wearable Technology

Throughout this research, interesting links and connections have been made between the practice of the dervish and flamenco dance. There has been exciting cross pollination of music and dance style and practices from the southern regions of Spain through to Turkey for centuries. These influences between cultures bring together possibilities for exploring new performances while enhancing them with technology.

Some of these possibilities lie within the musical forms of both Spanish flamenco and classical Turkish music. When flamenco is performed as a Bulería, the song that is sung can be very expressive and emotional often with elongated and drawn out stanzas that carry on into exaggerated trills. It is the most fast-paced rhythmic form of flamenco using light-hearted banter, mockery, back and forth dialogue between singers, accompanied by *palmas* (hand clapping) and guitar (Andaluz, 2019). Similarly, many Mediterranean/Arabic song styles are performed using improvisational *maqam*, whether reciting Islamic prayers or poems, the melodic musical style is often interpreted as the musicians perform made up of invented melodies that are adapted to pre-existing rhythms (Touma, 1971).

The links between the two distinct practices will become clearer when the two performers begin to make contact. A fusion of music and movement will result in a performative piece using a bespoke device created to augment these practices in a contemporary performance setting.

4.1 The Sound Drop

The wearable device- the Sound Drop is created as a tool for augmenting body movement performances. The concept was to build a contained device that was completely wireless and communicates to a computer system via Bluetooth. There were several iterations of the device the first of which were compiling the components into sections and sewing them into fabric swatches to be then sewn as a patch onto a costume. It was found that after some testing, the sensors and battery within a fabric patch were inaccessible, awkward and not streamlined. Further testing proved that a small device could be built using the 3D printing of a casing that was designed to house all of the components which included an Arduino Nano, a gyroscope/accelerometer, touch sensor, 3.7-volt Lithium ion battery, a Bluetooth module and power boost charger as well as a haptic motor and twelve neo-pixel ring sensor. The design of the Sound Drop initially inspired by a flower bud and then morphed into a drop shape which is a smooth, organic representation of a drop of water. It fits inside the palm of the hand or onto other parts of the body via Velcro straps attached to the back of the casing. Various 3D printed versions using standard polyvinyl were created until an ABS-like resin was used to test the model as seen in Figure 3. The version on the far right (grey) is the preferred material. It was found that the resin prototype proved to be the most suitable design due to its slight pliability and smooth texture after being cured.



Figure 3: Variations of Sound Drop 3D printed in Polyvinyl and Resin

The *Sound Drop* is programmed to react to movements or gestures of a performer. The device reacts when a threshold is met whereby the LED neo-pixel ring is initiated along with the haptic motor. The wearer can feel the subtle vibration of the device which acts as a tactile cue that informs the wearer that the action has taken place. This responsive interaction allows the performer to create subtle sounds that are programmed to each module thereby layering sounds that accompany a pre-composed piece of music for the stage. All of the sounds that have been used in each of the units have been pre-programmed using digitally composed sound samples that can be interchanged. The device works using Max/MSP to read the incoming Bluetooth data of the Arduino Nano and processes the data to create variations on the pre-programmed sounds. The sounds themselves are representative of Turkish instruments traditionally used in classical Turkish music as well as sound samples that have manipulated of Spanish guitar. The accompanying piece is a chord progression of ambient electronic soundscapes.

The final design was printed in clear resin with the intention of having the components visible as a hybrid physical and digital object. The *Sound Drop* in its final form with the circular LED ring lit in the translucent resin can be seen in Figure 4.



Figure 4: The Sound Drop

Conclusion

This research has observed the developments in wearable technology over the last few decades and how these advancements contribute to the possibilities for use of wearable technology devices to enhance or augment performance practices. The study has also adapted the historically rich traditions of Flamenco and the Whirling Dervishes of Turkey by intertwining them into a performance setting where a narrative can be used to bring the two practices together in an immersive audio-visual work that augments the traditions by using bespoke devices that track certain movements or gestures to which sound is attributed. These intersections of cultural performance practices can be further explored by investigating other body movement/dance traditions globally. This study can also lead to the preservation of intangible cultural heritage by digitizing and capturing movements. Future implications of the development of the Sound Drop can lead to producing devices that are smaller, streamlined and consumer accessible and marketable to be used as external musical composition tools or to be used to enhance performances in theatre, dance, opera, musicals and other forms of stage entertainment.

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