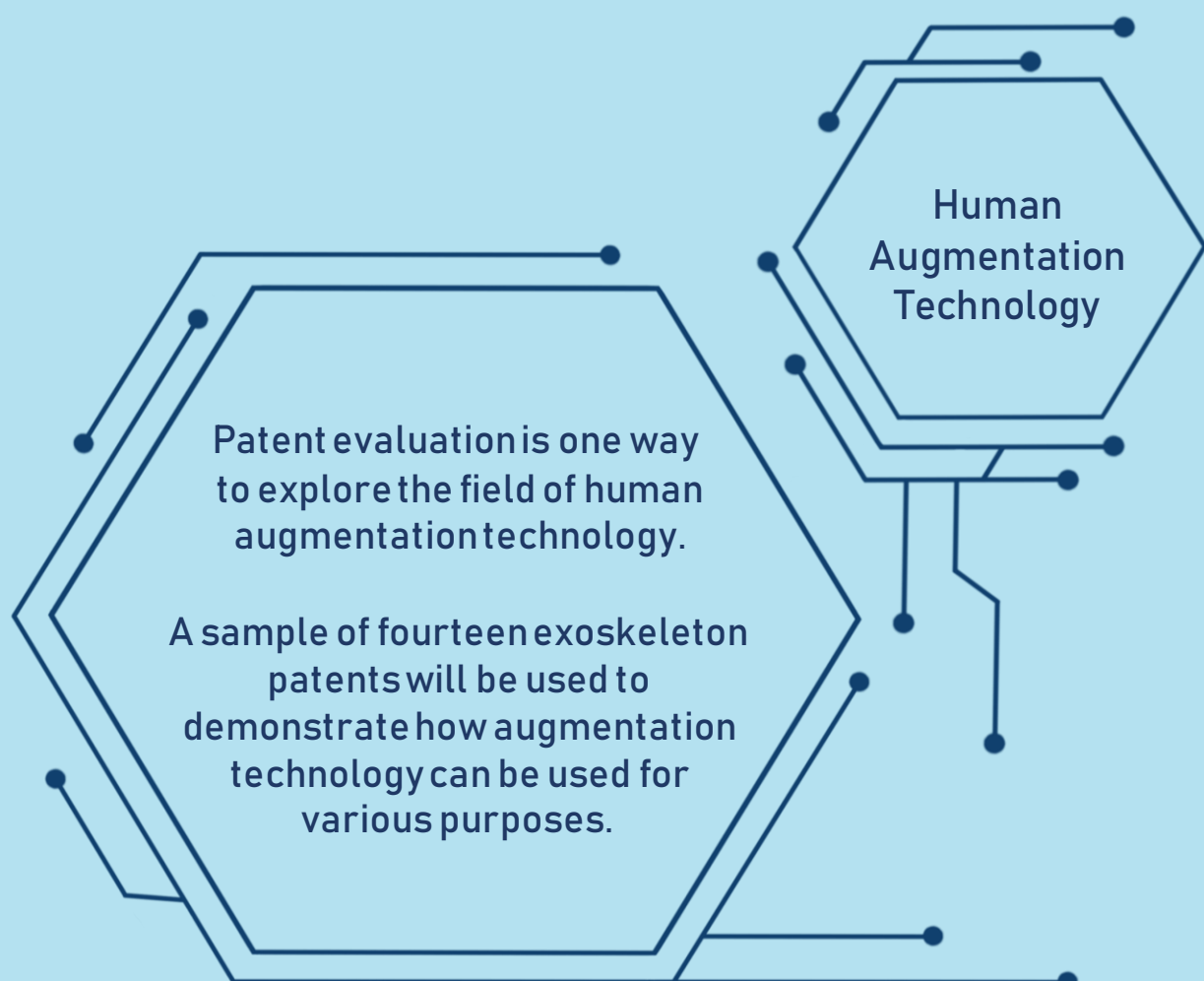
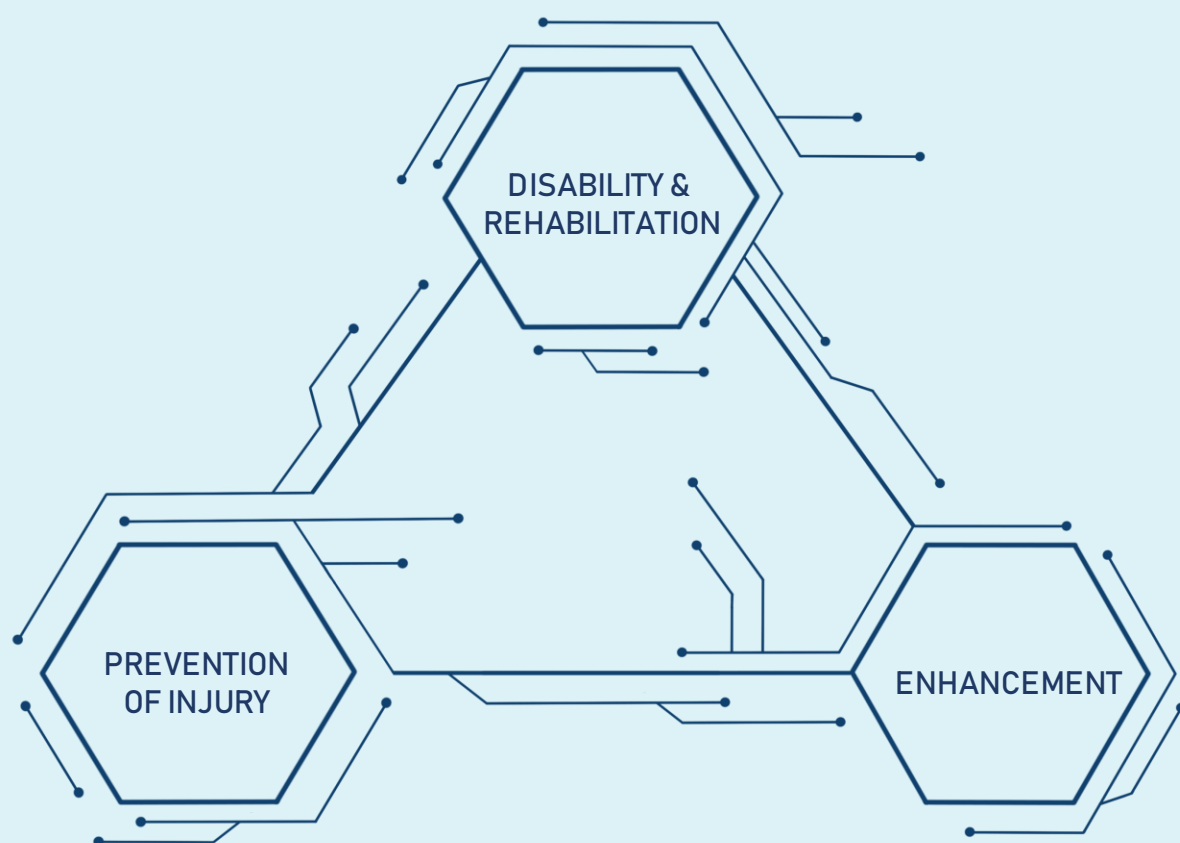


# Human Augmentation Technology

## Exploring Exoskeleton Patents



The patents can be sorted into three categories based on the focus and purpose of the respective inventions. Some patents are primarily geared towards a specific branch, though many fall under more than one category.



## DISABILITY & REHABILITATION

Some augmentation technology focuses primarily on serving people with disabilities or rehabilitating those with existing injuries.

These patents attempt to replicate the abilities of non-disabled individuals.

They are intended to restore a body's physical capabilities, allowing users to complete tasks they may otherwise not be able to perform in their condition.

## PREVENTION OF INJURY

Some augmentation tech aims to assist the body in such a way as to prevent injury from repetitive motions, heavy lifting, strain etc.

These patents are related to disability because they can be used to prevent disabilities that arise through injury.

## ENHANCEMENT

Some augmentation tech shifts away from disabilities, instead allowing users to surpass the typical capacity of most able-bodied people.

Such patents aim to provide additional abilities that enhance the human body such as superior strength, endurance, or speed.



# Patent Sampling



This selection is composed of patents from China, Japan, South Korea, and the United States.

CN211073587U



"Passive Bionic Spine Exoskeleton Device"

The patent design is a non-electrical exoskeleton model that reduces weight on the user.

The patent acknowledges injuries and degradation of spinal function caused by aging, labor, heavy lifting, and repetitive motions. The utility model specifies that the invention can be used for both rehabilitation of injuries and supporting those with spinal diseases.

*Classification: Disability & Rehabilitation*

JP6533874B2



"Modular Exoskeleton Structure to Provide Users with Force Support"

The patent design is a modular exoskeleton that distributes weight and provides mechanical support to increase the physical strength of the user.

The patent describes how exoskeleton technology can be used to improve physical capabilities. It focuses on military applications, where increased strength and carrying capacity are useful on different terrains.

*Classification: Enhancement*

• CN211382522U



• "Power-Assisted Knee Joint Exoskeleton"

• The patent design is a partial exoskeleton that provides assistance for walking and general leg movement.

• The invention uses assembly points around the knees, thighs, and waist to provide additional force to the user's legs. The patent specifies usage for rehabilitation of injuries and diseases, particularly in aging populations with weakening limbs.

• *Classification: Disability & Rehabilitation*

• KR20210120587A



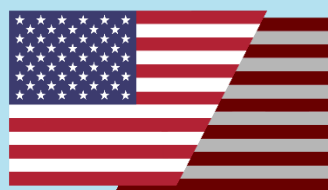
• "Wearable Gravity Compensation Apparatus Capable of Multiple Degrees of Freedom of Movement"

• The patent design is an upper exoskeleton model that uses flexible links and leverages gravity to increase the weight-bearing capacity of the user.

• The patent highlights workplace and military applications of this exoskeleton device, particularly in cases where the user must move or carry heavy objects. The wearable device not only increases carrying capacity, but allows flexible movement for soldiers, labourers, industrial workers etc.

• *Classification: Enhancement*

• US20200261298A1

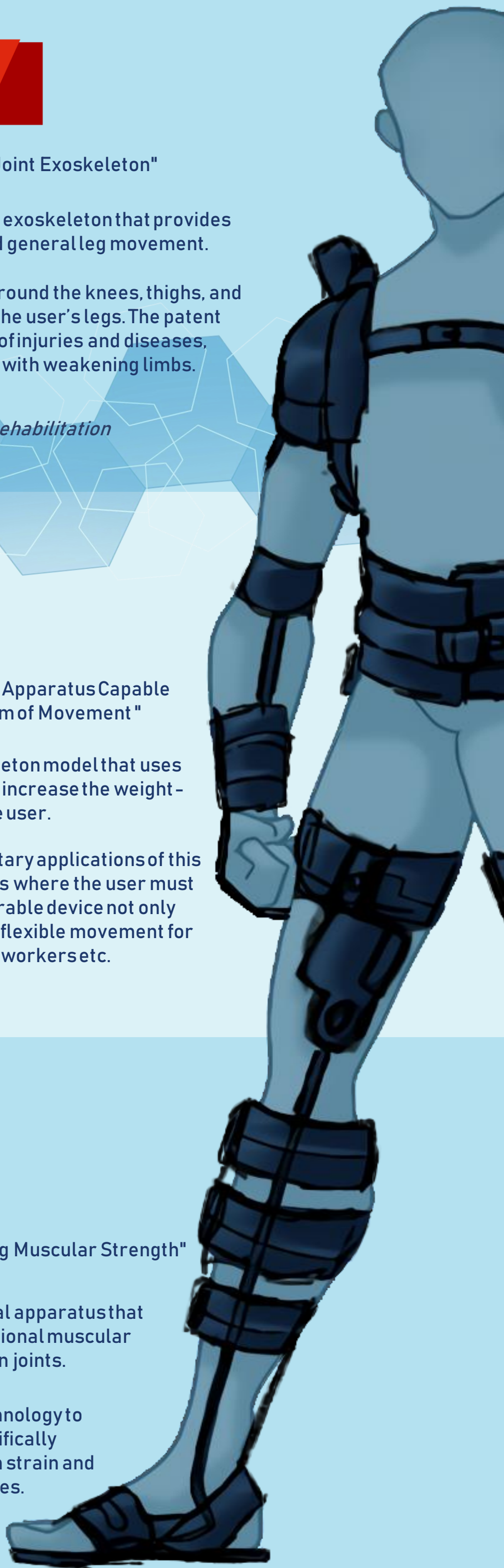


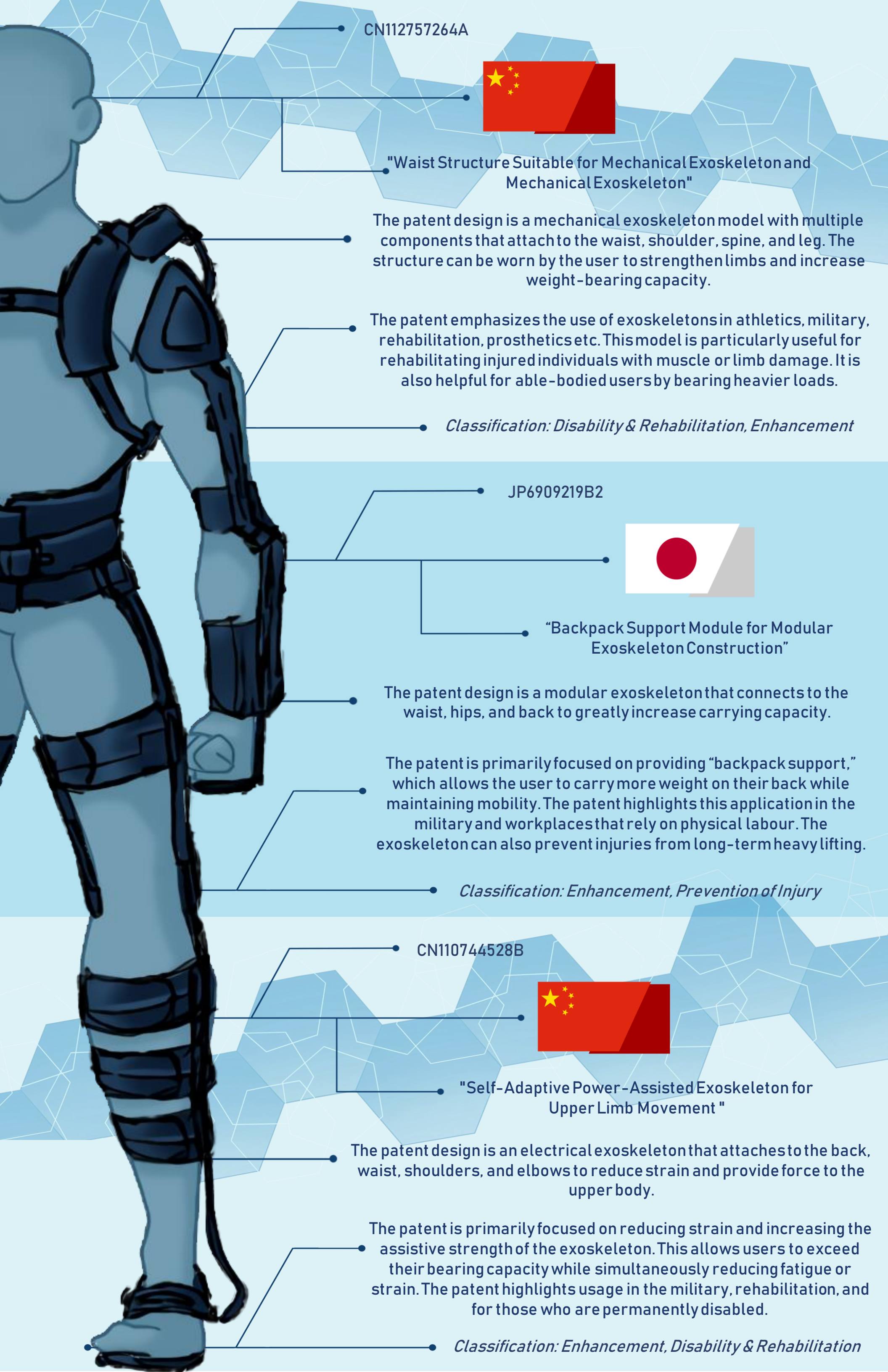
• "Wearable Apparatus for Assisting Muscular Strength"

• The patent design is a wearable mechanical apparatus that supports the user's arms, providing additional muscular strength and reducing pressure on joints.

• The patent acknowledges the applicability of this technology to the workplace, military, and medical fields. It specifically highlights that the apparatus can prevent injuries from strain and reduce weight for those recovering from injuries.

• *Classification: Disability & Rehabilitation*





CN112757264A



"Waist Structure Suitable for Mechanical Exoskeleton and Mechanical Exoskeleton"

The patent design is a mechanical exoskeleton model with multiple components that attach to the waist, shoulder, spine, and leg. The structure can be worn by the user to strengthen limbs and increase weight-bearing capacity.

The patent emphasizes the use of exoskeletons in athletics, military, rehabilitation, prosthetics etc. This model is particularly useful for rehabilitating injured individuals with muscle or limb damage. It is also helpful for able-bodied users by bearing heavier loads.

*Classification: Disability & Rehabilitation, Enhancement*

JP6909219B2



"Backpack Support Module for Modular Exoskeleton Construction"

The patent design is a modular exoskeleton that connects to the waist, hips, and back to greatly increase carrying capacity.

The patent is primarily focused on providing "backpack support," which allows the user to carry more weight on their back while maintaining mobility. The patent highlights this application in the military and workplaces that rely on physical labour. The exoskeleton can also prevent injuries from long-term heavy lifting.

*Classification: Enhancement, Prevention of Injury*

CN110744528B



"Self-Adaptive Power-Assisted Exoskeleton for Upper Limb Movement"

The patent design is an electrical exoskeleton that attaches to the back, waist, shoulders, and elbows to reduce strain and provide force to the upper body.

The patent is primarily focused on reducing strain and increasing the assistive strength of the exoskeleton. This allows users to exceed their bearing capacity while simultaneously reducing fatigue or strain. The patent highlights usage in the military, rehabilitation, and for those who are permanently disabled.

*Classification: Enhancement, Disability & Rehabilitation*

CN113305805A



"Passive Double-Frame Bionic Exoskeleton Back Device"

The patent design is a non-electrical exoskeleton model that distributes carrying weight and allows for flexible movement.

The flexibility of the invention makes it ideal for rehabilitating those with back and spinal injuries. The patent also acknowledges that this technology can be applied to the workplace and military settings.

*Classification: Disability & Rehabilitation, Enhancement*

US9918892B2



"External Structural Brace Apparatus"

The patent design is a portable exoskeleton that distributes weight and helps the user walk.

The patent heavily emphasizes the use of exoskeletons for injury rehabilitation by minimizing strain during treatment. The invention can be used to both immobilize and provide structural support for the spine. The patent also highlights the use of exoskeletons in workplaces to prevent injury from repetitive motions and heavy lifting.

*Classification: Prevention of Injury, Disability & Rehabilitation*

CN211835264U



"Adjustable Waist Mechanism in Exoskeleton Robot"

The patent design is an adjustable waist component that eases movement and integrates safety handles to prevent further injury.

The invention is primarily intended for those who are already disabled. It provides physical support for weak or injured lower limbs. In addition to helping with movement, the patent specifies that its adjustable safety handles can prevent injury to both the user and caregivers.

*Classification: Prevention of Injury, Disability & Rehabilitation*



CN113601489A



"Hip Joint Assistance Exoskeleton"

The patent design is a light-weight, partial exoskeleton that focuses primarily on the hip joint. The device generates torque at the joints to support basic leg movements including walking, using stairs, squatting etc.

The patent emphasizes improving the comfort and wearability of the exoskeleton while providing the necessary force for users to move their lower limbs. This allows disabled users to continue using their legs without excessive strain or discomfort.

*Classification: Disability & Rehabilitation*

KR101989218B1



"Exoskeleton and Method of Providing an Assistive Torque to an Arm of a Wearer"

The patent design is an exoskeleton model that uses a spring mechanism to generate torque and support the user's arm movements.

The exoskeleton provides additional arm strength and stability. The patent highlights that these benefits increase performance and prevent injuries from repetitive motions in the workplace and military settings. However, the device is most useful for non-disabled people as users still support their own weight.

*Classification: Enhancement, Prevention of Injury*

CN113693891A



"Exoskeleton Enhancement Auxiliary System"

The patent design is a mechanical exoskeleton that aims to provide additional force to users of different heights and builds.

This device increases weight-bearing capacity for any user, though the patent highlights that such technology is usually used for rehabilitation purposes. The patent is also classified under A61H3/00, which specifies that the invention in question is intended to help disabled individuals walk.

*Classification: Disability & Rehabilitation, Enhancement*