

Why Puppeteer?

Puppeteer is an embedded computer, designed to be embedded inside an exhibit or interactive to provide control. It is designed to add interest, life and drama to exhibits, through the use of sound and other devices such as light, smell, smoke and special effect. It responds to a broad range of sensors (light, heat, movement, touch etc.), both digital and analogue, to allow users to control or influence an exhibit. Puppeteer can control a broad range of devices (motors, lights, relays, actuators etc.), both digital and analogue, to create a fascinating and absorbing experience for users. It has excellent sound facilities, for sound effects, with two separately controlled channels. It is small enough to fit easily into stand alone exhibits.

battery powered

Puppeteer can run off DC voltage between 7V and 24V. It is capable of accepting a fluctuating input voltage, providing it doesn't exceed the given range. We have run Puppeteer off a solar panel, with the panel charging a deep discharge battery. This means that we can run systems outdoors, in a self-contained unit, with little installation costs.

Low voltage has major safety implications, especially where the general public is concerned. Everything can be designed to run off 12V, so there is no mains power in reach of the public. Low power also means low electricity consumption, but without losing anything in terms of processing power – Puppeteer is as powerful as your desktop computer.

simple programming

Puppeteer is unlike show controllers. It is a fully fledged computer, which provides immense flexibility, but means it needs to be programmed in a computer language. We have opted for Java as a programming language, largely because it is a modern, object-oriented language, but also because it is a simple language and quick to learn. There is also considerable expertise available, both in terms of human resources and Internet resources. The environment we have provided is a fast prototyping system, allowing development on a PC and easy transfer of applets to Puppeteer for testing.

We have provided an interface library, so that much of the work involved in talking directly to interfaces is minimised. This means that producing an applet is really only a case of designing the logic in the exhibit. Applets can be tested on PCs to ensure that the applet behaves as expected, before committing to hardware.

Gressenhall Museum in Norfolk was originally built as a work house. It now houses the Norfolk Rural Life Museum. Puppeteer was used in an innovative exhibit which depicts the harshness of the Gressenhall Workhouse regime to modern day visitors.

The punishment cell of the Workhouse is still intact complete with its huge, unflinching metal door – an ideal place to convey the chilling, negative side of the workhouse system. The small, windowless room is whitewashed with just a wooden bench inside. A sympathetic, imaginative system of lighting, sound and imagery was developed to create the atmosphere and to tell the tale of one small boy locked alone in the room for 6 hours because he had the nerve to cheek matron.

networking, collaboration

Puppeteer has an Ethernet port, which allows connection over a network to both PCs and the Internet. Puppeteer can act as a web server providing web pages on demand, or send an e-mail over the Internet. It can be accessed using any of the standard Internet tools, such as ftp, telnet etc.

Again, because of the use of Java and networking, it is quite simple to set up collaborative processing between one or more Puppeteers. As an example, one Puppeteer could be configured as an input device only and a second Puppeteer as an output only device. Each would communicate with the other to ensure that events on one are reported to the other. A cluster of Puppeteers could be built, each aware of what the others are doing. Java and networking is an ideal combination, it is quick and simple to program.

expansion with i/o cards

Puppeteer normally provides 8 digital outputs and 12 digital inputs. In addition, there are 2 analogue inputs. These numbers can be varied, by producing an appropriate card to connect to the expansion port. We plan to provide a number of standard cards (for example, 32 digital inputs and outputs) and also intend to use this method as a means of addressing unusual requirements. For example, it may be of interest to monitor a number of analogue signals, so we would produce a sampling card to cater for this.

There are also two RS232 ports provided, which can be used to drive any other equipment that can be controlled via RS232, for example, a modem. One of the ports is used as a debugging port, so messages can be printed from applets through this port and can be viewed on an attached computer. This is useful during testing.

distribution of content

A major benefit of the built in networking is the ability to communicate with Puppeteer remotely. This can be used in a number of ways, but the benefit arises from the fact that it doesn't matter where Puppeteer is located, it will be possible to communicate with it. This allows updates of sound files, pictures or the applets themselves from a central location to any Puppeteer connected to the network - this could be anywhere in the world. Such a technique does not require any physical access to the units.

This works the other way as well, in that it would be possible to pull information off Puppeteer, so that if it was running a voting system, for example, it would be possible to pull data off at frequent intervals, such as daily or hourly. Alternatively, Puppeteer can initiate the transfer of data, possibly by sending an e-mail message. Ansaе have included the means for Puppeteer to gather statistics, so that the time of operation can be recorded, to provide feedback on visitors, length of stay etc.

A diorama at the Royal Signals Museum portrays a signaller in action on D-Day. Corporal Thomas Waters is the only member of the regiment to receive the Military Medal. The diorama has been on display at the museum for 10 years, and Adam Forty, the Business Development Manager, felt that it needed updating.

The base and the lid were reworked by Ansaе, to provide a much cleaner looking design. Puppeteer was used to add the story behind the winning of the Military medal. Three buttons are provided, each controlling a dramatised commentary on the events of D-Day, using a narrator and recordings from the era. In addition, Puppeteer controls a number of lighting effects, to add machine gun fire and explosions to the diorama. Atmospheric lighting is used to depict night and day.

standardisation of hardware - building blocks

An important aspect of Puppeteer is the standardisation of components. Puppeteer is a building block, part of a larger system. This has a number of advantages - when designing a system, there is considerable re-use of software from previous projects. System development should be rapid, because much of the infrastructure of a system is already there; the starting point for a project is so much further advanced. This is our philosophy behind the use of Java; the language is so rich, so much of the work is already done, so the start point for a project is already well down the road.

Another important area is maintenance. Should there be any problem with a unit, then it is simple to swap out. Providing the correct content is included, any Puppeteer can replace any other. Maintenance takes another form, in that changes may be requested by a customer once an exhibit has been installed and commissioned. Because Puppeteer is a standard component, it is then possible to develop and test those changes without having to have access to the installed system. We actively encourage frequent updates to a program, whether it is changing sound files or images, it can freshen up an exhibition by making minor changes. And why not seasonal changes, so that an exhibit is changed for example, at Christmas?

Support is also simpler, because support staff know the hardware installed, and indeed, if necessary, can configure a Puppeteer for themselves in order to investigate a problem.

sound

Puppeteer has excellent sound capabilities, using the standard Windows .WAV file format. This allows production of sound files on any Windows computer. The only limitation on the files is ultimately the amount of flash memory on the unit. We can keep adding flash memory to suit any requirement; we can compress files to reduce the storage requirements; we also plan to offer support for MP3 files, which is an Internet standard, and has better compression.

Sound is an essential element for any exhibit or interactive. Imagine a computer game without sound. Sounds can provide punctuation, drama and emotion. It can be used for voice-overs, for music and for effects. We have found that adding sound will 'lift' an interactive.

One of the key exhibits for children in the recently opened Lee Valley Visitors Centre in Walthamstow, is an inter-active survival game, controlled by the Ansaе 'Puppeteer'.

Designed to fit within the centre's objective of focusing on the nature and wildlife found around the former Water Treatment site, the game gives the players a chance to 'survive' as a local creature in a world full of hungry predators.

Installed by Bremner & Orr, the Ansaе Puppeteer software controller was chosen as it can be constructed and tested away from the Visitor Centre and fitted once all the components work reliably. It also offers random selection of creatures - one player will be a worm, the next (maybe!) a fox, and the whole game is brought to life through the creative use of sound and light.