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Motorised Projector Mount

Michael Hollingsworth

Mt Roskill Grammar School

Year 13 Technology Electronics, full-year project

Teacher: Eddy Tang

Michael's client was the camera crew of a large church. Church sermons were projected onto a screen via a projector that had to be raised into position, together with the stage lights, for each service. Alignment of the projector is critical, and the crew has to do this manually each time, from atop a 15m ladder.

After investigating his client's needs, Michael proposed a remote-controlled motorised projector mount that can be adjusted through three axes (similar to a ball and socket joint). Stability, and the ability to finely adjust the platform, is crucial because a small angle change translates to a big movement of the projected image.

Before coming up with his design concept Michael investigated existing projector mounts and different types of motors. As well as regular consultations with his client, Michael also consulted experts with backgrounds in motor control and mechanical engineering, and developed a model to effectively demonstrate this concept.

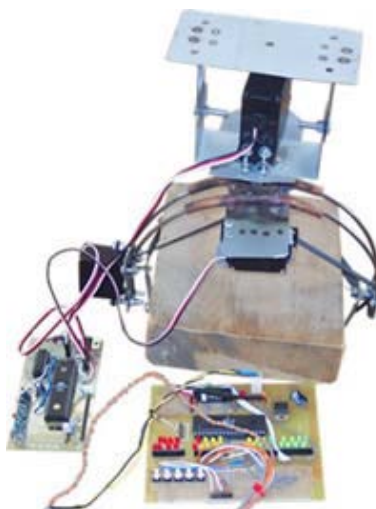
Michael's final solution uses three [servo motors](#) connected to some highly original mechanical moving parts, controlled by a microcontroller, for which he wrote the software. The control module uses simple toggle switches to control the projector mount's movement. Rather than using a wired remote controlled solution, Michael went one step further and established a wireless radio link between the user control module and projector mount, to give his client freedom to move around the church hall.

Michael's client was impressed by the manner in which the conceptual design has addressed the original problem, and the way Michael modelled its effectiveness. Michael was pleased with how his final design would work technically and acknowledges both the technical and project management skills he has developed in the process.

He plans to take the project further, seeing a market for this kind of device, and has established contact with companies that provide lighting and video solutions for concerts and conferences.

Teacher comment

Michael gained a high level of electronics skills through having to design his own motor driver software and hardware interface. This project shows how a conceptual design can be challenging enough for a student to model all the complexities in a solution, while being realistic enough for a client to 'see' the real product.



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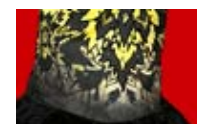
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