

## Design and Development of a PC Video Game for Improving Vision in People with Amblyopia



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**Abstract:**

Amblyopia is a developmental disorder in one or both eyes that affects approximately 5% of the population worldwide. Patching of the eye with better vision is the principal treatment for unilateral amblyopia. There have been few alternatives to patching treatment of amblyopia for more than two years. Patching treatment gives moderate results with children, but it is often abandoned due to its boring design and no interactivity with the normal treatment. An effective treatment that is combined with eye exercises in a form of video game with narrative and fun would be more effective in treatment for children with amblyopia.

An attempt is made to design a video game that is specially designed using eye exercises for improving vision in children having amblyopia. The game levels using the eye exercises are implemented using Action Script 2.0 in Adobe Flash. The identified game assets and other game props for the game scene is created using Autodesk Maya. The terrain is generated using the height maps in the UDK game engine. The textures for the game assets such as buildings and display boards are done using Adobe Photoshop. Finally the game assets and game levels are imported into the game engine and appropriate game environment was built using the game engine. The GFXmovie command and kismet scripting language included in the game engine are used to implement game levels.

The survey is conducted with sixteen participants to analyse the user experience of the game. Results were identified with the user study report, three amblyopic children and eight long sighted participants who played the game were able to roll, track and focus their eyes while playing the game. The results fetched from the analysis of the survey and the expert comments confirming the credibility of the PC video game by an ophthalmologist suggests that it has enough potential to improve vision in people with amblyopia, if tested over a period 6 to 8 months. This offers hope for improving vision in people with amblyopia.



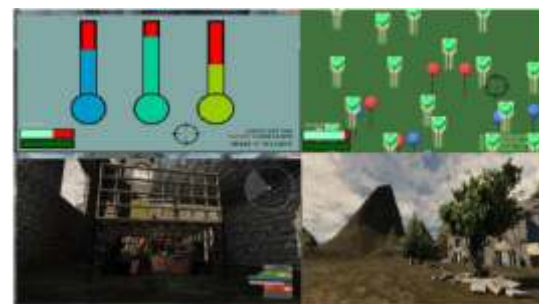
**Game art**



**3D model**



**Game logic**



**Result**