# Project Proposal

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## Executive Summary

This is a project proposal for an interactive game controlled by the user’s facial muscle movements and heart rate. The game will be a simple 2-D Android application where the user controls the direction of the character by winking and the speed of the character with their heart rate.

## Sensors

Sensors mounted on a carefully crafted hat (ensuring no discomfort to the user) will be used to detect changes in facial muscles and in the heart rate of the user. The output of the sensors will feed into an analog filtering and amplification board. The output of the analog board will be used as an input the ARM microprocessor ADC.

## ARM microprocessor

The arm microprocessor will collect and process the signal data to determine the facial activity and heart rate of the user and send that information to the Android device.

## Communication with the Android Device

Communication with the Android device will be done through Bluetooth. The ARM microprocessor will communicate with a Bluetooth module using UART.

## Android Application Details

The Android application will feature a character that will move through a 2-D world collecting coins and avoiding a veritable army of man-eating penguins. The speed of the character will be proportional to the heart rate of the user (higher heart rate corresponds to faster movement and higher jumps). The direction of the character will be controlled by the user’s winking. If the user closes their left eye (leaving their right eye open) the character will move to the right. If the user closes their right eye (leaving their left eye open) the character will move to the left. Closing both eyes will result in the character jumping upwards (the strength of the jump being determined by the user’s heart rate).

The user will have a limited amount of time to move from the left end of a 2-D world to the right end of the world collecting as many coins along the way as possible while avoiding being eaten by the formidable penguin henchmen. If the user makes it to the finish, the user will be assigned a score based on the amount of time remaining and the number of coins collected.

## High-Level System Diagram