Gaming Controllers with Micro:bit(s)

Nadeen Gebara, Philippos Papaphilippou, Jingqing Zhang, Ruizhe Zhao

A Customizable PC Gaming Experience

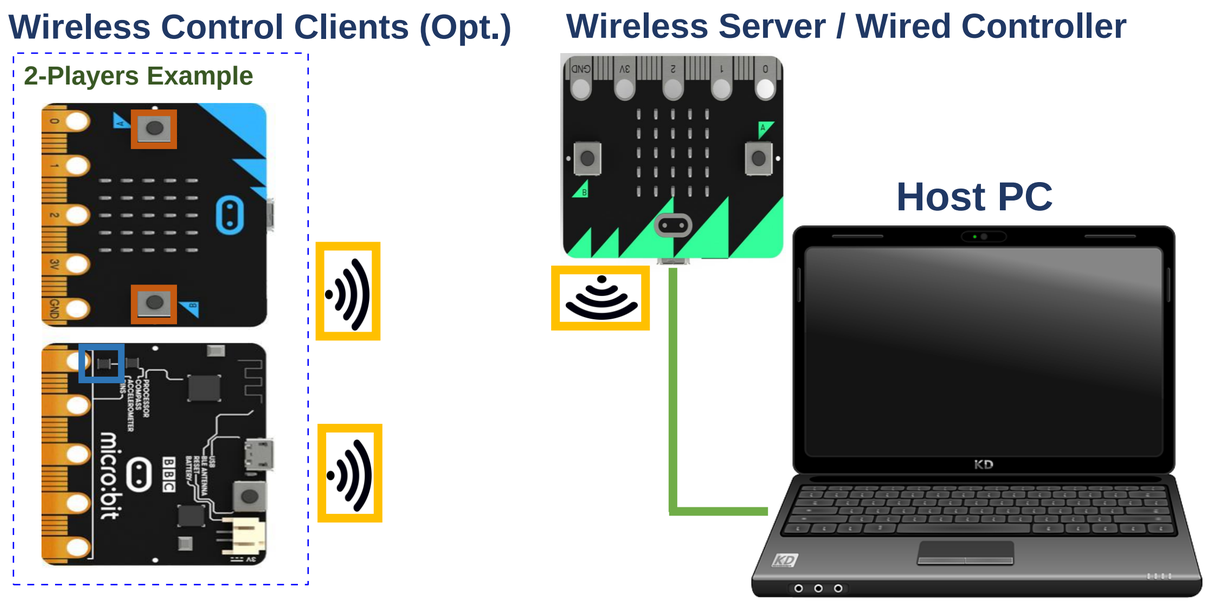
Motivation

Micro:bit: An embedded system designed for use in computer education in the UK

PC Gaming With Micro:bit

+ Provides a cheap, customizable gaming experience that suits each child's preference
+ Introduces kids to general programming as they code their desired controller functionalities.
+ Enhances the understanding of geometry and physics when using the built-in accelerometer and communication by utilizing the Micro USB and radio functionality.
+ Gaming is also beneficial as it enhances memory and improves problem-solving skills as well as coordination and attention.

Micro:bit Game Controller Design



Game Controller(s) Implementations

Modified Single-Player Games

Neverball

"Tilt the floor to roll a ball through an obstacle course within the given time. If the ball falls or time expires, a ball is lost."

An open-source game that now uses micro:bit's accelerometer as a gyroscope to adjust the angle of the floor.
Kids can experiment with the serial output functionality and how varying the position of the micro:bit impacts the readings of the accelerometer.
Accelerometer, Wired, Linux

TORCS

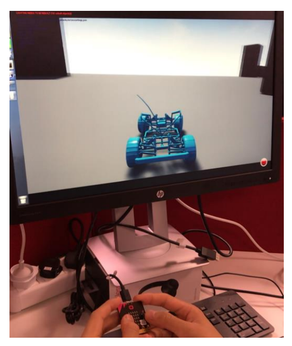
"Car Racing"

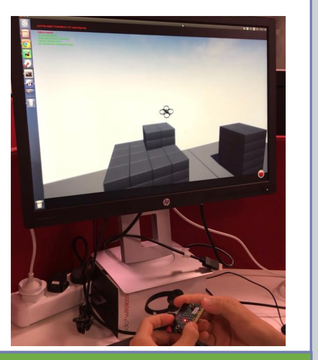
An open-source game that now uses the micro:bit as a controller in tilting and steering wheel modes. The implementation consists of collecting accelerometer data and adding a new TORCS driver that reacts to micro:bit status updates. Kids can learn simulation and control of car driving while programming.
Accelerometer, Push buttons, wired, Linux-only

AirSim

"Car Driving and Drone Flying Simulator"

An application based on Microsoft AirSim and Unreal Engine. Our micro:bit controller allows users to drive a car or a drone in a given 3D scenario simply by tilting and pressing buttons. Raw data from micro:bit is first collected and the corresponding control instructions are then sent to the car/drone through AirSim Python APIs.
Accelerometer, Pushbuttons, Wired, Windows





Generic Controllers: Wireless Multi-Player Gaming

Featured Linux Game:

SuperTuxKart

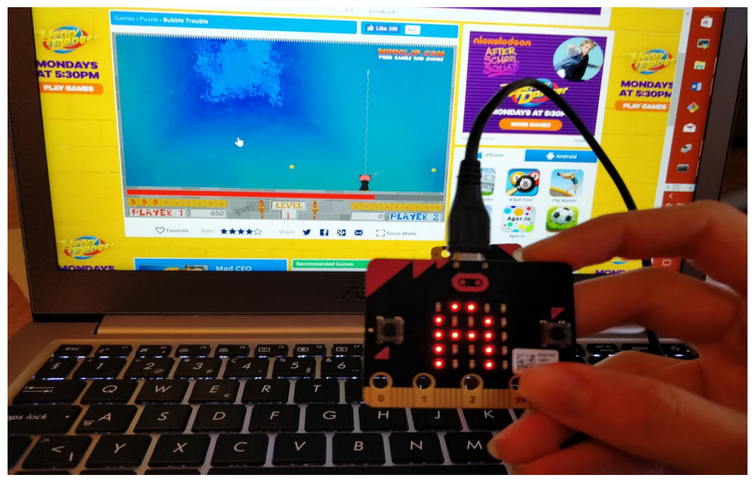
"Adventurous Car Racing"

An open-source clone of Mario Kart that allows players to participate using keyboard commands. Players can now wirelessly use their controller micro:bit(s) to control their gaming characters. This approach can be used for any Linux game…
Accelerometer, Pushbuttons, Wireless, Linux

Featured Windows Game: Bubble Trouble

"Classic old school game; run around and shoot your harpoon at the dangerous bubbles to break them down".

An online game that allows up to two players. Two control modes are provided that either use the accelerometer or pushbuttons to wirelessly control the screen character by mapping received micro:bit instructions to appropriate keyboard commands. This can be used for any Windows game...
Accelerometer, Pushbuttons, Wireless, Windows



Learn More

Video Demonstrations
Additional Details
Source code
Tutorials

Imperial College London
HiPEDS
Microsoft
EPSRC
Engineering and Physical Sciences Research Council