Injecting Inputs Over Internet Connections

University of Tartu Institute of Computer Science

Author: Raiko Valo

Supervisor: Ulrich Norbisrath

Introduction

This project aims to create a custom controller system that minimizes latency and ensures consistent input transmission using a WiFi connection for communication. Controller is built using powerful M5StickC microcontroller, doing the communication and the computations, paired with the JoyC Omnidirectional Controller, needed for dual joysticks and battery socket. A input devices for playing games on the CGVR Lab's smart glass panels from corridor without long delays between controller action and movement on the screen.
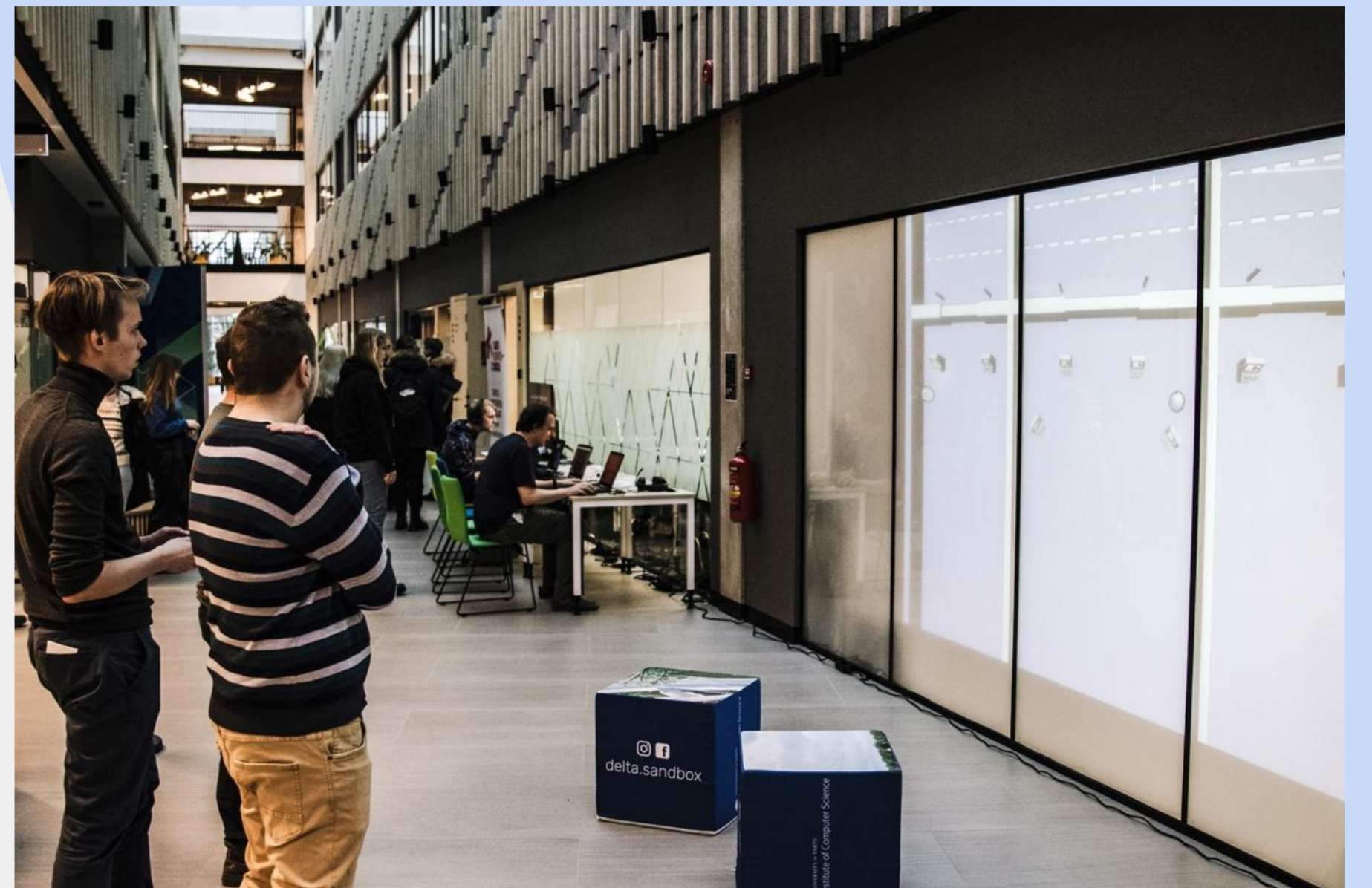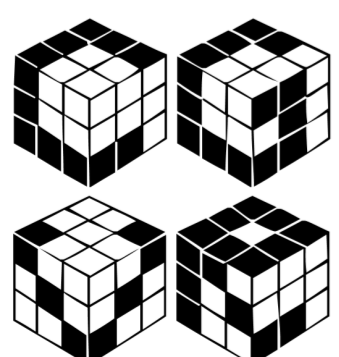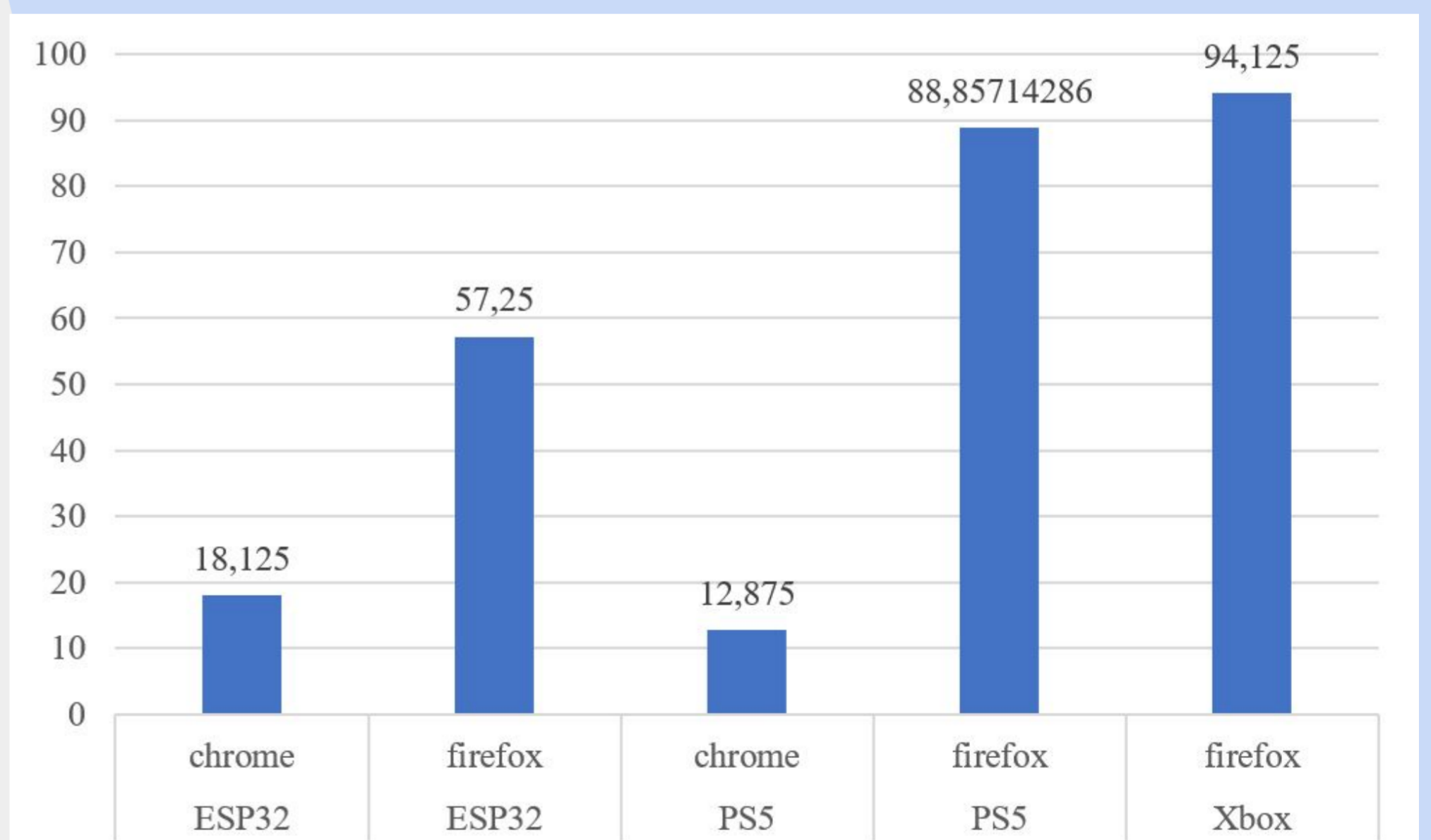

System Flow

The M5StickC captures input from the JoyC Omnidirectional Controller and transmits data over a UDP connection, for fast and one-sided communication to a Raspberry Pi. The server setup on the Raspberry Pi continuously listens for incoming data packets, parsing them into JSON format and updating the state of virtual gamepads using the vgamepad library. Done by emulating virtual controller on host machine and relaying incoming information to games.
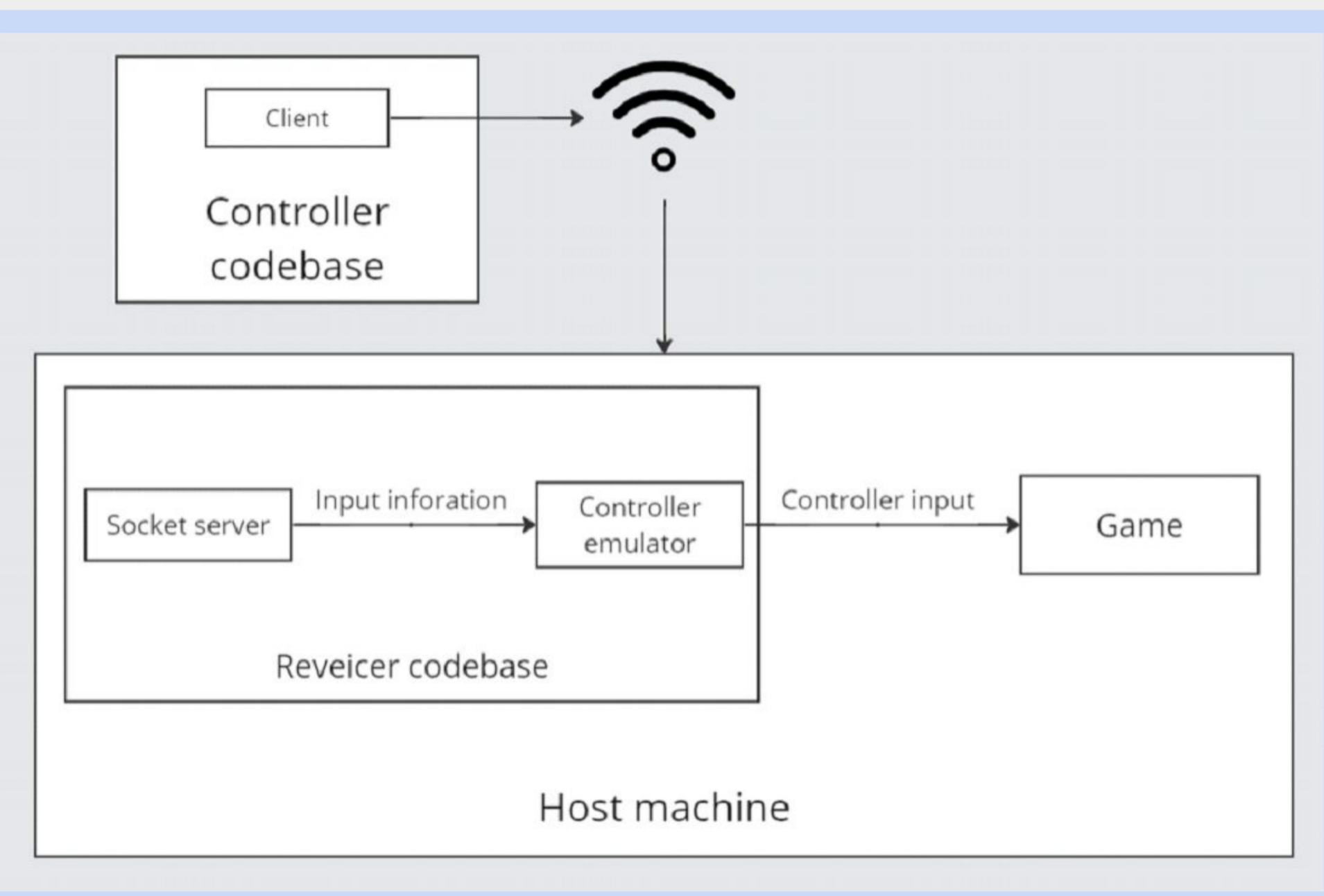
Results

A comparison evaluated the latency performance of three controllers: the Xbox controller connected via a wireless adapter, the PlayStation 5 controller connected via Bluetooth, and the custom M5StickC with JoyC Omnidirectional Controller connected through WiFi. The custom controller performed well, especially considering its do-it-yourself nature, showing competitive latency figures, even surpassing established controllers in certain browsers, suggesting its strong potential for gaming applications. Creating the system was a success, as it can be used by various machines and offers a viable alternative for gaming.Visit the project on

https://comserv.cs.ut.ee/ati_thesis/datasheet.php?id=79601

UNIVERSITY OF TARTU
Institute of Computer Science