

Thesis Project Portfolio

E-thello Game Board

(Technical Report)

Serverless Computing and Its Influence on Labor Dynamics Within the Technology Industry

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Technical Project: E-thello Game Board

For the technical project, my group chose to develop an electronic version of the classic board game Othello, designed to enhance player experience for a wider audience. This innovation aims to merge the benefits of online versions of Othello, such as move highlighting and automatic board updates, with the tactile feedback of a physical game board. Key features include a custom-designed 8x8 grid of LEDs for the board, with each LED representing Othello pieces that change color according to player moves. The interface includes tactile buttons on top of each LED, allowing players to input their moves easily. This setup not only facilitates an intuitive and engaging game environment but also provides an AI opponent for solo play, making the game accessible to a wider audience without the need for a human opponent. Other convenient features on top of these include an LCD screen and buttons that allow for users to see the score and adjust game settings, including the AI difficulty and starting player.

This setup lessens the learning curve for beginners by highlighting legal moves and automating score tracking and piece counts, which are traditionally manual aspects that can intimidate new players. The board is powered by a Raspberry Pi, which runs a Python script that handles game logic and LED control using pre-existing Neopixel libraries to simplify the programming requirements. All components are encased in a sleek, 3D-printed enclosure that not only protects the electronic components but also gives the board a modern look suitable for both home and competitive environments. By bridging the gap between digital and physical boardgames, this project not only revitalizes a classic strategy game but also serves as a practical application of skills learned in computer engineering, particularly in embedded systems and software development.

STS Project: The Impact of Serverless Computing on Labor Dynamics

My STS research paper, on the other hand, delves into the socio-economic implications of serverless computing within the technology industry, particularly focusing on its impact on labor dynamics and IT professionals' employment. Serverless computing, as a model where the management of servers is outsourced to a cloud provider, fundamentally shifts the responsibilities and skills required from IT professionals. The research examines how companies like Amazon have transitioned to this model, significantly altering job roles, required skills, and even the economic structure of IT employment. Theoretical frameworks such as Actor-Network Theory (ANT) are applied to analyze the complex interactions between human and non-human actors, such as technology platforms, corporate policies, and labor markets. This exploration is crucial for understanding how technological innovations like serverless computing are redefining professional landscapes and what this means for future employment in tech industries.

Interconnected Insights and Broader Implications

While the technical project and the STS research appear distinct, they converge on the theme of technological advancement and its broader implications in both leisure and professional settings. The E-thello board illustrates direct application and user interaction with technology, enhancing the traditional game experience. Conversely, the research on serverless computing tackles the indirect effects of technology on professional fields, highlighting shifts in labor requirements and job security driven by advancements in serverless computing.

Both projects highlight a key aspect of technology's dual-edged nature: while it can create opportunities, such as creative twists on classic boardgames and operational efficiencies in

businesses, it also poses challenges like job displacement and the need for continual skill development. The projects together underscore the importance of designing technology that is considerate of its socio-economic impacts, advocating for a balance between innovation and its implications on human capital.

The insights from these projects are instrumental for stakeholders in technology development, policy-making, and education. For technology developers and companies, understanding these dynamics can guide more responsible product and service designs that consider long-term social impacts. For policymakers and educators, these findings emphasize the need for robust training programs and regulations that can help the workforce adapt to rapidly changing technological landscapes.

In summary, these projects offer valuable perspectives on how technology intersects with everyday life and professional domains, proposing thoughtful engagement with technology as a tool for societal and personal advancement.