



Headless Terminal

Transaction Processing via Speech

ELECOMP Capstone Design Project 2018-2019

Sponsoring Company:

IGT Global Solutions Corporation

55 Technology Way

West Greenwich, RI 02817

Phone: 401-392-1000

<https://www.igt.com/>

IGT is continuing their support of the Program for the 3rd Consecutive Year!

<http://web.uri.edu/elecomp-capstone/past-projects-2016-2017/igt-jackpot/>

<http://web.uri.edu/elecomp-capstone/past-projects-2016-2017/igt-windfall/>

<https://web.uri.edu/elecomp-capstone/project-details-by-team/igt/>

Company Overview:

IGT is the world's leading end-to-end gaming company. It is listed on the New York Stock Exchange under "IGT." Its holding company headquarters are in the United Kingdom, with operating headquarters in Rome, Italy; Las Vegas, Nevada; and Providence, Rhode Island. IGT attracts the industry's top talent, with more than 12,000 employees across the globe.

IGT's integrated portfolio of technology, products and services, including its best-in-class content, is shaping the future of the gaming industry by delivering the innovation for players.

IGT is uniquely positioned to provide the government-sponsored and commercial gaming industry with proven solutions for gaming, lottery, interactive, and social, through every channel across the spectrum, including retail, web, and mobile. It is IGT's mission is to be the global innovation leader in the gaming industry.

Our vision to combine the best of our legacy companies to enhance and build our capabilities; deliver content, technology, and expertise that drive customer and player demand; continue to grow leadership in the lottery and gaming space, and become a leader in the interactive space; and use the power of our understanding of central systems and connectivity to define the future of gaming.



Technical Director:

Robert Corvese

Advance Research & Innovation Architect
401 392-7143

Robert.Corvese@igt.com

<https://www.linkedin.com/in/robert-corvese-pmp-b384983/>



Project Motivation:

Lottery terminals have been processing transactions via touchscreen interfaces for many years with online terminals. Tasks range from manually entering wagers using the user interface to using play slips to process wagers. This capstone project will explore the feasibility of developing a headless lottery terminal to process wagers. This would entail removing the current touchscreen based terminal interface and replacing it with a terminal that can understand voice commands and respond with appropriate speech responses.

Anticipated Best Outcome:

The anticipated best outcome is a functional prototype lottery terminal capable of receiving and processing voice commands and translating such commands to terminal functions. Voice commands will be used to produce wagers and must be processed without error. To assist the user, an interactive voice-assistant will be developed; providing users with instructions and tips to improve the overall experience.

Project Details:

The project hardware environment is composed of a small PC, a microphone, a speaker, and a POS (point-of-sale) printer as seen from the image below. The application layer will be developed in Java, while any firmware development should be written in C. The operating system of the PC may be either Windows-based or Linux-based; pending initial investigation and discovery.

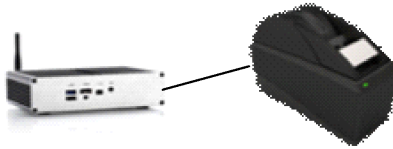


Fig. 1: A small computing system connected to a POS printer.

The headless terminal should be able to do the following.

- Receive voice commands and convert them to system application functions
- Interact with a retailer in a natural way; allowing the retailer to place wagers
 - e.g. A player asking the retailer to place a bet for them
- Placing wagers should be a hands-free activity. No physical interaction required
- When more information is needed to perform a task, the system should ask questions in order to obtain more information.
- The system should, whenever necessary, ask the player to verify that the data submitted is valid and without any error.
 - e.g. The system should ask to confirm the cost of a wager
- The system must monitor the state of the terminal, and be able to communicate with the retailer when physical intervention is required.
 - e.g. The printer is low on paper, a notification has been received
- Use voice recognition to identify retailer in contrast to a player
- Enable printing of wagers
 - Static information on ticket will consist of logo, teller number, etc.
 - Dynamic data will consist of draw dates, numbers selected for a Lotto type of game
- Respond in a clear and understandable voice

Example System - Snips AIR: *A Private-by-Design, Open-Source, Decentralized Voice Assistant*
link: <http://bit.ly/2LoWb8k>

Snips Maker Hub - Open-Source Snips Development: <https://makers.snips.ai>



Electrical Tasks:

- Gain familiarity with existing IGT terminal systems
- Research and determine hardware to meet product specifications
- Design and implement the underlying system circuitry required to interface the computing system to the required peripheral devices (microphone, speaker, printer, display)
- If needed, provide assistance in signal processing of sampled voice data for recognition
- Develop and implement necessary project components in order to produce a prototype system

Firmware/Software/Computer Tasks:

- Gain familiarity with existing IGT terminal systems
- Determine a hardware platform for the embedded computing system
- Determine cost-effective peripheral devices capable of meeting specifications and product requirements
- Determine any and all dependent libraries of the application
- Underlying Firmware Development (if needed)
 - Peripheral drivers
 - Peripheral Interface
- Main Application
 - Voice Recognition
 - Selection and implementation of a voice recognition system capable of meeting project requirements
 - Voice Assistant - commands and responses
 - Peripherals
 - Microphone, Printer, and Speaker control
 - Business and Domain
 - Retailer Logic
 - Player Logic
 - Presentation
 - GUI Development and Implementation



Composition of Team:

1 Electrical Engineer (ELE) and 1-2 Computer Engineers (CPEs)

(preference will be given to ELE students who can also undertake some of the Firmware/Software/Computer Tasks)

Skills Required:

Computer Engineering Skills Required:

- Proficiency in Java application development
- Experience developing GUI applications
- Experience with voice recognition is desirable, but not required
- Familiarity with cross-platform application development (Java, Qt, Xamarin)
- Familiarity with embedded systems
- Familiarity with Windows and Linux Operating Systems
- Low-level programming experience, such as C

Electrical Engineering Skills Required:

- Analog and Digital Circuit Design
- Digital Signal Processing
- Experience with voice recognition is desirable, but not required
- Experience with system peripherals (microphones, speakers, printers) is desirable, but not required.

Anticipated Best Outcome's Impact on Company's Business, and Economic Impact:

Touch-screen interfaces are used numerous many IGT products (lottery, gaming, social). A voice-driven system would eliminate the requirement of both expensive and fragile digitizers found in both capacitive and resistive touch displays. Additionally, the viability of a voice-driven system extends to other products IGT manufacturers and services they render.

Broader Implications of the Best Outcome on the Company's Industry:

Hands-free selling of lottery wagers has several benefits. Most notably is the total reduction of system size, allowing space to be more efficiently utilized. There is potential expansion of such a system to fully self-driven lottery self-service machines. Such advancements would drive future advancements in the lottery industry.