Project Name: Voice Biometric Integration

Team Name: Tres Commas

Members:	Emails:
Jonathan Easterman (Team Lead)	jonathaneasterman@gmail.com
Sasha Shams (Scribe)	sashagshams@gmail.com
Vince Nicoara	vincenicoara@gmail.com
Arda Ungun	ardaungun@gmail.com
Carson Holoien	chilloien@gmail.com

Overview of the problem:
We want to bring authentication to the 21st century. Tried and true methods of user authentication are dated and unreliable. We will utilize modern voice biometrics to identify and authorize users in a seamless process. No more having to remember years-old pins and passwords. No more having to share private, sensitive information with strangers over the phone. Using our technology, an individual's identity will be ascertained in the utterance of a sentence.

Solving this problem is important because it provides convenience for users and automation for businesses. Authenticating a user can be 100% autonomous, which will speed up the process for users and cut down the amount of needed for call center employees.

Current solutions are not widely used and can be hard to set up in-house. Also, there are doubts about security in situations where near 100% accuracy is necessary.
Current solutions:
- VoiceIT and Knurld (paid web APIs)
- Project Oxford (Microsoft)
- Custom software baked into call centers / banks / businesses (too expensive)

Outcome Of Project:

Upon completion, this project will feature a web server that incorporates voice recognition technology into Invoca's existing telephony processing system. Call center clients will be able to make requests to our server to create voiceprints, and compare a real-time sample of a voiceprint to confirm authorization of a given person. We plan to tie our solution into Invoca's architecture so that any client of Invoca can utilize voice authentication without any additional effort.

Furthermore, we plan to implement a modular solution so that, after capstone, Invoca could plug-in a variety of voice authentication softwares with relative ease. The project will also feature a web application interface that allow administration and visual feedback of the voice authentication program.

Specification:

We will begin to have the first draft of the PRD by Monday October 17. This will consist of a system architecture overview, a list of the functional and nonfunctional requirements, and use cases/expected behavior for the core functionality of our project.

As we gain traction with our minimum viable product, we will revisit the system operation contracts throughout the course. The version of the PRD, PRDv1, is due at the end of the first sprint, on Friday, October 28.

Design:

While completing the initial specification, we will have begun system design. We plan to complete the first iteration of the system design with the second sprint, by Friday November 11. This will include more complete diagrams for the System Architecture, as well as the User interaction and Design. Class Diagrams and System Models will be provided, using UML to illustrate the system's proposed architecture.

Prototyping:
- PRDv1, due Friday, Oct 28th, includes prototype code, tests, and metrics for 5+ user stories, with further github issues and comments.
- The second sprint ends on Friday, Nov. 11th, and we plan to deliver our first working prototype.
- PRDv2, due Monday, Nov 28th, includes further prototype code, tests, metrics, for 10+ user stories, with corresponding github commits and comments.
- The 4th Sprint ends on Friday, December 9th. The MVP of the project is due by the end of this quarter!

PROJECT MVP:
- Users can add their own voice fingerprint over the phone
- Once a fingerprint has been set up, a user can authenticate using their voice during the call
- Use phone number to narrow down matches by region
- Project is built within Invoca's FreeSWITCH/Ruby on Rails infrastructure

Additional features, after the MVP:
- Agents can fingerprint callers after the call
- If user's voice biometric is not within a certain confidence interval, they will be redirected to further manual authentication.
- Callers can authenticate selves solely based on natural dialogue, not specific phrases.
- Large scale = Expand our architecture to works with thousands of fingerprints.
- Agent Web/Api interface for
  - Indicating if callers are authenticated
  - Requesting call authentication
  - Managing user fingerprints

Platforms and Technology Stack:
- AWS
- Docker
- Ruby on Rails
- Continuous Integration
- FreeSWITCH

Process Overview:
Our workflow process is an agile approach with daily Scrum meetings. Through the use of a Kanban board (we opted to use waffle.io), we have a pipeline already created that facilitates the entire design process and allows for categorical oversight. New issues will follow the pipeline below:

In addition to the Kanban board, our private GitHub repo will be implementing either circleCI or Codeship to facilitate test driven development.